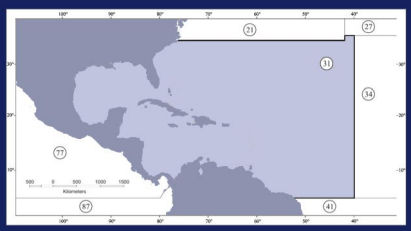
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THE LIVING MARINE RESOURCES OF THE

WESTERN CENTRAL ATLANTIC

Volume 2 Bony fishes part 1 (Acipenseridae to Grammatidae)



AMERICAN SOCIETY OF ICHTHYOLOGISTS AND HERPETOLOGISTS

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS

EUROPEAN COMMISSION

FAO SPECIES IDENTIFICATION GUIDE FOR FISHERY PURPOSES
and
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SPECIAL PUBLICATION No. 5

THE LIVING MARINE RESOURCES OF THE WESTERN CENTRAL ATLANTIC

VOLUME 2
Bony fishes part 1 (Acipenseridae to Grammatidae)

edited by

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with the support of the
American Society of Ichthyologists and Herpetologists
and the
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SUMMARY

This 3 volume field guide covers the species of interest to fisheries of the major marine resource groups exploited in the Western Central Atlantic. The area of coverage includes FAO Fishing Area 31. The marine resource groups included are the bivalves, gastropods, cephalopods, stomatopods, shrimps, lobsters, crabs, hagfishes, sharks, batoid fishes, chimaeras, bony fishes, sea turtles, and marine mammals. The introductory chapter outlines the environmental, ecological, and biogeographical factors influencing the marine biota, and the basic components of the fisheries in the Western Central Atlantic. Within the field guide, the sections on the resource groups are arranged phylogenetically according to higher taxonomic levels such as class, order, and family. Each resource group is introduced by general remarks on the group, an illustrated section on technical terms and measurements, and a key or guide to orders or families. Each family generally has an account summarizing family diagnostic characters, biological and fisheries information, notes on similar families occurring in the area, a key to species, a checklist of species and a short list of relevant literature. Families that are less important to fisheries include an abbreviated family account and no detailed species information. Species in the important families are treated in detail (arranged alphabetically by genus and species) and include the species name, frequent synonyms and names of similar species, an illustration, FAO common name(s), diagnostic characters, biology and fisheries information, notes on geographical distribution, and a distribution map. For less important species, abbreviated accounts are used. Generally, this includes the species name, FAO common name(s), an illustration, a distribution map, and notes on biology, fisheries, and distribution. The final volume concludes with an index of scientific and common names.

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BONY FISHES

GENERAL REMARKS

by K.E. Carpenter, Old Dominion University, Virginia, USA

Bony fishes constitute the bulk, by far, of both the diversity and total landings of marine organisms encountered in fisheries of the Western Central Atlantic. They are found in all macrofaunal marine and estuarine habitats and exhibit a lavish array of adaptations to these environments. This extreme diversity of form and taxa presents an exceptional challenge for identification. There are 30 orders and 269 families of bony fishes presented in this guide, representing all families known from the area. Each order and family presents a unique suite of taxonomic problems and relevant characters. The purpose of this preliminary section on technical terms and guide to orders and families is to serve as an introduction and initial identification guide to this taxonomic diversity. It should also serve as a general reference for those features most commonly used in identification of bony fishes throughout the remaining volumes. However, I cannot begin to introduce the many facets of fish biology relevant to understanding the diversity of fishes in a few pages. For this, the reader is directed to one of the several general texts on fish biology such as the ones by Bond (1996), Moyle and Cech (1996), and Helfman et al. (1997) listed below. A general introduction to the fisheries of bony fishes in this region is given in the introduction to these volumes. Taxonomic details relevant to a specific family are explained under each of the appropriate family sections.

The classification of bony fishes continues to transform as our knowledge of their evolutionary relationships improves. Many changes have been proposed in fish classification since the initiation of this project in 1993. At the time, Eschmeyer's (1990) classification was the most widely accepted in its general form and it served as a basis for planning the taxonomic assignments for these volumes. Since then, Nelson's (1995) third edition of "Fishes of the World" appeared with some changes to Eschmeyer's classification and some reassignments in these volumes were made to adjust for improvements. In addition, some authors made a special case for a deviation from our acceptance of Nelson's classification and these were mostly incorporated. The classification in Eschmeyer's (1998) more recent monumental "Catalog of Fishes" largely follows Nelson (1995) and further supports the basis for the classification used here. There have been a number of notable advances in our knowledge of the phylogenetic relationships of bony fishes in recent years. Many of these are found in Johnson and Anderson (1993) and Stiassney et al. (1996). However, much of the comparative morphology with implications to changes in classifications in these volumes needs to be further corroborated before these changes will become commonly used. An alternative classification with modifications to Nelson's (1994) classification, particularly with respect to suborders of perciform fishes, can be found in Paxton and Eschmeyer (1994).

The common English names of orders and families varies widely from place to place. To help standardize common family names, we asked the authors to choose the single most representative name. In cases where there was ambiguity, we tended to choose the one listed in Nelson (1994). This recommended common family name is given in the guide to orders and families section. In separate family accounts, the preferred name is given first and followed by secondary frequent common names listed in parentheses.

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TECHNICAL TERMS AND MEASUREMENTS

by K. E. Carpenter

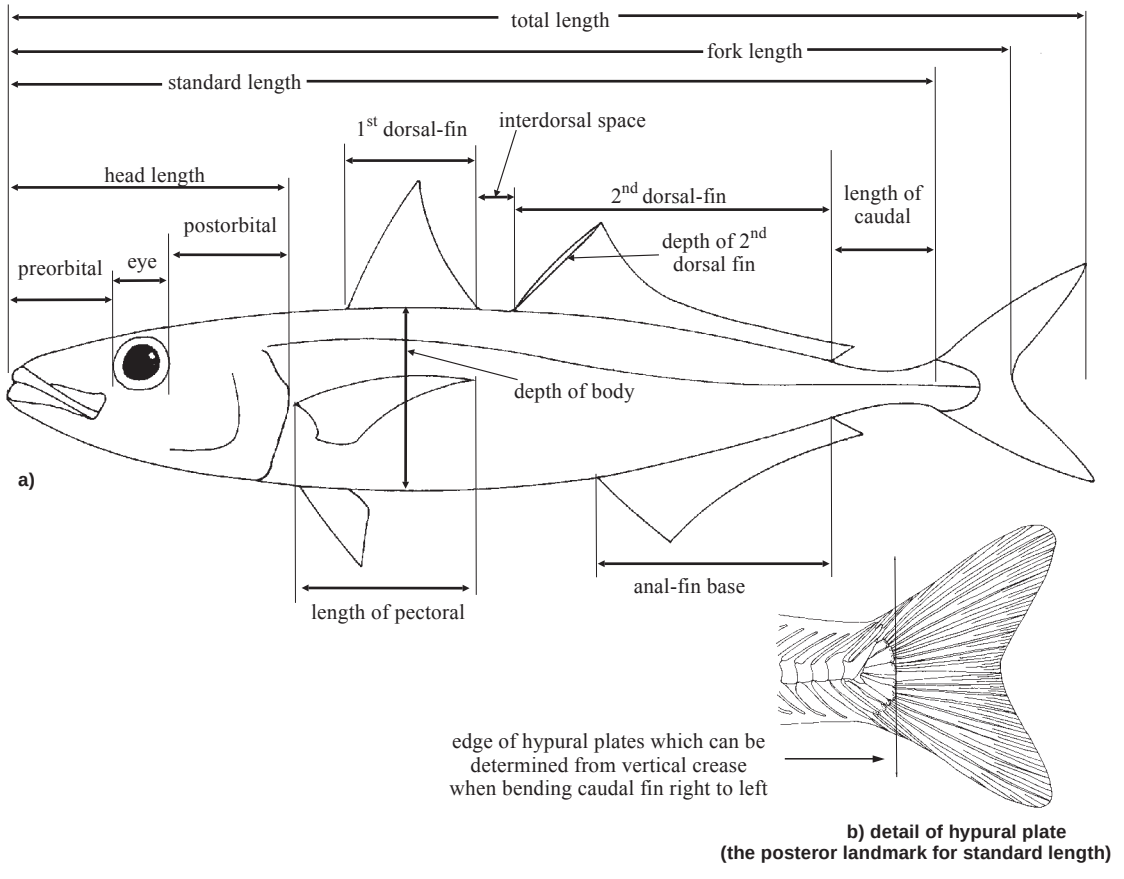


Fig. 1 common external measurements
NOTE: although all measurements are shown vertical and horizontal, all distances are measured as the straight line, shortest distance between the 2 points

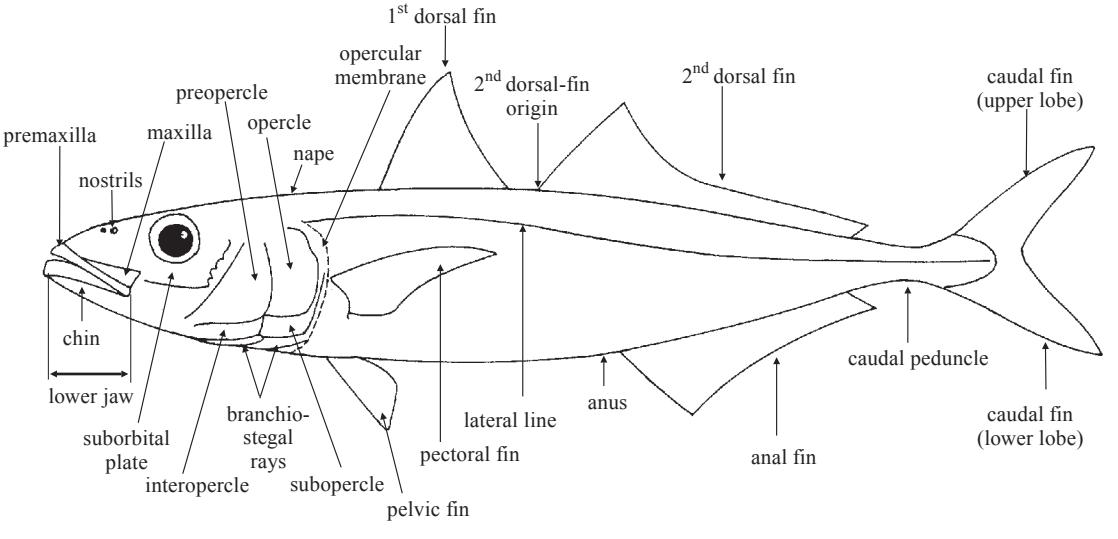


Fig. 2 common external features

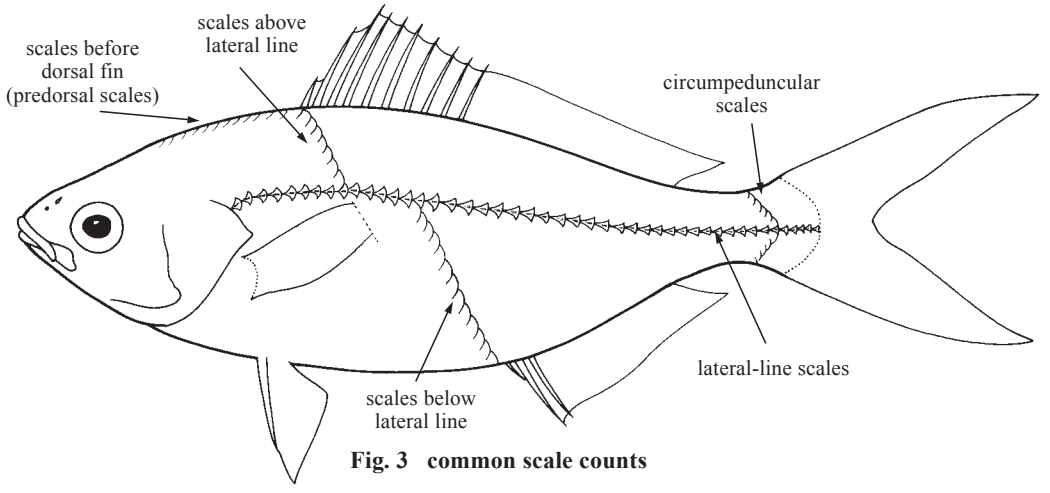


Fig. 3 common scale counts

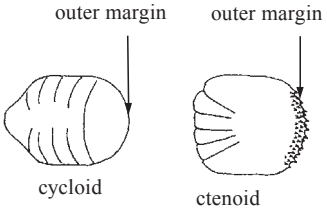
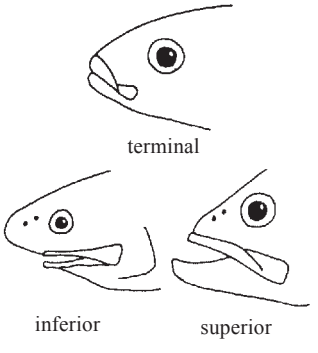


Fig. 4 schematic examples of typical scales



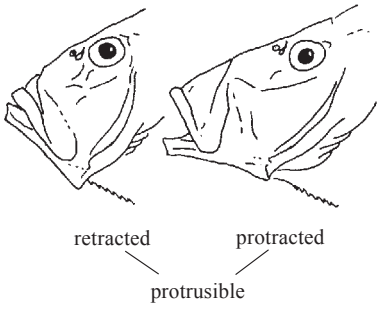


Fig. 5 mouth position and protrusibility

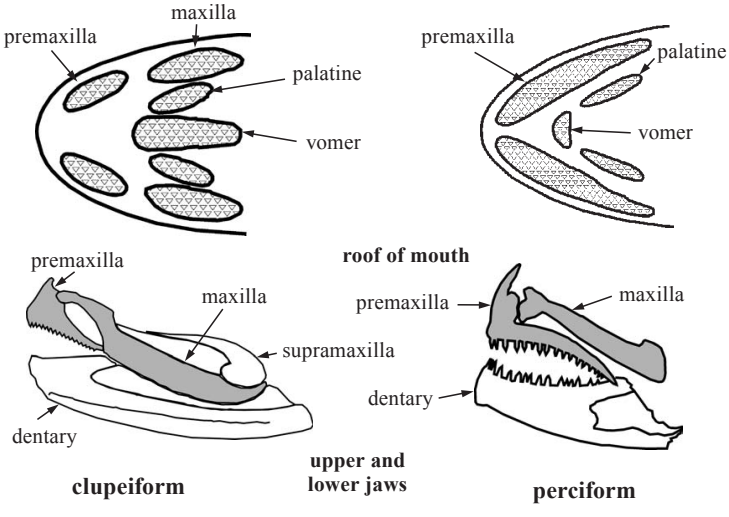


Fig. 6 teeth bearing bones in the roof of the mouth and alternative positions of premaxilla and maxilla in ancestral (clupeiform) versus derived (perciform) fishes

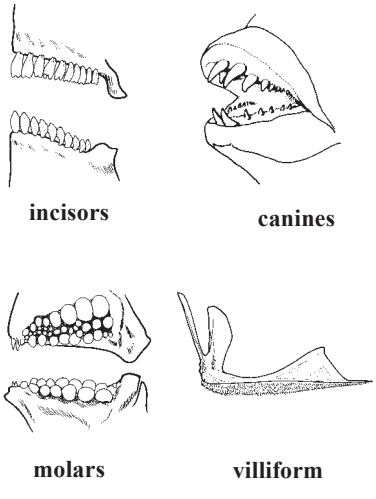


Fig. 7 common teeth types

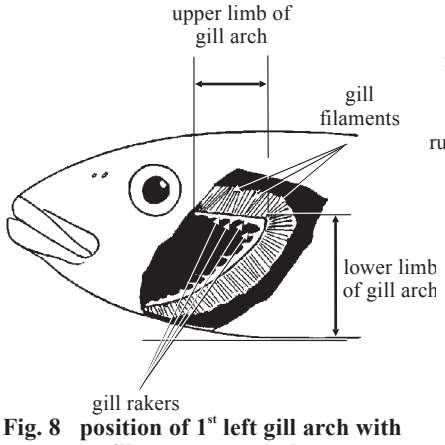


Fig. 8 position of 1st left gill arch with gill cover removed

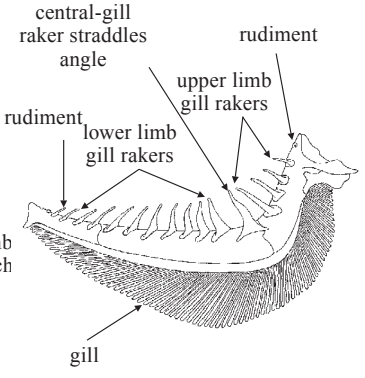


Fig. 9 structures of 1st left

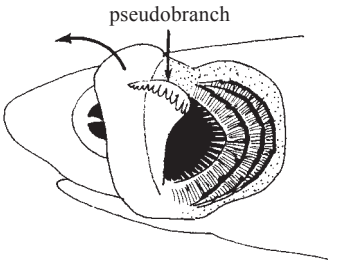


Fig. 10 position of pseudobranch with left gill cover folded forward

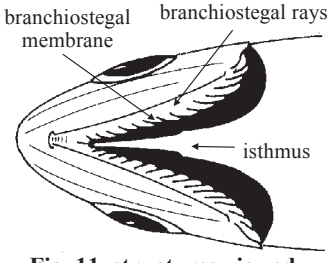


Fig. 11 structures viewed on underside of head

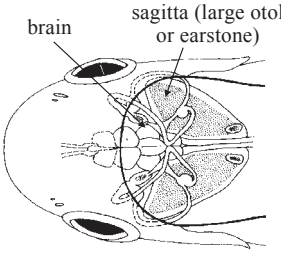


Fig. 12 position of sagittal otolith inside head (dorsal view)

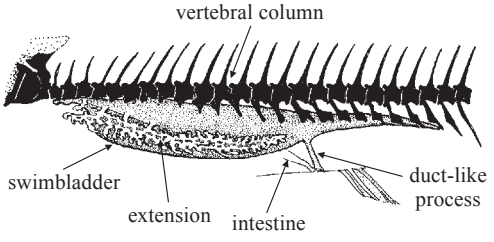


Fig. 13 position of swimbladder inside body cavity

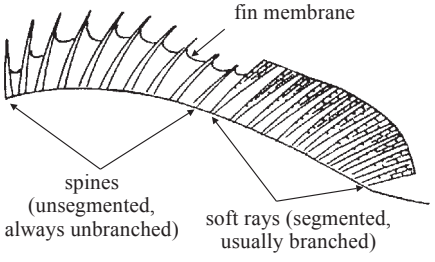


Fig. 14 example of a continuous dorsal fin of a spiny-rayed fish

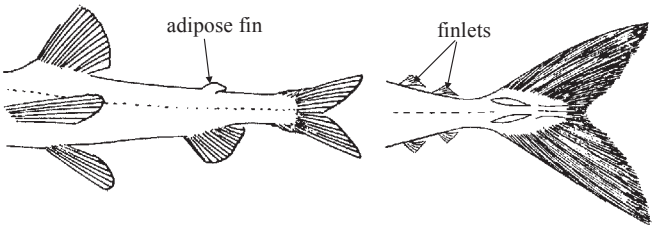


Fig. 15 accessory dorsal and anal fins: adipose fin and finlets

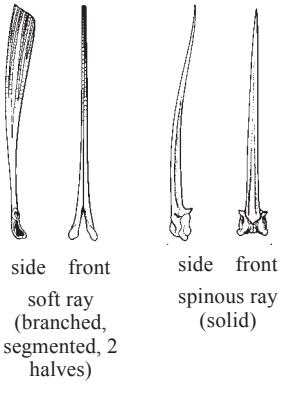


Fig. 16 construction of fin

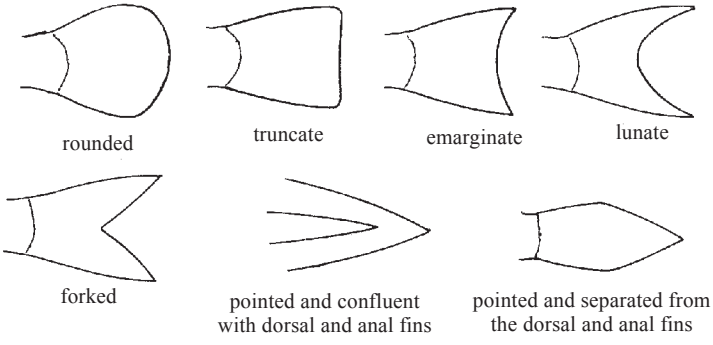


Fig. 17 most common types of caudal fins

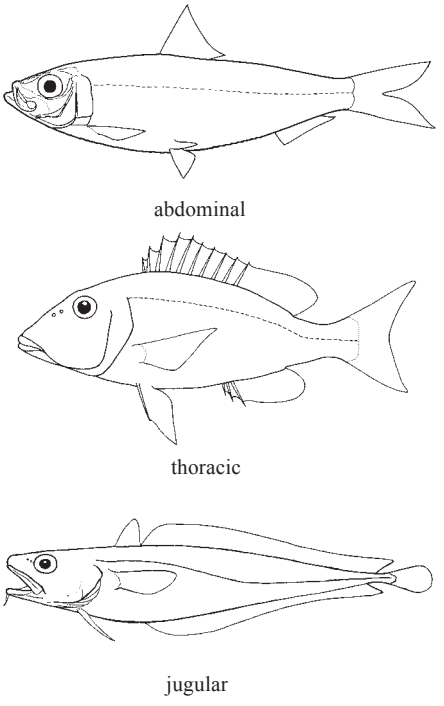


Fig. 18 positions of pelvic fins

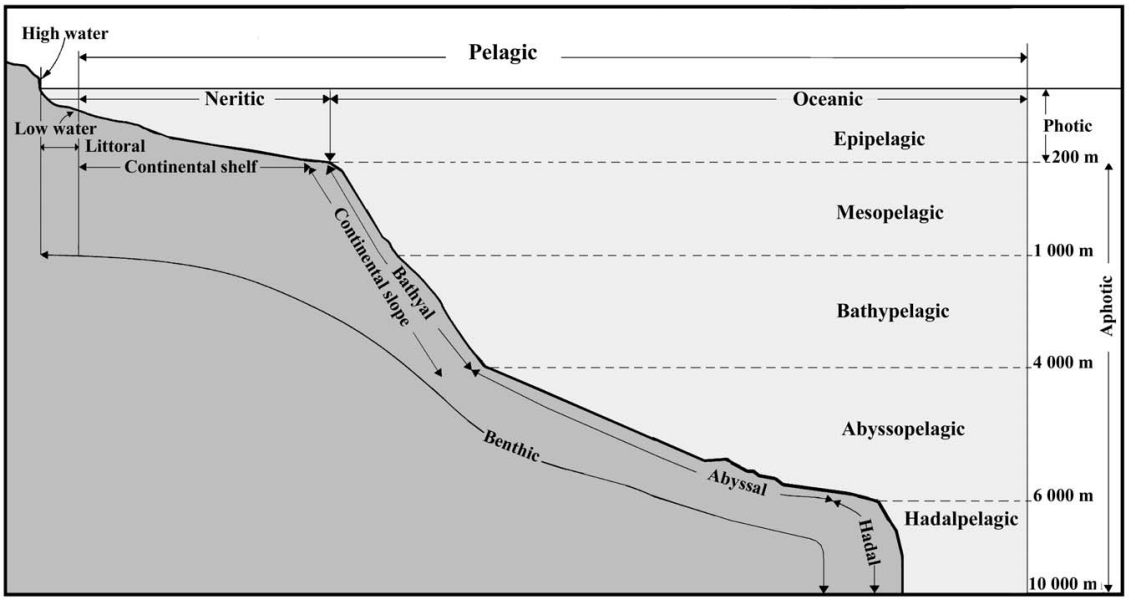


Fig. 19 marine habitat divisions

GLOSSARY OF TECHNICAL TERMS USED FOR BONY FISHES

by K.E. Carpenter, Old Dominion University, Virginia, USA

This glossary refers to figures 1-18 in the previous pages.

Abdomen - the belly; ventral area between breast and anus.

Abyssal - region of the ocean floor between the depths of 4 000 and 6 000 m (Fig. 19).

Abyssopelagic - pelagic zone between the depths of 4 000 and 6 000 m (Fig. 19).

Acute - pointed or sharp.

Adipose eyelid - transparent fleshy tissue covering part or all of the eye in some fishes.

Adipose fin - small, fleshy fin without rays or spines on the dorsal midline between the dorsal and caudal fins of some fishes (Fig. 15).

Air bladder - see swimbladder.

Anadromous - living mostly in seawater and migrating to freshwater to spawn.

Anal fin - unpaired median fin supported by rays on the tail behind the anus (Fig. 2).

Anterior - pertaining to the front portion often combined with other directional terms such as lateral in a shortened form (anterolateral, referring to front part of sides).

Antrorse - turned forward.

Anus - posterior opening of the intestine through which wastes are excreted; vent (Fig. 1).

Appressed - pressed down or lying flat.

Attenuate - elongate; extended or drawn out.

Axil - angular area between pectoral fin and body, equivalent to arm-pit.

Axillary scale - an elongate or modified scale at the insertion of the pelvic or pectoral fins in some fishes.

Band - usually refers to an oblique or irregular marking.

Bar - elongate nearly straight vertical marking.

Barbel - elongate fleshy tentacle-like sensory projection, usually about the mouth or head.

Base of fin - part of the fin that attaches to the body (Fig. 1).

Bathyl zone - region of the ocean floor from the edge of the continental shelf (at around 200 m) down to a depth of about 4 000 m (Fig. 19).

Bathypelagic - pelagic zone between the depths of about 1 000 and 4 000 m (Fig. 19).

Benthic - referring to the ocean bottom; benthic species are closely associated with and often attached to the ocean bottom (Fig. 19).

Benthopelagic - inhabiting waters above but near the bottom or, spending part of the time on the bottom and part of the time further up in the pelagic zone.

Bifed, bifurcate - separated or divided into 2 branches (forked).

Branchiostegal membranes - membranes on the ventral interior surface of the gill cover supported by branchiostegal rays.

Branchiostegal rays - bony rays supporting the membranes inside the lower part of the gill cover (Fig. 11).

Breast - ventral surface of body between the isthmus and pectoral or pelvic fins.

Canine - slender conical tooth, often enlarged and elongate (Fig. 7).

Carapace - a hardened encasing covering all or part of the body.

Cardiform - small, short conical outgrowths in a close-set patch or band; usually refers to a band of close-set small conical teeth.

Catadromous - living in freshwater and migrating to the sea to spawn.

Caudal fin - tail fin (Fig 1).

Caudal peduncle - posterior part of body between the rear parts of the dorsal and anal fins, and the caudal fin (Fig. 1).

Cephalic - pertaining to the head.

Cheek - side of head below and slightly behind the eye.

Cirrus - small, fleshy protuberance.

Cleithral - pertaining the cleithrum or area of the cleithrum which is typically the largest bone of a series of bones that support the pectoral fin (pectoral-girdle bones).

Compressed - flattened laterally; a body shape much deeper than wide.

Continental rise - gentle slope at the base of the continental slope.

Continental shelf - flattened edge of the continental land mass between the coast and the continental slope (generally, the continental subtidal zone down to a depth of about 200 m).

Continental slope - sloping edge of the continental land mass, generally beginning at a depth of around 200 m.

Crenate - having a notched edge.

Crenulate - scalloped or wavy edge.

Ctenoid scale - scale with a spiny posterior margin (Fig. 4).

Cycloid scale - scales with smooth posterior margin, without spines on posterior margin (Fig. 4).

Deciduous - easily shed or rubbed off; refers to scales.

Demersal - free living close to the sea bottom.

Dentary - the main tooth bearing bone of the lower jaw (Fig. 6).

Denticle - small tooth-like structures.

Depressed - flattened from top to bottom; body shape much wider then deep.

Dimorphism - having 2 different morphological forms.

Distal - near outer edge; far end from point of attachment or centre of body.

Dorsal - back or upper body.

Dorsal fin - median fin supported by spines and/or rays; in spiny-rayed fishes the dorsal fin is separable into spiny-rayed and soft fins and can be continuous (Fig. 14a), incised (Fig. 14b), separate (sometimes soft-rayed portion has 1 or more spines anteriorly) (Fig. 14c), or with separate spines (Fig. 14d).

Ectopterygoid - one of the series of bones that suspends the jaw.

Edentulous - without teeth.

Emarginate - margin slightly concave; pertains to a caudal fin shape (Fig. 17).

Entire - smooth or straight margin.

Epaxial - referring to the main body muscles (myomeres) of the upper sides.

Estuary - partly enclosed body of sea water that is measurably diluted with fresh water.

Falcate - sickle-shaped (Fig. 14c).

Finlets - small separate dorsal and anal fins (Fig. 15).

Forked - branched; caudal fin shape with distinct upper and lower lobes and the posterior margin of each lobe relatively straight or gently curved (Fig. 17).

Frontal - a major paired bone of the skull that articulates medially and generally found dorsal to the orbit.

Furcate - forked.

Fusiform - spindle-shaped, tapering toward each end.

Gas bladder - see swimbladder.

Gill - organ for exchange of dissolved gasses between water and the blood stream; gill tissues are supported by a gill arch in fishes (Figs. 8,9).

Gill arch - bony angular skeleton that supports the gill filaments and gill rakers (Figs. 8,9).

Gill filaments - principal site of gas exchange in the gill (Fig. 9).

Gill membrane - membranes along the posterior and ventral margin of the gill cover.

Gill rakers - bony projections along the front edge of the gill arch that help prevent food from escaping through the gill opening (Figs. 8,9); gill-raker counts are typically taken on the outermost (first) gill arch and are often separated into upper limb and lower limb counts; if a raker straddles the angle of the arch, the count is included in the lower limb; rudiments are included in counts unless otherwise noted.

Gular plate - bony plate covering the underside of the head as exemplified in elopiform fishes.

Hadal zone - region of the ocean floor between the depths of 6 000 and 10 300 m (Fig. 19).

Herbivore - feeding on plants.

Heterocercal - asymetrical caudal fin with the upper lobe larger than the lower lobe.

Hyoid - referring to the series of bones behind the gill cover that suspends the branchiostegal rays and connects to the gill arches.

Hypural plates - series of bones that support the caudal-fin rays (Fig. 1b).

Incised - notched, cut into; see Dorsal fin.
Infraorbital - another term for suborbitals (see Lacrimal).

Illicium - modified isolated first ray of the dorsal fin that forms the 'fishing gear' (rod-and-lure) in anglerfishes.

Incisor - flattened chisel-shaped tooth (Fig. 7).

Inferior - mouth position on underside of head with snout projecting in front of mouth (Fig. 5).

Insertion - anterior or posterior point of attachment of a fin to the body.

Integument - referring to the skin.

Interdorsal - space on the back between the bases of the first and second dorsal fins (Fig. 1).

Interopercle - lower anterior bone of the gill cover (Fig. 2).

Interorbital - space on top of the head between the eyes.

Intertidal - area of the shore covered at high tide and exposed at low tide.

Isthmus - part of the underside of the head separating the gill openings (Fig. 11).

Jugular - pertaining to the throat region; pelvic fins are jugular when positioned on the underside of the head in front of the pectoral fins (Fig. 18).

Lanceolate - spear- or lance-shaped.

Lacrimal (lachrymal) - the most anterior of the series of 6 or fewer bones around the lower margin of the eye that are refered to as suborbital bones; the lacrimal is sometimes also referred to as the preorbital.

Lateral - the side or toward the side.

Lateral line - a vibration sensory canal along the side of the body with a series of pores that communicate to the outside of the body, often through specialized pored lateral-line scales (Figs 2, 3).

Littoral - intertidal area of the shore.

Lunate - crescent-shaped; caudal-fin shape that is deeply emarginate with narrow lobes (Fig. 17).

Mandible - lower jaw.

Maxilla - bone in the upper jaw behind/above the premaxilla. In ancestral fishes the maxilla is the principal bone of the upper jaw that bears teeth; in derived fishes it generally does not bear teeth and serves more to support the premaxilla (Fig. 6).

Median - middle or toward the midline.

Median fins - fins that lie on the midline; the dorsal, anal, and caudal fins.

Melanophore - cell carrying black or greyish pigments.

Membrane - a thin sheet of tissue; often refers to thin sheet of tissue between fin (Fig. 14) and branchiostegal (Fig. 11) rays.

Mesopelagic - pelagic zone between the depths of about 200 and 1 000 m (Fig. 19).

Molar - a low, blunt, rounded tooth for crushing and grinding (Fig. 7).

Nape - dorsal part of the body just behind the occiput or hard dorsal region of the skull (Fig. 2).

Neritic - nearshore; the zone of water above the continental shelves.

Nuchal - pertaining to the neck; the nape of the neck.

Occiput - upper back part of the head or skull.

Ocellus - a round eye-like spot or marking with a marginal ring.

Opercle - large posterior upper bone of the gill cover (Fig. 2).

Operculum - gill cover composed of the preopercle, opercle, interopercle, and subopercle.

Orbital - referring to the eye, particularly the bones surrounding the eye.

Origin - anterior point of attachment of fins to the body (anterior insertion) (Fig. 2).

Otolith - a small calcareous structure (or ear stone) in the inner ear of fishes (Fig. 12).

Oviparous - egg laying, development of the embryo occurs externally and nourishment comes from the egg.

Ovoviviparous - eggs are retained in the female and the embryo develops partially or wholly internally but nourishment is still derived from the egg.

Paired fin - fins found on both sides of the body; the pectoral and pelvic fins (Fig. 2).

Palate - roof of the mouth.

Palatine - paired bones on each side of the palate, behind and lateral to the vomer, often bearing teeth (Fig. 6).

Papilla - a small fleshy projection.

Parietal - a bone of the upper posterior part of the skull.

Pectoral fin - paired fins on the sides behind the gill cover (Fig. 2).

Peduncle - a stalk-like process (see Caudal peduncle).

Pelagic - the division of the marine environment composed of all the ocean's water; living in the open seas or oceans (Fig. 19).

Pelvic fins - paired fins in front of the anus (Fig. 2), sometimes called the ventral fins; lower or primitive fishes generally have the pelvic fins in the abdominal position while derived (advanced) fishes generally have the pelvic fins in the thoracic or jugular position (Fig. 18).

Peritoneum - a thin membrane that lines the body cavity, covers the heart, and forms the mesenteries.

Pharyngeal teeth - teeth on the elements of the last gill arch or pharyngeal arch.

Photophore - light-emitting organ or luminous spot.

Physoclistous - the advanced condition wherein the pneumatic duct is closed in the adult (see Physostomous).

Physostomous - the primative condition wherein a connection via the pneumatic duct between the swimbladder and the gut is retained in adults potentially allowing gas to enter the swimbladder through gulping air.

Posterior - pertaining to the rear portion.

Postmaxillary process - a broad or finger-like extension of the premaxilla along the upper edge of the lower arm of this bone.

Postorbital - 1 or more of the suborbital bones, starting with the third suborbital bone and possibly referring also to the fourth, fifth, and sixth suborbital bone (see Lacrimal).

Premaxilla - anterior bone in the upper jaw (see maxilla) (Fig. 6).

Preopercle - upper anterior bone of the gill cover (Fig. 2).

Preorbital - referring to the region before the eye; a suborbital bone in front and below the eye (see Lacrimal).

Principal caudal-fin ray - branched and unbranched caudal-fin rays that reach the rear margin of the fin.

Procurrent caudal-fin ray - small ray (sometimes spinous) at the insertions of the fin that do not reach the rear margin.

Proximal - part nearest the centre of the body.

Pseudobranchium - a small patch of gill-like filaments on the upper inner surface of the gill cover (Fig. 10).

Pyloric caeca - finger-like projections of the digestive system near the juncture of the stomach and the small intestine.

Ray - supporting element of fins (Fig. 16); ray is sometimes used as a collective term to designate both soft rays and spines; it is also sometimes used to designate exclusively, soft rays.

Rostral/rostrum - towards the front of the fish/the area of the snout.

Rounded - a caudal-fin shape with the terminal border smoothly convex (Fig. 17).

Rudiment - a poorly developed structure, usually small and minimally functional at best; these include small unbranched soft rays and small gill rakers at the ends of a gill arch.

Scapula/scapular - a flat bone on the upper part of the pectoral girdle/pertaining to the shoulder region.

Scute - a modified scale that can be enlarged, hardened, ridged, keeled, or spiny.

Serrate - with saw-like teeth along a margin.

Setae - bristles or hardened hair-like projections.

Soft dorsal fin - the portion of the dorsal fin supported by soft rays (Fig. 14).

Soft ray - a fin support element that is composed of 2 halves (paired laterally), segmented, and usually flexible and branched (Fig. 16). Rarely, soft rays can be pointed and stiff and appear to be a spine.

Spine - a fin support element that is unpaired laterally, unsegmented, unbranched and usually stiff and pointed (Fig. 16); also refers to slender, sharply pointed bony processes not associated with fins.

Sphenotic - a bone of the skull above and behind the orbit.

Spinous dorsal fin - the anterior portion of the dorsal fin that is supported by spines (Fig. 14).

Spinule - a small spine.

Standard length - distance from the anteriormost point on the fish to the posterior end of the vertebral column that is generally equivalent to the end of the hypural plates (and recognized externally by the crease between the tail and caudal fin when the caudal fin is bent laterally); sometimes abbreviated as SL (Fig. 1).

Stripe - generally refers to a horizontal nearly straight side marking.

Subopercle - lower rear bone in the gill cover (Fig. 2).

Suborbital bones - see Lacrimal.

Subtidal - ocean floor below the low tide mark.

Sulcus - a groove or fissure.

Superior - above or on the upper surface; a mouth position with the snout behind the anterior opening of the mouth (Fig. 5).

Supramaxilla - 1 or 2 bones above the maxilla; found in primitive bony fishes (Fig. 6).

Swimbladder - a gas-filled sac lying under the backbone in the abdominal cavity, used in buoyancy; also referred to as air bladder or gas bladder (Fig. 13).

Symphysis - the articulation between two bones; often refers to the anterior juncture between the two halves of either jaw.

Terminal - pertaining to at the end, or situated at the end; a mouth position with the opening of the mouth even with the tip of the snout (Fig. 5).

Vomer - an unpaired median bone on the roof of the mouth (Fig. 6).

Terete - cylindrical, typically tapering at both ends, circular in cross-section, and smooth.

Thoracic - referring to the breast region; pelvic fins are thoracic in position when directly below the pectoral fins (Fig. 18).

Truncate - terminating abruptly in a square end; a caudal-fin shape with a vertically straight terminal border (Fig. 17).

Vent - see anus.

Ventral - the bottom, lower surface, or abdominal part of the body.

Ventral fins - see pelvic fins.

Vertebrae - bones of the vertebral column or back bone; vetebral counts are often given as a formula: precaudal vertebrae + caudal vertebrae, where precaudal vertebrae typically have paired ventrolateral extensions that support ribs and caudal vertebrae have a single ventrally directed spine (haemal spine) and does not support ribs.

Vertical fins - median fins; the dorsal, caudal, and anal fins.

Vestige - small or underdeveloped structure, as in a rudiment.

Villiform - many small slender outgrowths, usually in a close-set patch or carpet; often refers to slender teeth forming velvety bands (Fig. 7).

Viviparous - development of embryo internally with nourishment from the mother.

GUIDE TO ORDERS AND FAMILIES OCCURRING IN THE AREA

by K.E. Carpenter, Old Dominion University, Virginia, USA

This guide is designed to help find the family identity of a fish in 2 steps. First, the appropriate order should be found by comparing the characters listed under each order until a match is found. Second, the characters listed to distinguish the families within the order should be compared with the fish in hand until a match is found. Volume and page numbers for the family account are listed after each family to refer to further information about the family and its species. The volume number is listed first, followed by the page number in the volume. The orders and families are listed in phylogenetic order. Key characters for the order are presented only on the first family listed in the order but are generally applicable to all families in the order. These order-specific characters are presented in capital letters and highlighted in grey. This will help distinguish the ordinal characters from the unhighlighted, uncapitalized characters useful in distinguishing among the families within the order. These family characters are presented with a general diagram representing the family and point to the area on the fish where the character can be found, if appropriate. The diagram representing the family can, in most cases, help with identification through its generalized shape. However, in some families, the general shape of particular genera and species varies widely within the family and therefore particular care should be paid to examination of the characters. In some cases, additional diagrams of morphological details are presented to help clarify the use of the character. Characters used are not only key characters but also those characters most useful in distinguishing the family from similar looking families. This guide is specifically designed to work for those orders and families found in the Western Central Atlantic area and may not work well for identification to this level outside the area.

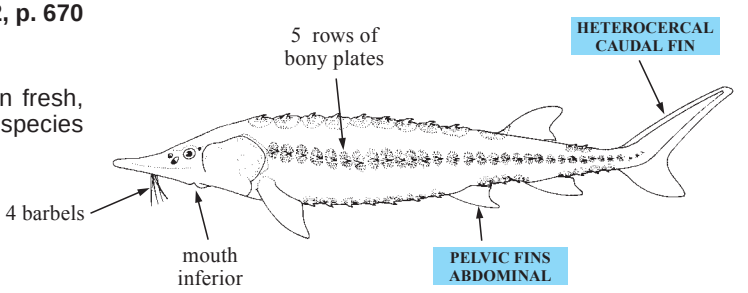
Identification hints: The orders and families are listed in phylogenetic sequence. Therefore, it is helpful to be able to distinguish a primitive or ancestral fish from an advanced or derived fish to quickly find the appropriate order. This is not always and easy task but certain characters can be examined to give a general impression. For example, more ancestral fishes generally have the position of the pelvic fin more abdominal while advanced fishes usually have them thoracic or jugular (Fig. 18 above). Primitive fishes also tend to lack true spines (Fig. 16), have the maxilla with teeth and a prominent part of the gape (Fig. 6), and have non-protrusible mouths (Fig. 5). There are some exceptions to this, however, and these characters should be used cautiously. An example are the barracudas (family Sphyraenidae) that have true spines and the premaxilla predominant in the gape but that have abdominal pelvic fins and non-protrusible jaws. Since barracudas are considered advanced fishes, the primitive characteristics are thought to have evolved secondarily from more advanced character states.

Order ACIPENSERIFORMES - Sturgeons

ACIPENSERIDAE **Vol. 2, p. 670**

Sturgeons

To 200 cm. Generally near bottom in fresh, brackish, and coastal waters. Three species in the area.

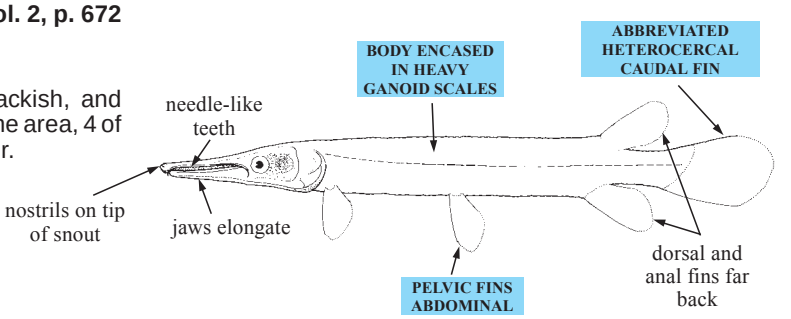


Order SEMIONOTIFORMES - Gars

LEPISOSTEIDAE **Vol. 2, p. 672**

Gars

To at least 300 cm. In fresh, brackish, and coastal waters. Seven species in the area, 4 of which commonly in brackish water.

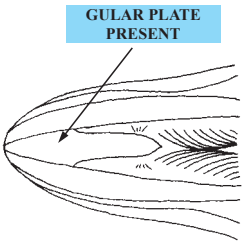


Order ELOPIFORMES - Tarpons and allies

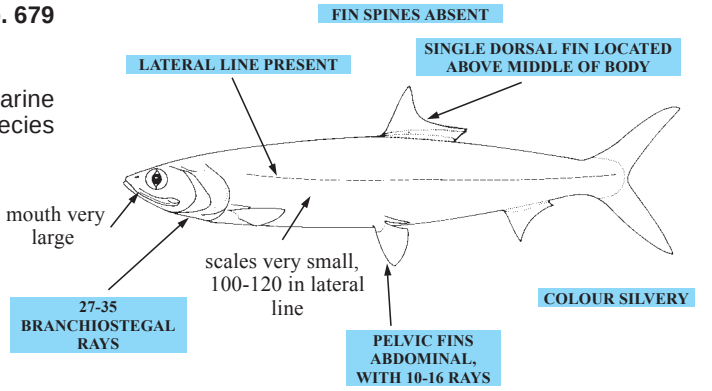
ELOPIDAE **Vol. 2, p. 679**

Ladyfishes

To 90 cm. Mostly midwater in coastal marine waters and brackish waters. A single species in the area.



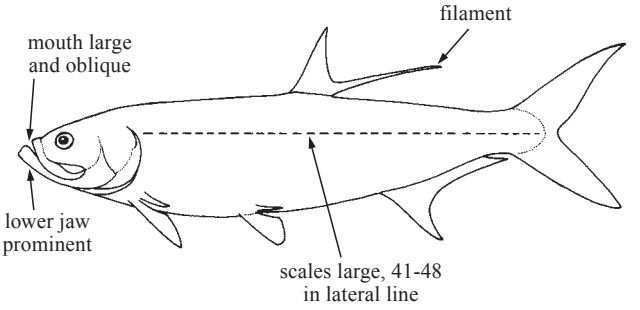
ventral view of head



MEGALOPIDAE Vol. 2, p. 681

Tarpons

To 220 cm. Mostly pelagic in coastal marine waters, but also brackish, hypersaline, and fresh waters. A single species in the area.

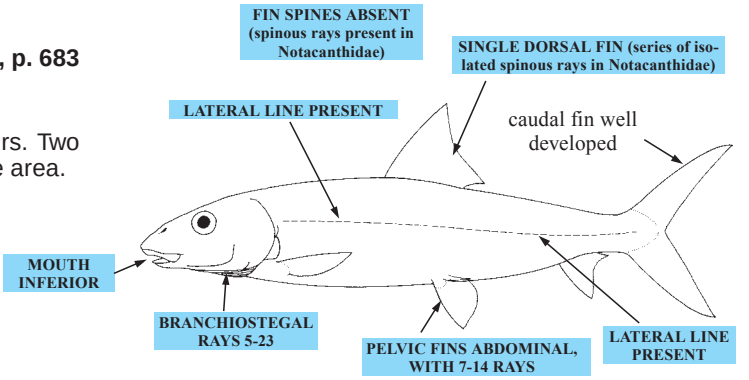


Order ALBULIFORMES - Bonefishes and allies

ALBULIDAE Vol. 2, p. 683

Bonefishes

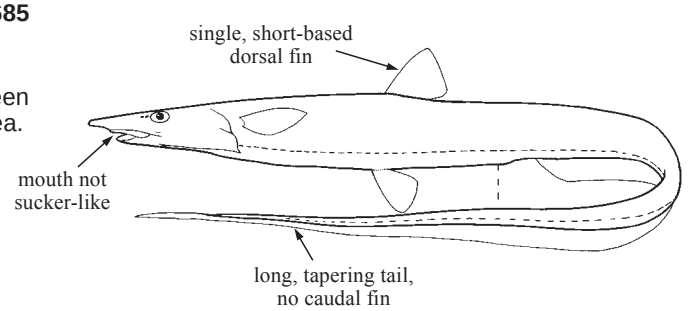
To 80 cm. Demersal in coastal waters. Two species currently recognized from the area.



HALOSAURIDAE Vol. 2, p. 685

Halosaurs

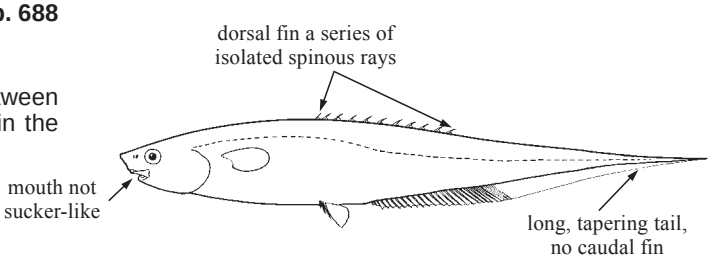
To 100 cm. Demersal from depths between 500 and 3 000 m. Eight species in the area.



NOTACANTHIDAE Vol. 2, p. 688

Spiny eels

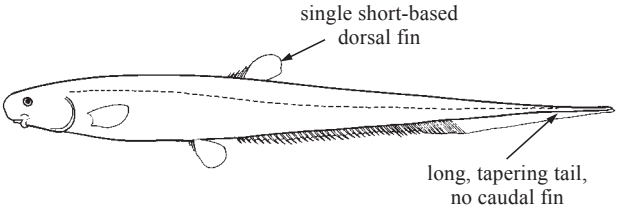
To about 50 cm. Demersal at depths between 200 and 3 500 m. Possibly 4 species in the area.

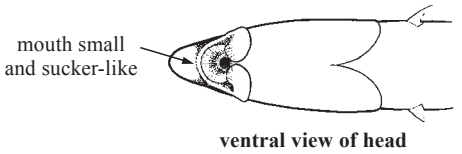


LIPOGENYIDAE **Vol. 2, p. 690**

Spiny sucker eels

To about 40 cm. Demersal at depths between 600 and 2 000 m. A single species. Sometimes included within Notacanthidae.





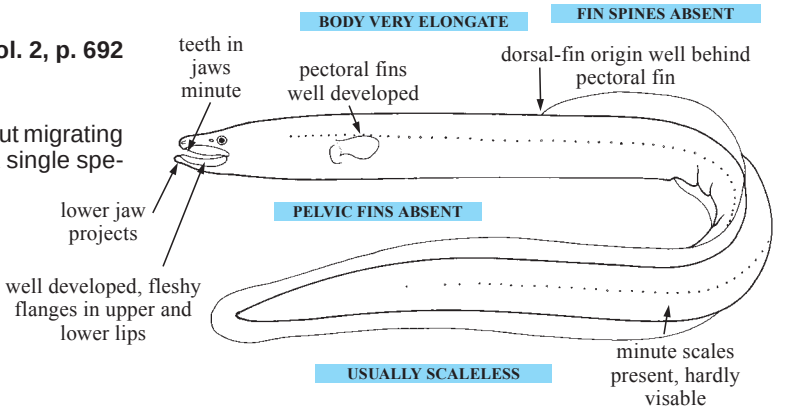
ventral view of head

Order ANGUILLIFORMES - Eels

ANGUILLIDAE **Vol. 2, p. 692**

Freshwater eels

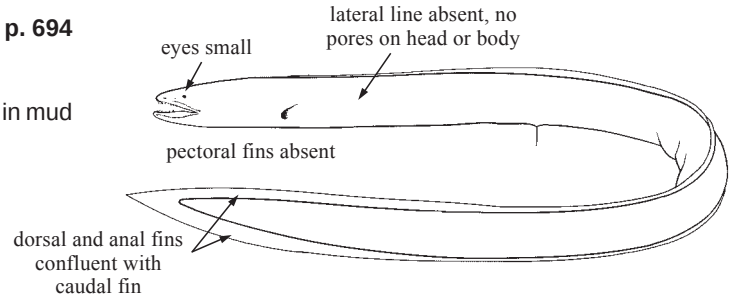
To 150 cm. Mainly in fresh water, but migrating to oceanic waters for spawning. A single species in the area.



HETERENCHELYIDAE **Vol. 2, p. 694**

Mud eels

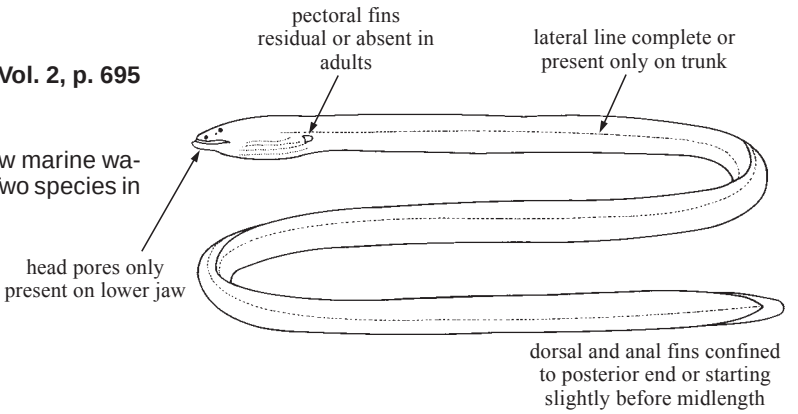
To about 100 cm. Demersal, burrowing in mud or sand. A single species in the area.



MORINGUIDAE **Vol. 2, p. 695**

Spaghetti eels

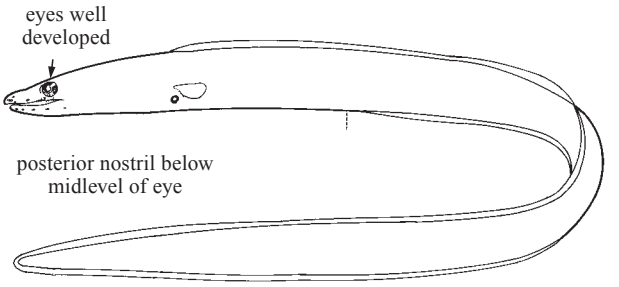
To about 60 cm. Mostly in shallow marine waters, burrowing in sand or mud. Two species in the area.



CHLOPSIDAE **Vol. 2, p. 697**

False morays

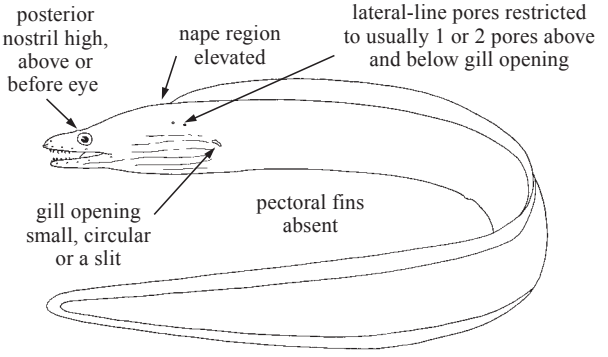
To about 30 cm. Small, cryptic eels found in coral reefs, seagrass beds, and rubble. Seven species in the area.



MURAENIDAE **Vol. 2, p. 700**

Morays

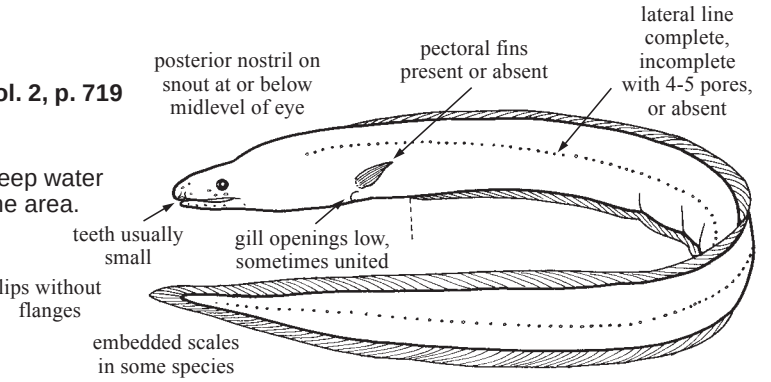
To 375 cm. Cryptic or demersal in shallow coastal areas including coral reef, rock, sand, or mud bottoms, to a depth of about 500 m. Twenty-two species in the area.



SYNAPHOBRANCHIDAE **Vol. 2, p. 719**

Cutthroat eels

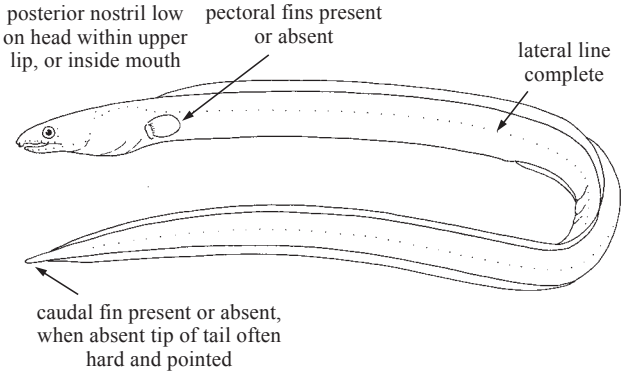
To 180 cm. Demersal, typically in deep water to 2 000 m. Around 13 species in the area.

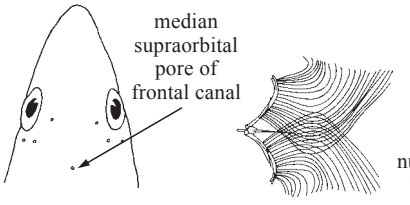


OPHICHTHIDAE **Vol. 2, p. 724**

Snake eels

To about 250 cm. From sandy intertidal to midwater depths of 800 m; mostly shallower than 200 m on sand and mud bottoms, estuaruies, and coral reefs. At least 49 species in the area.



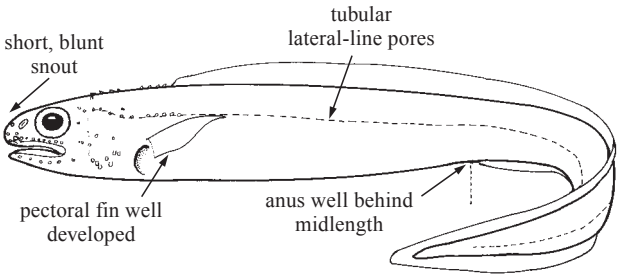


dorsal view of head

COLOCONGRIDAE **Vol. 2, p. 734**

Short-tailed eels

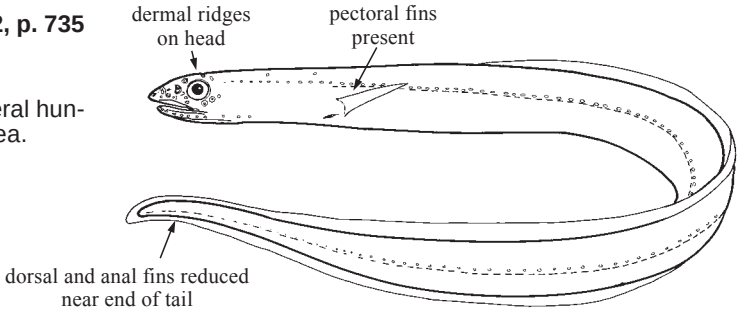
To 60 cm. Mostly on muddy bottoms on the mid to upper continental slope at around 300 to 1 000 m. A single species in the area.



DERICHTHYIDAE **Vol. 2, p. 735**

Longneck eels

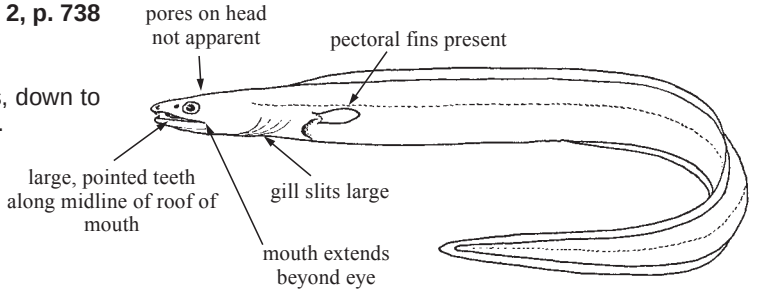
To 60 cm. Midwater at depths of several hundred metres. Three species in the area.



MURAENESOCIDAE **Vol. 2, p. 738**

Pike congers

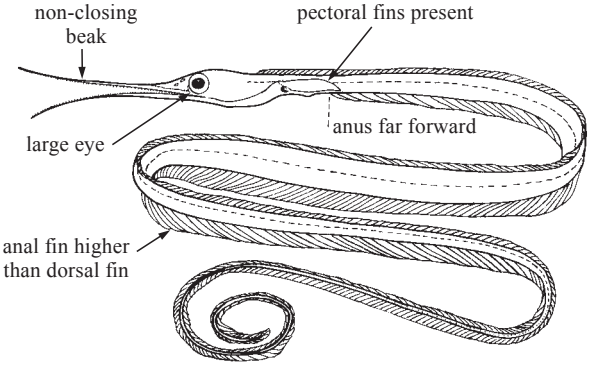
To 50 cm. Demersal in soft bottoms, down to 100 m. A single species in the area.



NEMICHTHYIDAE **Vol. 2, p. 740**

Snipe eels

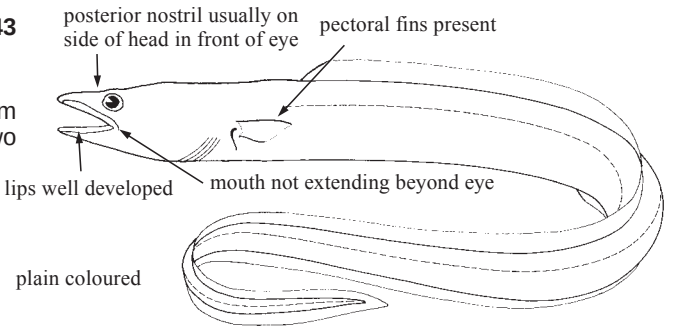
To 1 m or more. Midwater between around 300 and 2 000 m. Four species in the area.



CONGRIDAE **Vol. 2, p. 743**

Conger eels

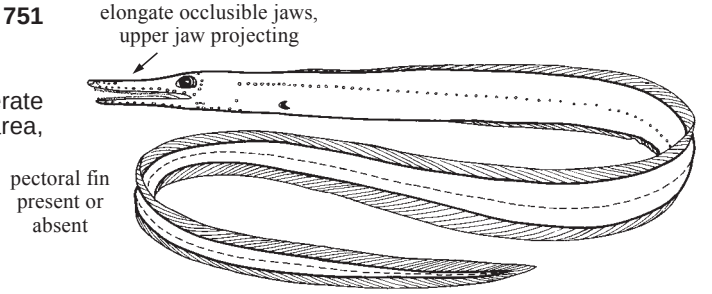
To 300 cm. Demersal on sand or mud bottom from coastline to 2 000 m or more. Thirty-two species in the area.



NETTASTOMATIDAE **Vol. 2, p. 751**

Duckbill eels

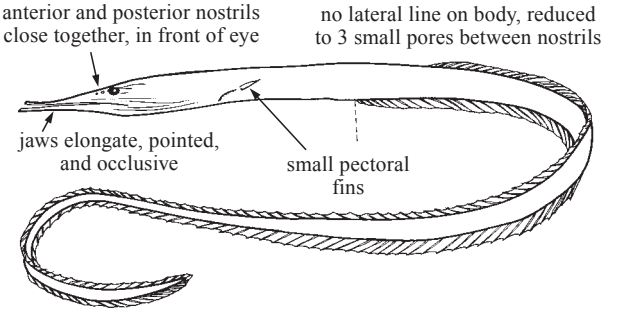
To about 1 m. On or near bottom in moderate to deep water. At least 13 species in the area, probably more.



SERRIVOMERIDAE **Vol. 2, p. 755**

Sawtooth eels

To 75 cm. Midwater at depths between 500 and 1 000 m. Three species in the area.

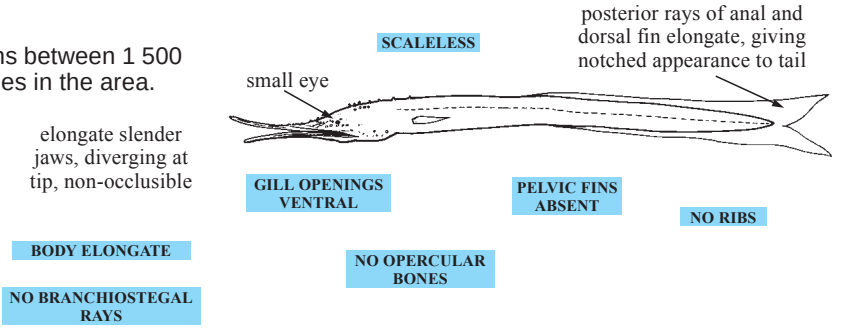


Order SACCOPHARYNGIFORMES - Gulpers and allies

CYEMATIDAE **Vol. 2, p. 757**

Bobtail eels

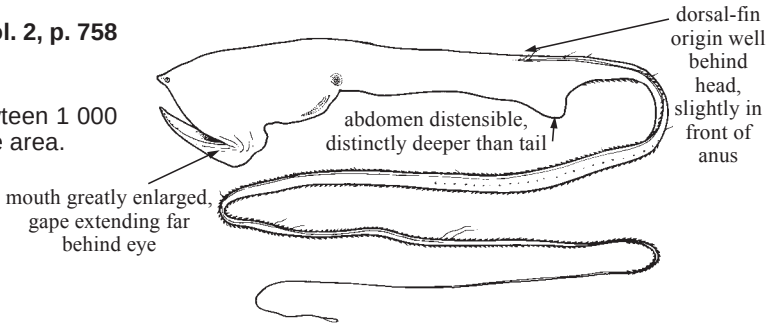
To 14 cm. Midwater at depths between 1 500 and 3 000 m. A single species in the area.



SACCOPHARYNGIDAE Vol. 2, p. 758

Swallower eels

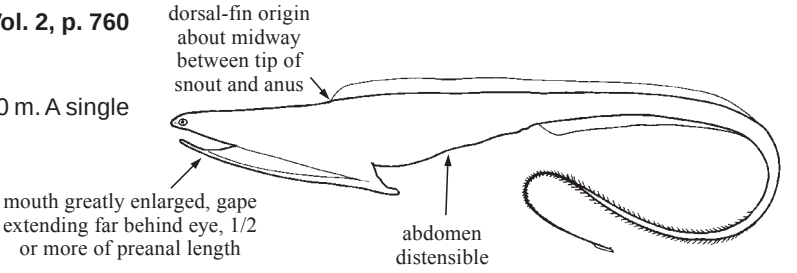
To 170 cm. Pelagic at depths bewteen 1 000 and 3 000 m. Three species in the area.



EURYPHARYNGIDAE Vol. 2, p. 760

Gulper eels

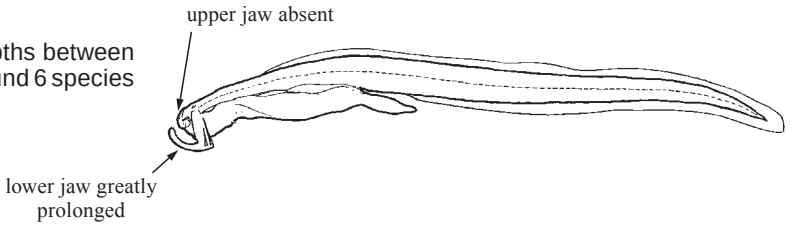
To 75 cm. Midwater, down to 3 000 m. A single species in the family.



MONOGNATHIDAE Vol. 2, p. 762

Monognathids

To 16 cm. Pelagic, mostly at depths between 2 000 and 5 400 m. Probably around 6 species in the area.

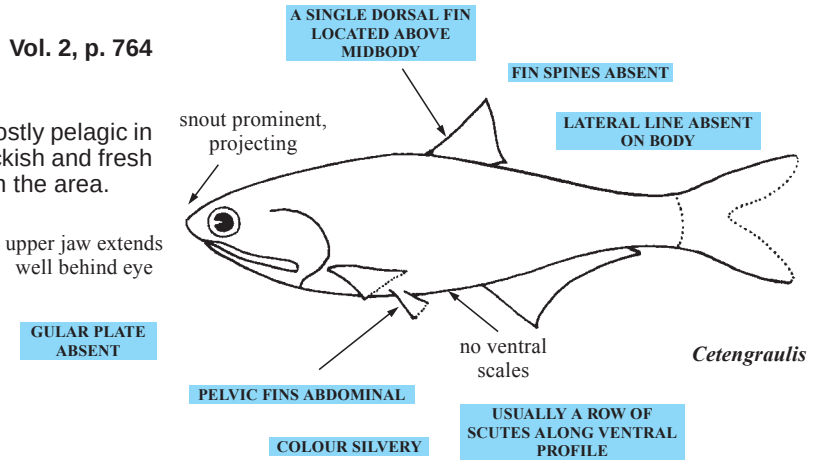


Order CLUPEIFORMES - Herrings and allies

ENGRAULIDAE Vol. 2, p. 764

Anchovies

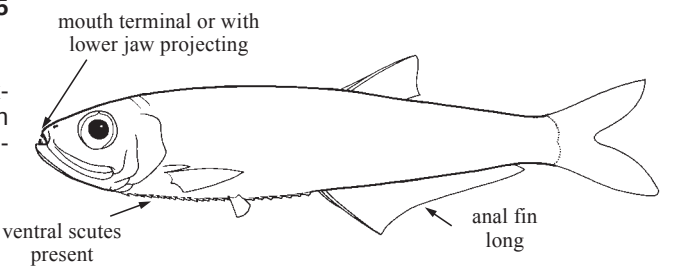
To 30 cm, generally smaller. Mostly pelagic in coastal waters, but also in brackish and fresh waters. Twenty-eight species in the area.



PRISTIGASTERIDAE **Vol. 2, p. 795**

Pellonas

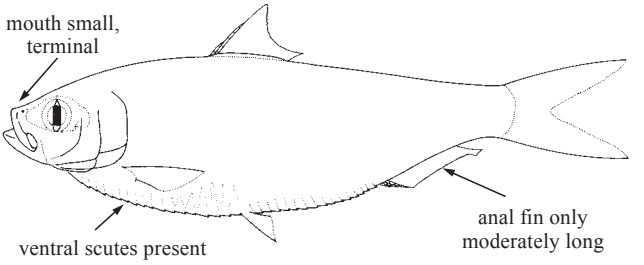
To 18 cm. Usually demersal in coastal, brackish, and fresh waters. Five marine species in the area with an additional 3 fresh water species.



CLUPEIDAE **Vol. 2, p. 804**

Herrings (shads, menhadens)

To 60 cm, generally smaller. Mostly pelagic in coastal waters, but some species also in brackish and fresh waters. Twenty-seven species in the area.

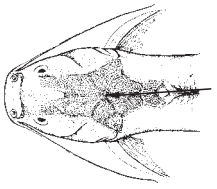


Order SILURIFORMES - Catfishes

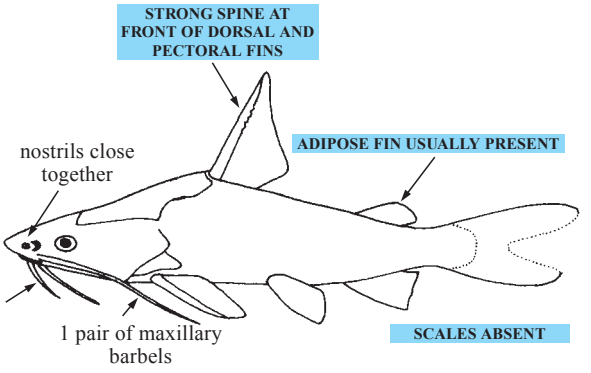
ARIIDAE **Vol. 2, p. 831**

Sea catfishes

To over 100 cm. Demersal in coastal marine and brackish waters and in fresh waters, from the coastline usually to about a depth of 100 m. At least 15 marine species.



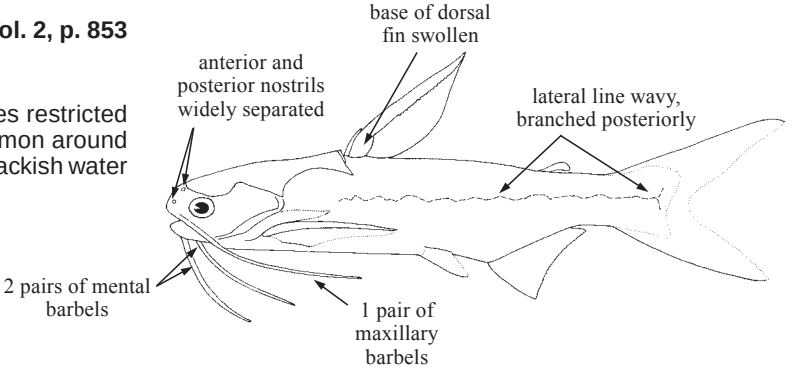
dorsal view of head



AUCHENIPTERIDAE **Vol. 2, p. 853**

Driftwood catfishes

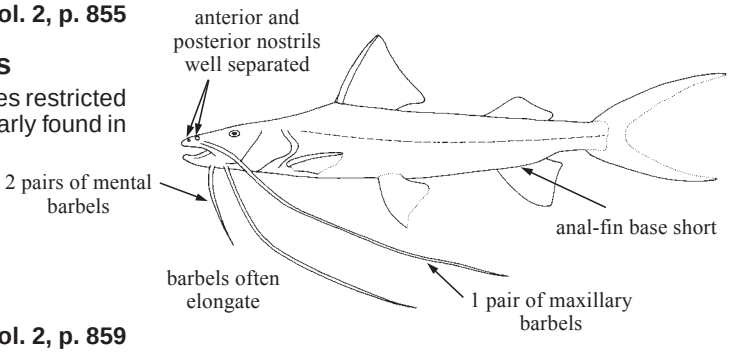
To 30 cm. Demersal, most species restricted to fresh water but 1 species common around brackish river mouths. A single brackish water species in the area.



PIMELODIDAE **Vol. 2, p. 855**

Long-whiskered catfishes

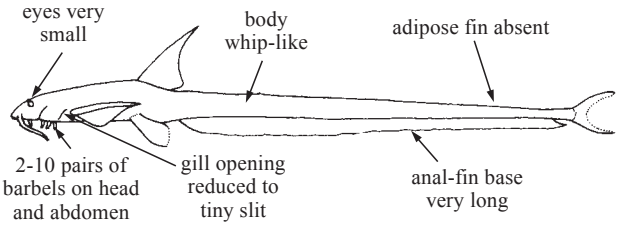
To 200 cm. Demersal, most species restricted to fresh water. Four species regularly found in brackish water in the area.



ASPREDINIDAE **Vol. 2, p. 859**

Banjo catfishes

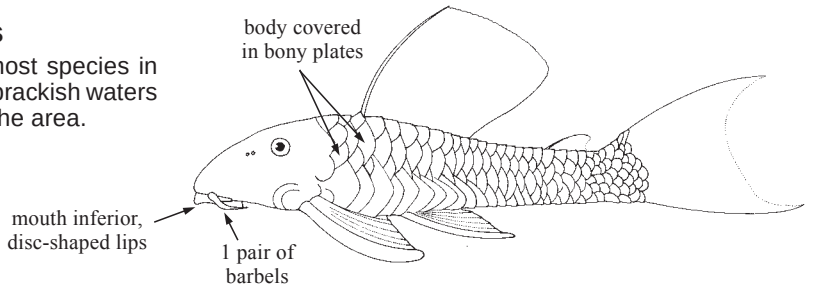
To 40 cm. Demersal; the majority of species live in fresh water, but 3 genera and 4 species are also found in brackish waters and occasionally in coastal marine waters of the area.



LORICARIIDAE **Vol. 2, p. 864**

Suckermouth catfishes

To about 75 cm. Demersal, most species in fresh water. Only 4 species in brackish waters and of interest to fisheries of the area.

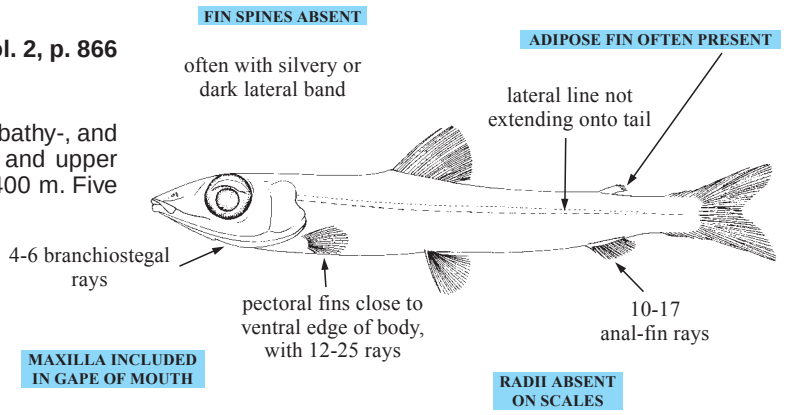


Order OSMERIFORMES - Argentines and allies

ARGENTINIDAE **Vol. 2, p. 866**

Argentines

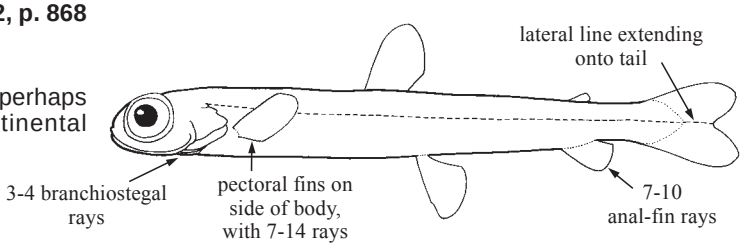
To 70 cm standard length. Meso-, bathy-, and benthopelagic on the outer shelf and upper slope, to a maximum depth of 1 400 m. Five species in the area.



MICROSTOMATIDAE Vol. 2, p. 868

Microstomatids

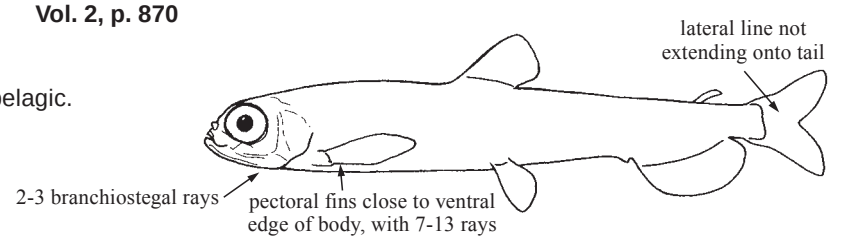
To perhaps 25 cm. Mesopelagic, perhaps also near the bottom along continental slopes.



BATHYLAGIDAE Vol. 2, p. 870

Deepsea smelts

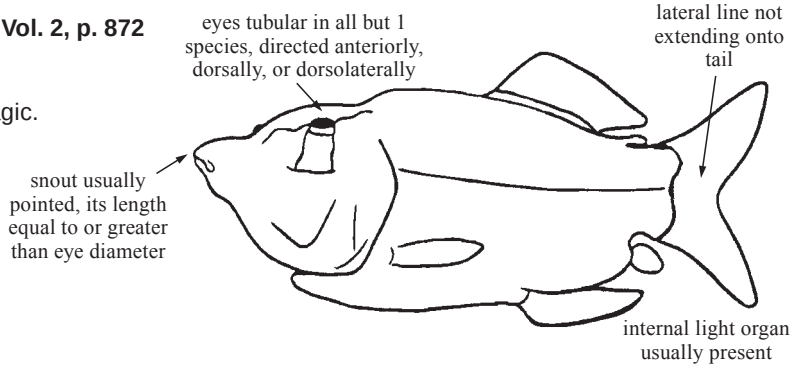
To 20 cm. Meso- and bathypelagic.



OPISTHOPROCTIDAE Vol. 2, p. 872

Barreleyes

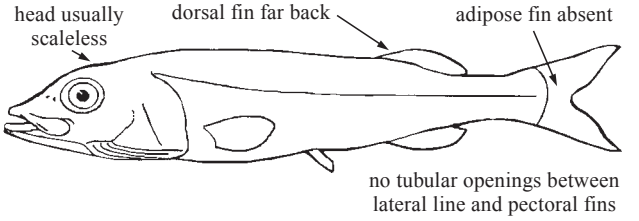
To 16 cm. Meso- and bathypelagic.



ALEPOCEPHALIDAE Vol. 2, p. 874

Slickheads

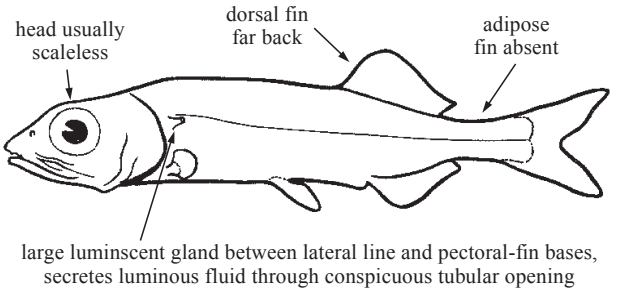
To about 60 to 70 cm. Benthopelagic, mesopelagic, and bathypelagic from depths of 100 to 5 000 m; usually between 800 and 2 500 m.



PLATYTROCTIDAE Vol. 2, p. 879

Tubeshoulders

To about 35 cm. Benthopelagic, mesopelagic, and bathypelagic; most commonly between depths of 800 and 2 000 m.

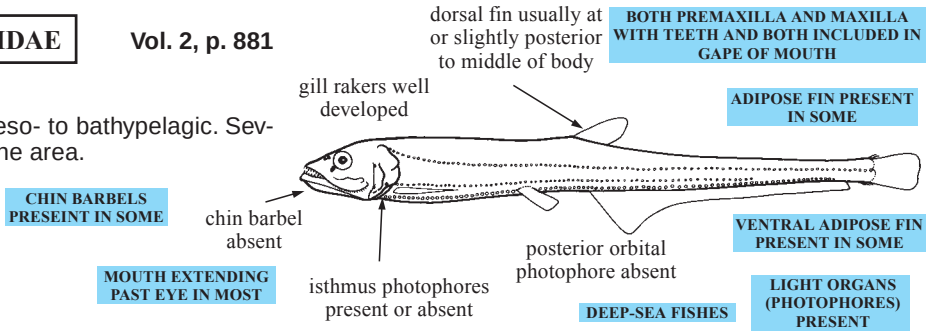


Order STOMIIFORMES - Bristlemouths and allies

GONOSTOMATIDAE Vol. 2, p. 881

Bristlemouths

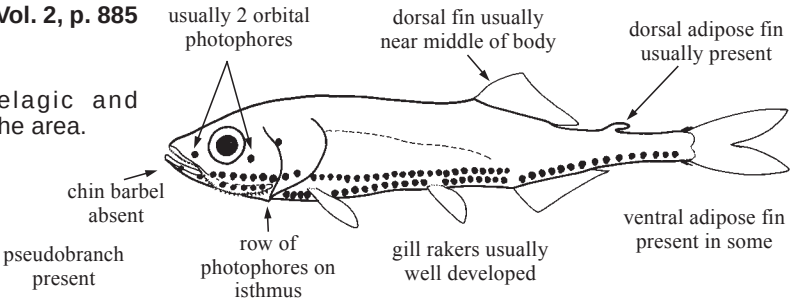
To about 36 cm. Meso- to bathypelagic. Seventeen species in the area.



PHOSICHTHYIDAE Vol. 2, p. 885

Lightfishes

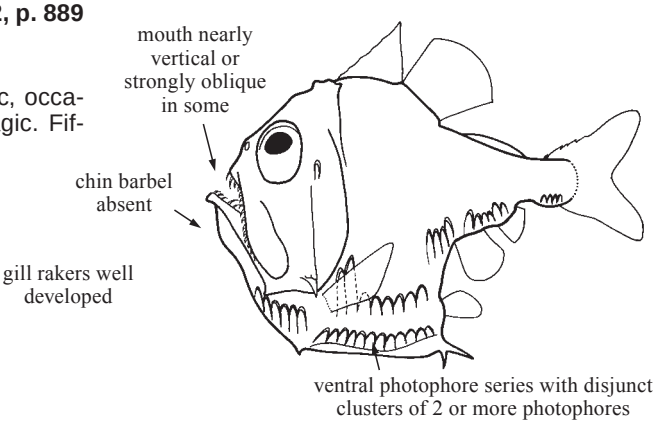
To about 30 cm. Mesopelagic and bathypelagic. Eight species in the area.



STERNOPTYCHIDAE Vol. 2, p. 889

Hatchetfishes

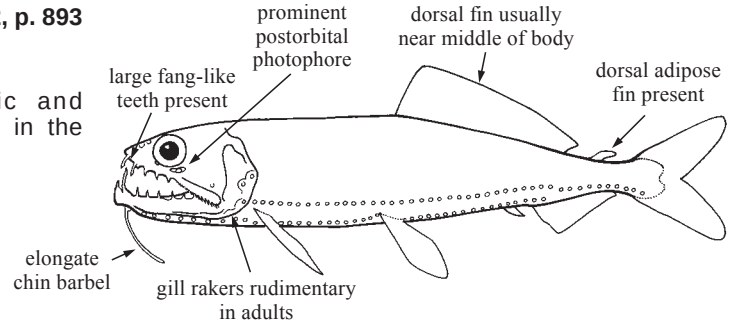
To about 10 cm. Mostly mesopelagic, occasionally bathypelagic or benthopelagic. Fifteen species in the area.



ASTRONESTHIDAE Vol. 2, p. 893

Snaggletooths

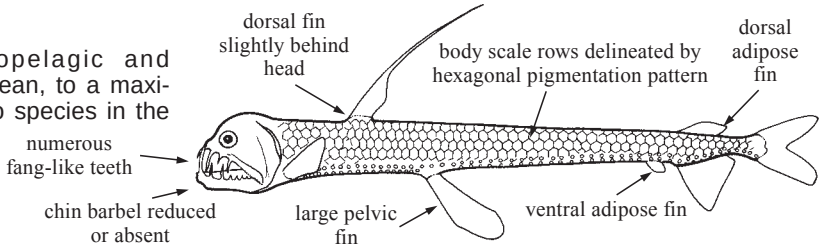
To about 22 cm. Mesopelagic and benthopelagic. Seventeen species in the area.



CHAULIODONTIDAE **Vol. 2, p. 896**

Viperfishes

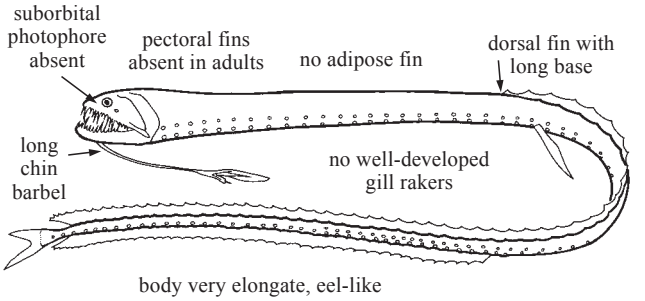
To about 30 cm. Mesopelagic and bathypelagic in the open ocean, to a maximum depth of 2 800 m. Two species in the area.



IDIACANTHIDAE **Vol. 2, p. 899**

Black dragonfishes

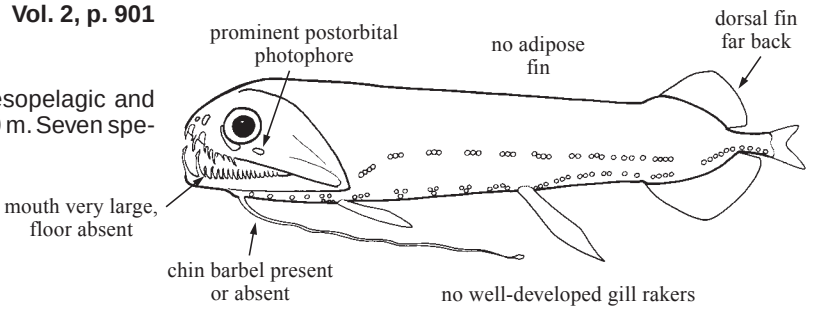
To about 48 cm. Mesopelagic and bathypelagic to a depth of 2 000 m. A single species in the area.



MALACOSTEIDAE **Vol. 2, p. 901**

Loosejaws

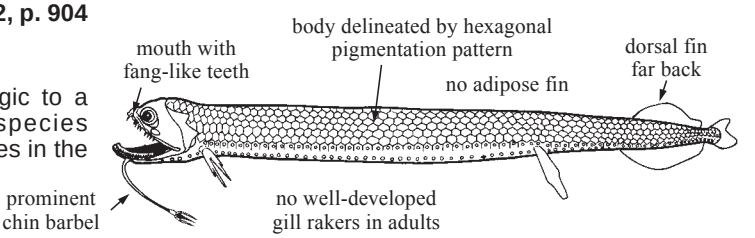
To 24 cm standard length. Mesopelagic and bathypelagic to depths of 4 000 m. Seven species in the area.



STOMIIDAE **Vol. 2, p. 904**

Scaly dragonfishes

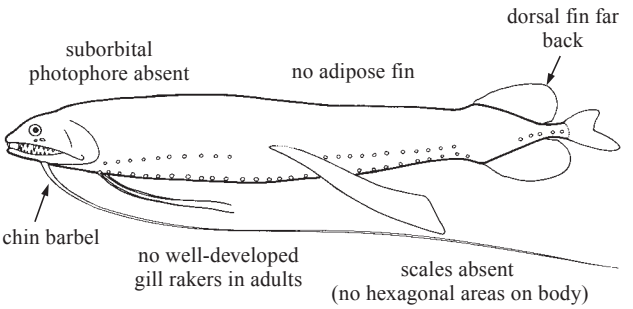
To about 41 cm. Mostly mesopelagic to a depth of 1 000 m, but some species bathypelagic to 2 000 m. Four species in the area.



MELANOSTOMIIDAE **Vol. 2, p. 907**

Scaleless black dragonfishes

To 50 cm standard length. Mostly mesopelagic to depths of 1 000 m, although some caught to depths of 4 500 m; some spceis migrate to surface at night. Around 90 species in the area.

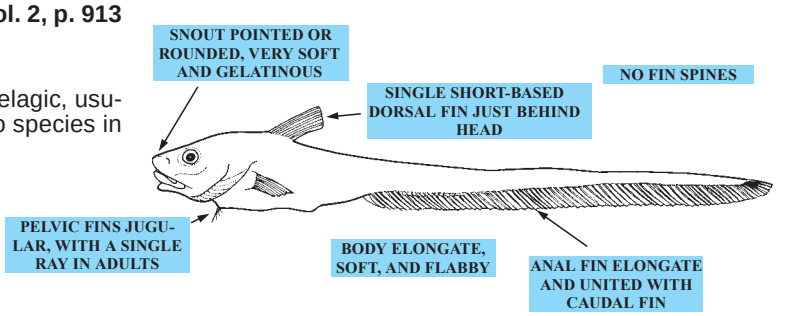


Order ATELEOPODIFORMES - Jellynoses

ATELEOPODIDAE **Vol. 2, p. 913**

Jellynoses

To 200 cm. Demersal or benthopelagic, usually between 200 and 800 m. Two species in the area.

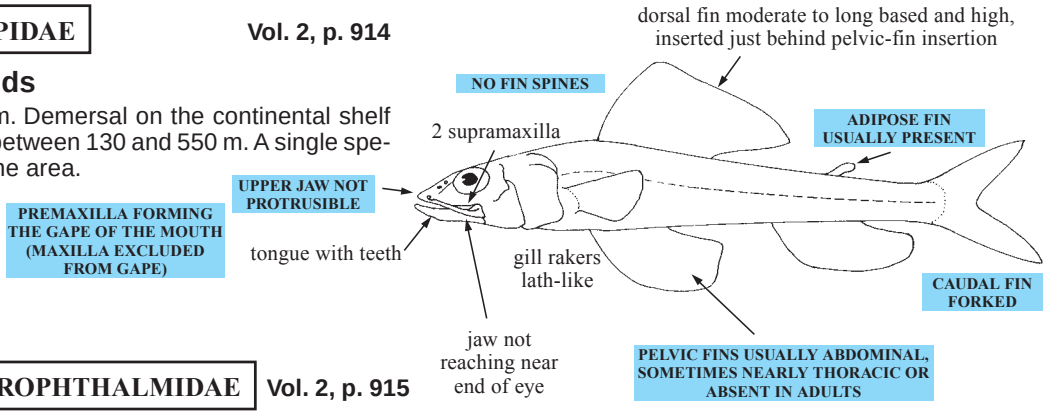


Order AULOPIFORMES - Greeneyes and allies

AULOPIDAE **Vol. 2, p. 914**

Aulopids

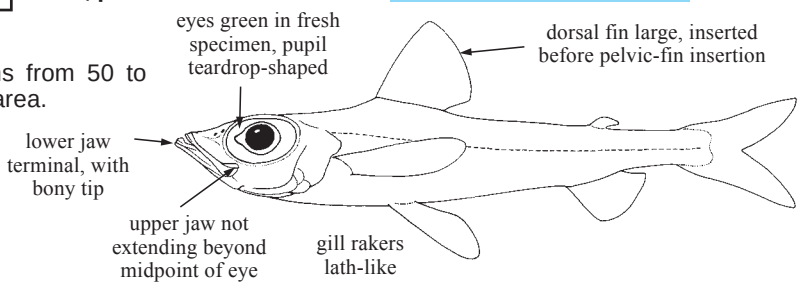
To 45 cm. Demersal on the continental shelf bottom between 130 and 550 m. A single species in the area.



CHLOROPHTHALMIDAE **Vol. 2, p. 915**

Greeneyes

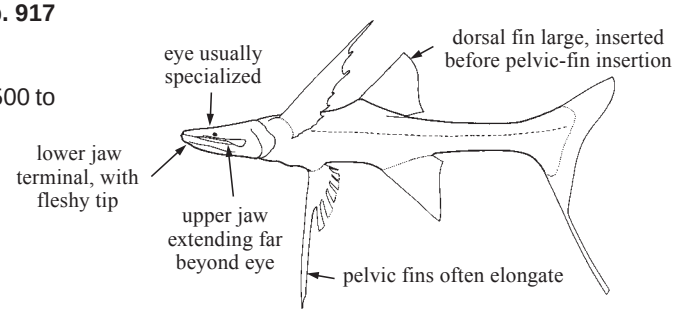
To 23 cm. Demersal at depths from 50 to 1 000 m. Three species in the area.



IPNOPIDAE **Vol. 2, p. 917**

Tripod fishes

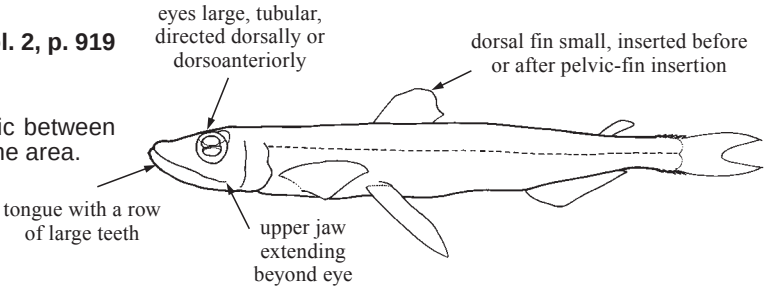
To 30 cm. Demersal in deep water from 500 to 6 000 m. Ten species in the area.



SCOPELARCHIDAE **Vol. 2, p. 919**

Pearleyes

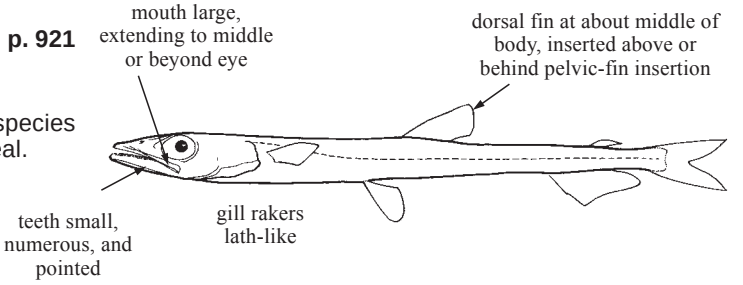
To 15 cm. Meso- and bathypelagic between 500 and 1 000 m. Six species in the area.



NOTOSUDIDAE **Vol. 2, p. 921**

Waryfishes

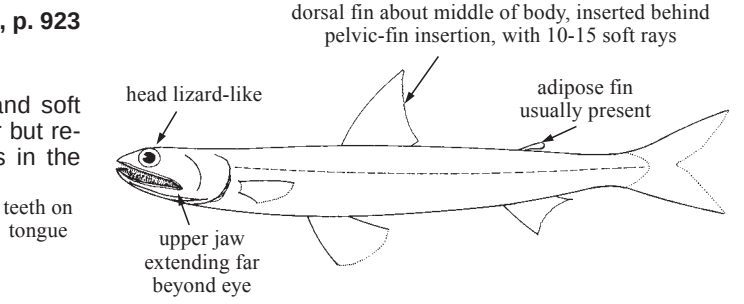
To 50 cm. Epi- to bathypelagic; some species benthopelagic. Five species in the areal.



SYNODONTIDAE **Vol. 2, p. 923**

Lizardfishes

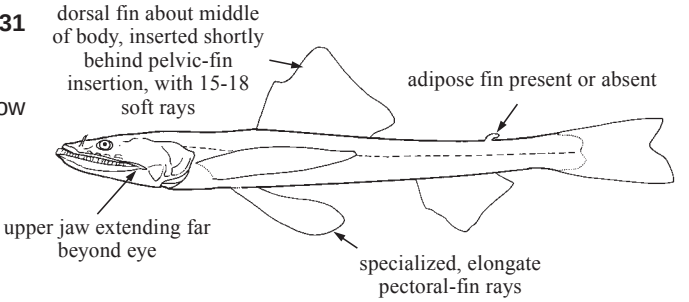
To 45 cm. Demersal on both hard and soft substrates generally in shallow water but recorded down to 545 m. Ten species in the area.



BATHYSAURIDAE **Vol. 2, p. 931**

Deepsea lizardfishes

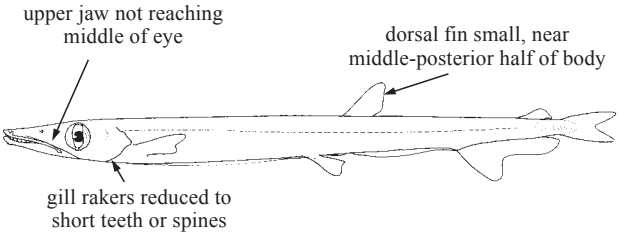
To about 83 cm. Demersal at depths below 1 000 m. Two species in the area.

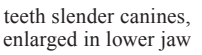


PARALEPIDIDAE **Vol. 2, p. 933**

Barracudinas

To 56 cm. Meso- to bathypeligic from the surface (at night) to a depth of 800 m. Around 20 species in the area.

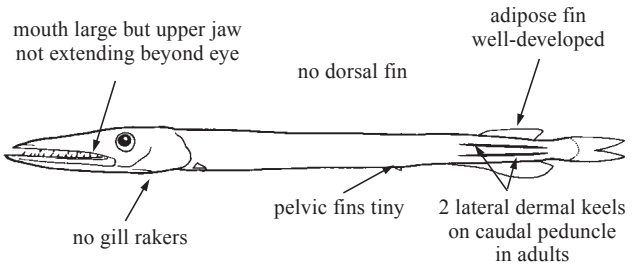




ANOTOPTERIDAE **Vol. 2, p. 935**

Daggertooth

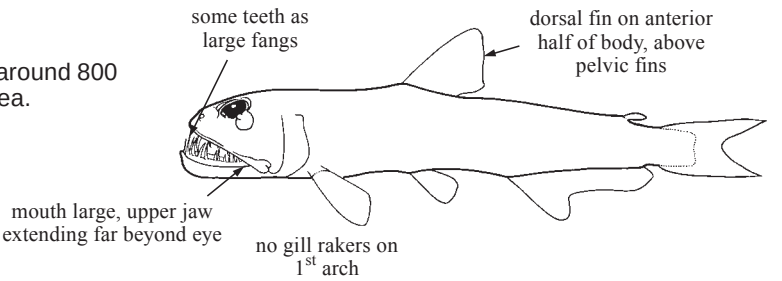
To about 1 m. Epi- to mesopelagic. A single species.



EVERMANNELLIDAE **Vol. 2, p. 936**

Sabertooth fishes

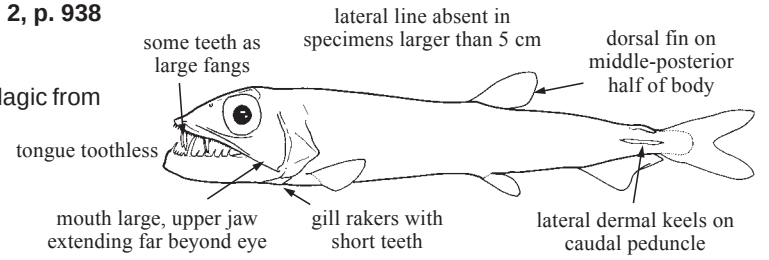
To 19 cm. Mesopelagic usually at around 800 to 1 000 m. Four species in the area.



OMOSUDIDAE **Vol. 2, p. 938**

Omosudid

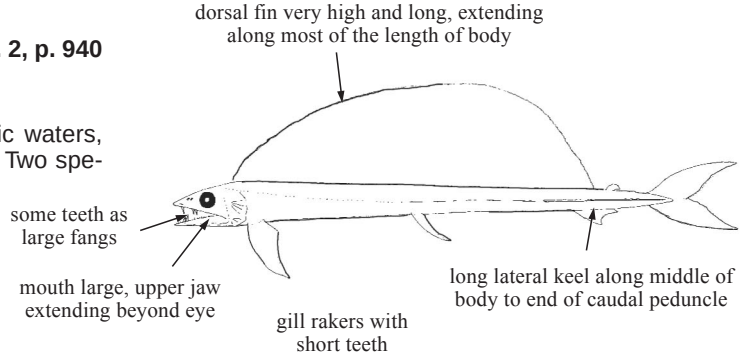
To 25 cm. Mesopelagic and bathypelagic from 700 to 1 650 m. A single species.



ALEPISAURIDAE **Vol. 2, p. 940**

Lancetfishes

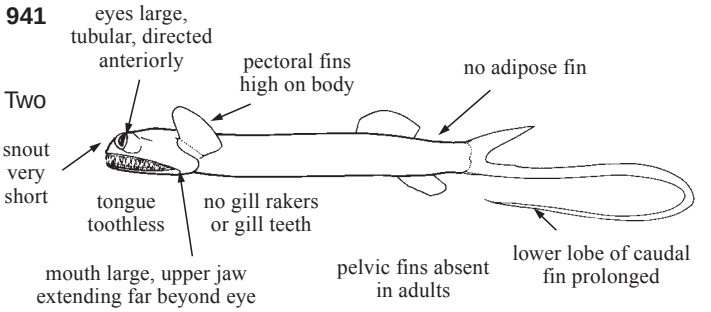
To over 200 cm. Pelagic in oceanic waters, from the surface down to 1 000 m. Two species in the area.



GIGANTURIDAE **Vol. 2, p. 941**

Telescope fishes

To 23 cm. Mesopelagic and bathypelagic. Two species in the area.

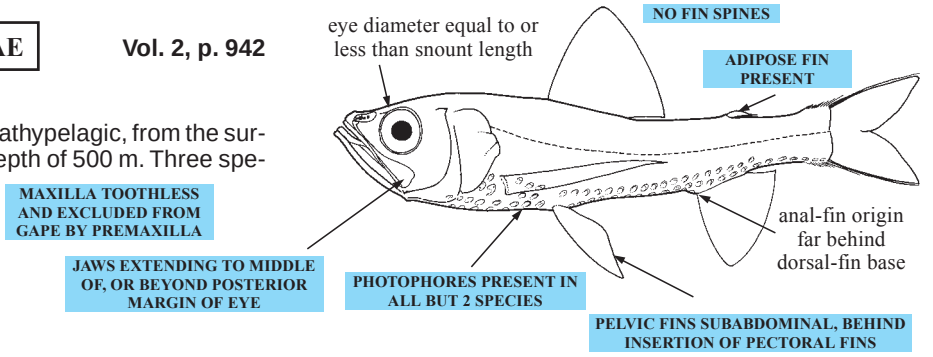


Order MYCTOPHIFORMES - Lanternfishes and Allies

NEOSCOPELIDAE **Vol. 2, p. 942**

Neoscopelids

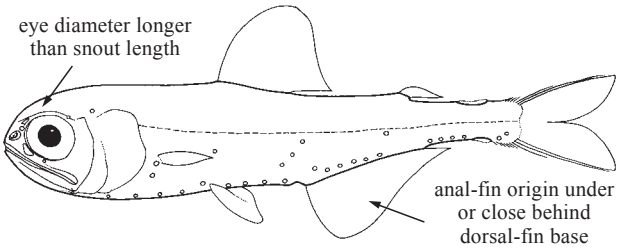
To 30 cm. Meso- to bathypelagic, from the surface (at night) to a depth of 500 m. Three species in the area.



MYCTOPHIDAE **Vol. 2, p. 944**

Lanternfishes

To 30 cm, but generally smaller than 10 cm. Meso- to bathypelagic migrating to surface waters at night. Around 77 species in the area.

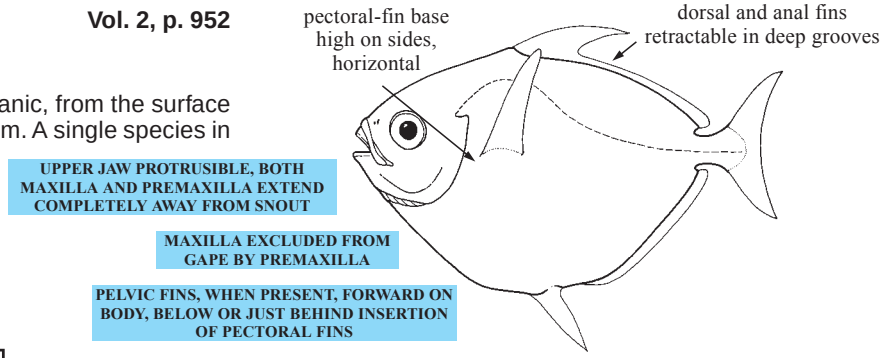


Order LAMPRIDIFORMES - Opahs and allies

LAMPRIDAE **Vol. 2, p. 952**

Opahs

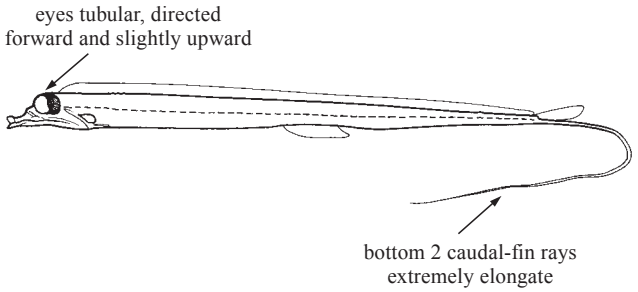
To 185 cm. Pelagic oceanic, from the surface to a depth of about 200 m. A single species in the area.



STYLEPHORIDAE **Vol. 2, p. 953**

Tube-eyes

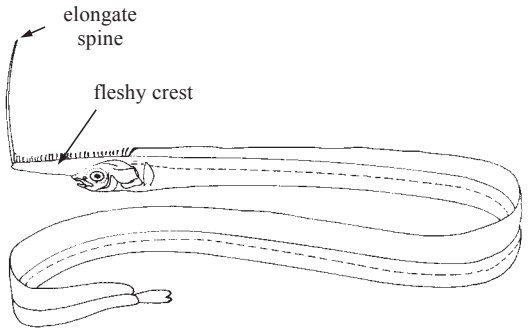
To 30 cm. Mesopelagic or bathypelagic usually between 300 and 800 m. Rare. A single species in the family.



LOPHOTIDAE **Vol. 2, p. 954**

Crestfishes

To 200 cm. Mesopelagic. Two species in the area.

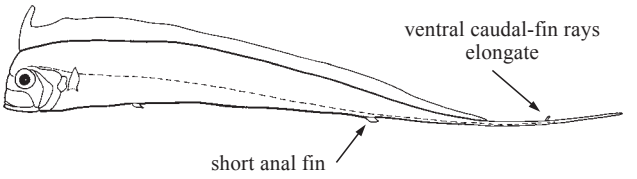


RADIICEPHALIDAE

Vol. 2, p. 956

Tapertails

To 80 cm. Mesopelagic. Very rare. A single species in the family.

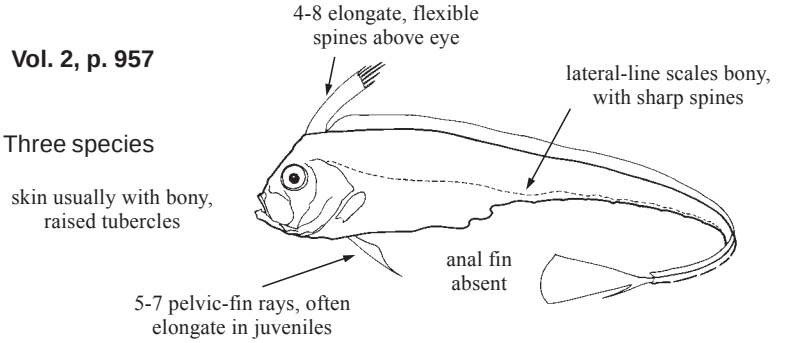


TRACHIPTERIDAE

Vol. 2, p. 957

Ribbonfishes

To 200 cm. Mesopelagic. Rare. Three species reported in the area.

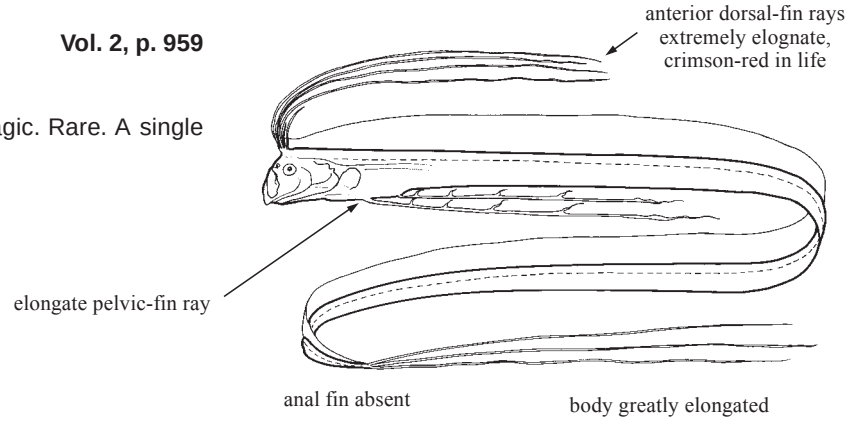


REGALECIDAE

Vol. 2, p. 959

Oarfishes

To about 17 m. Mesopelagic. Rare. A single species in the area.

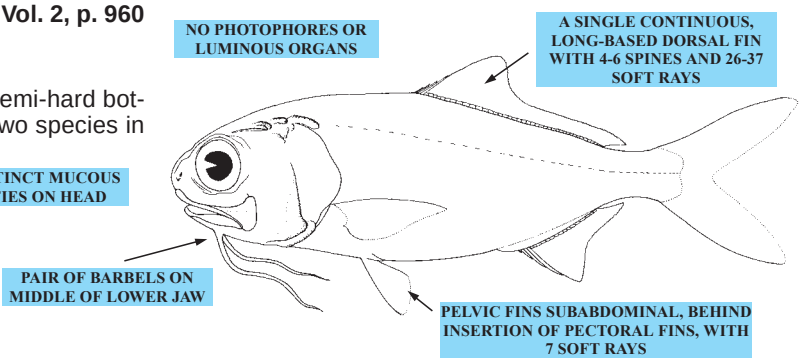


Order POLYMIXIIFORMES - Beardfishes

POLYMIXIIDAE Vol. 2, p. 960

Beardfishes

To 43 cm. Dimersal on soft or semi-hard bottoms between 50 and 800 m. Two species in the area.

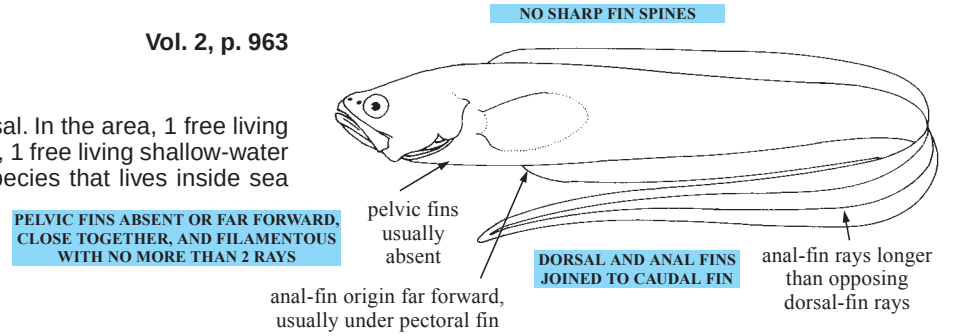


Order OPHIDIIFORMES - Brotulas and allies

CARAPIDAE Vol. 2, p. 963

Pearlfishes

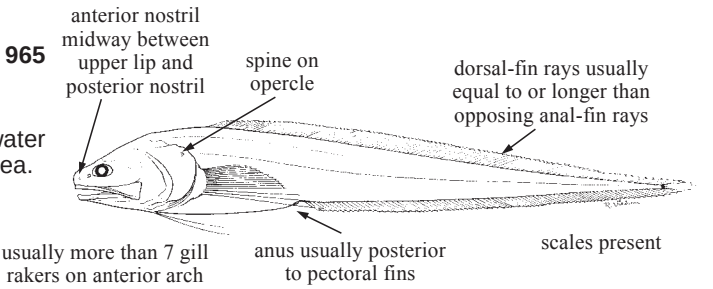
To 37 cm. Demersal. In the area, 1 free living deep-sea species, 1 free living shallow-water species, and 1 species that lives inside sea cucumbers.



OPHIDIIDAE Vol. 2, p. 965

Cusk-eels, brotulas

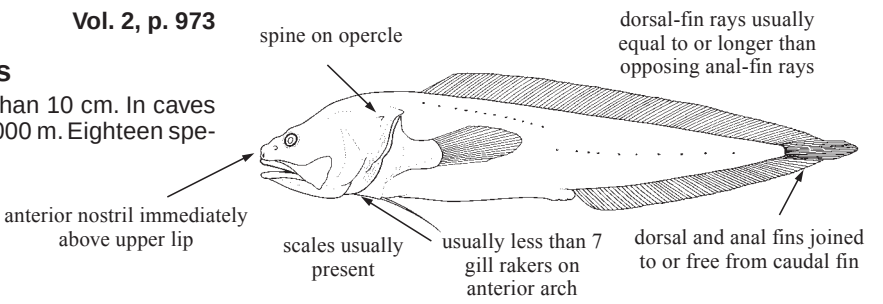
To 200 cm, Typically demersal, shallow water down to 8 370 m. Over 65 species in the area.



BYTHITIDAE Vol. 2, p. 973

Viviparous brotulas

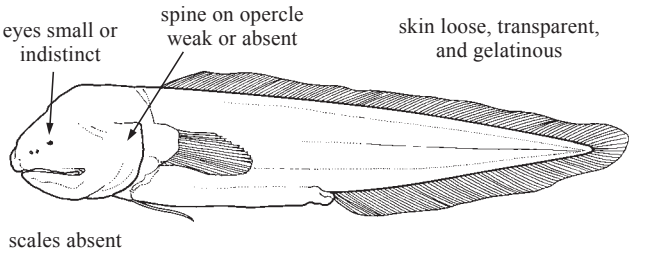
To 50 cm, typically less than 10 cm. In caves and demersal down to 2 000 m. Eighteen species in the area.



APHYONIDAE **Vol. 2, p. 975**

Aphyonids

To 25 cm. Demersal usually between 250 and 5 600 m. Rare. Eight species in the area.



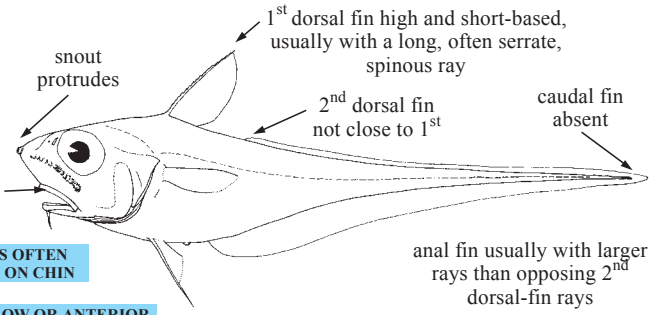
Order GADIFORMES - Hakes, Cods, and allies

MACROURIDAE **Vol. 2, p. 977**

Grenadiers

To about 110 m. Benthopelagic from a depth of about 250 to below 4 000 m. About 34 species in the area.


underside of body



BARBELS OFTEN PRESENT ON CHIN

PELVIC FINS BELOW OR ANTERIOR TO PECTORAL FINS AND WIDELY SEPARATED FROM EACH OTHER, USUALLY ENTIRE, BUT REDUCED TO FILAMENTS IN SOME SPECIES

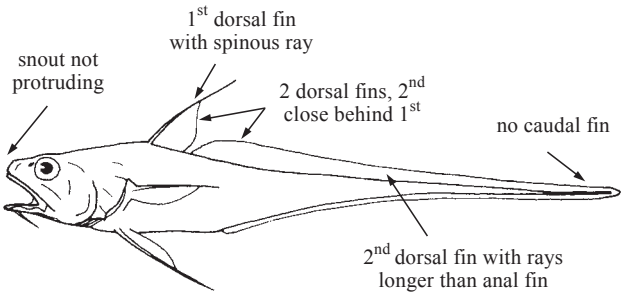
ALL SPECIES WITH LONG DORSAL AND ANAL FINS

NO TRUE SPINES IN FINS (ALTHOUGH SPINOUS RAYS PRESENT IN DORSAL FIN OF MOST MACROURIDS)

BATHYGADIDAE **Vol. 2, p. 988**

Bathygadids

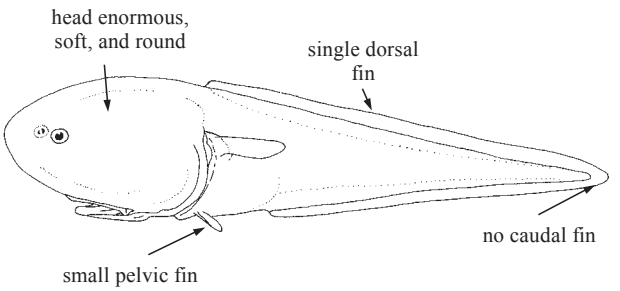
To about 60 cm. Benthopelagic on continental slope from 300 to 2 700 m. Six species in the area.



MACROUROIDIDAE **Vol. 2, p. 991**

Macrouroids

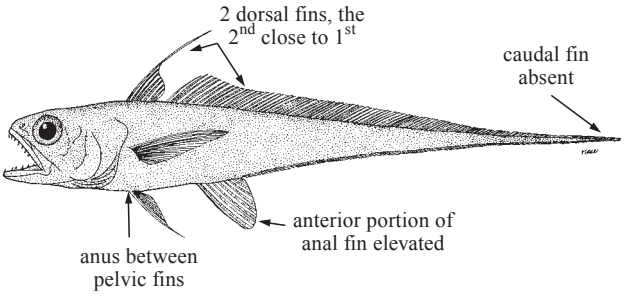
To 35 cm. Bentho- to bathypelagic. Two species in the area.



STEINDACHNERIIDAE **Vol. 2, p. 993**

Luminous hake

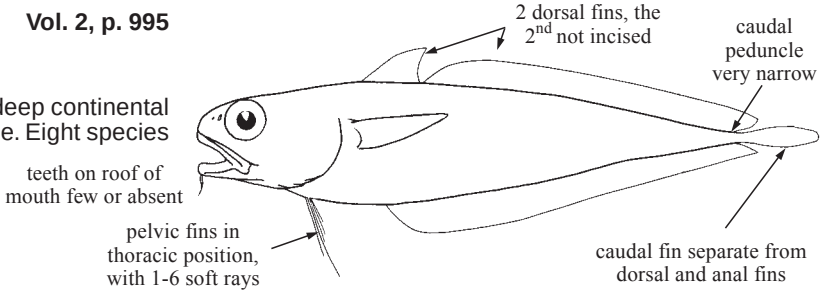
To about 30 cm. Benthopelagic between 350 and 550 m. A single species.



MORIDAE **Vol. 2, p. 995**

Moras

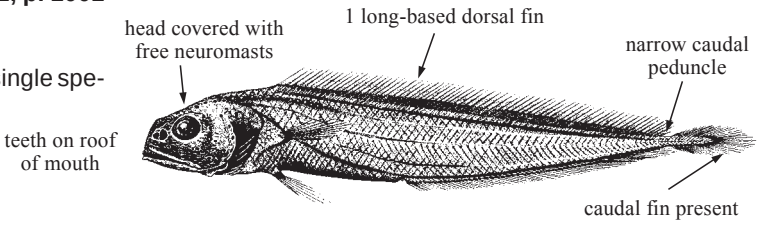
To 65 cm. Benthopelagic on deep continental shelf and the continental slope. Eight species in the area.



MELANONIDAE **Vol. 2, p. 1001**

Pelagic cods

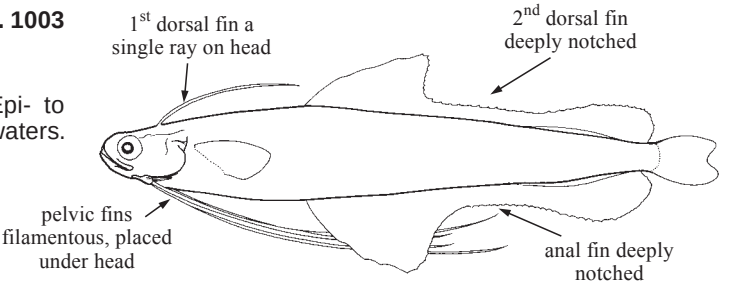
To 25 cm. Meso- to bathypelagic. A single species in the area.



BREGMACEROTIDAE **Vol. 2, p. 1003**

Codlets

To 10 cm, but usually 5 to 6 cm. Epi- to mesopelagic in coastal and oceanic waters. At least 4 species in the area.

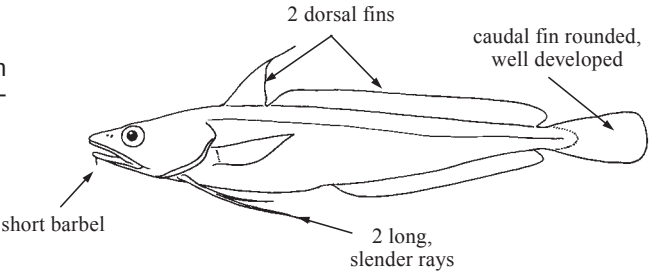


PHYCIDAE

Vol. 2, p. 1005

Phycid hakes

To 120 cm, usually 20 to 40 cm. Demersal on soft bottoms from shallow areas to upper continental slope. Seven species in the area.

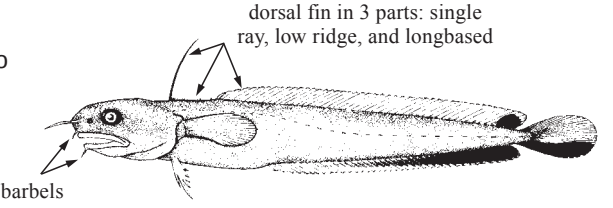


GAIDROPSARIDAE

Vol. 2, p. 1015

Rocklings

To 41 cm. Demersal on soft bottoms from 20 to 650 m. A single species in the area.

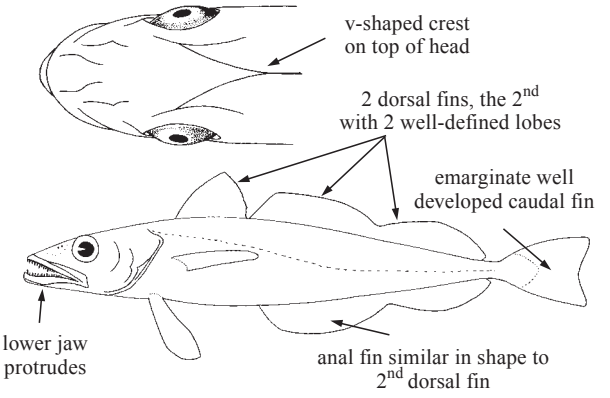


MERLUCCIIDAE

Vol. 2, p. 1017

Merlucciid hakes

To about 80 cm. Benthopelagic, from coastal waters to below a depth of 1 000 m. Two species in the area.

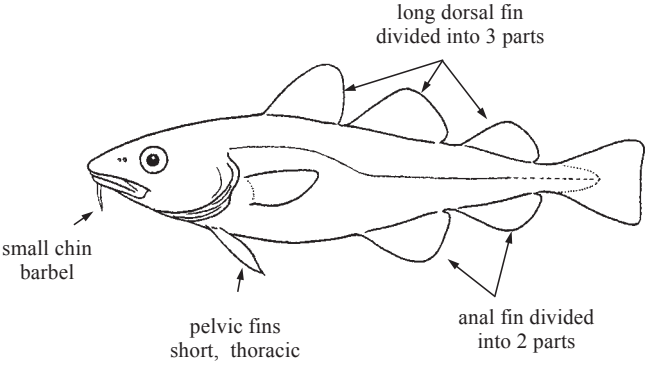


GADIDAE

Vol. 2, p. 1021

Cods

To 200 cm. Demersal, benthopelagic, and pelagic down to more than 1 000 m. Mostly temperate but 3 species occur in the very northern range of the area.



click for next page

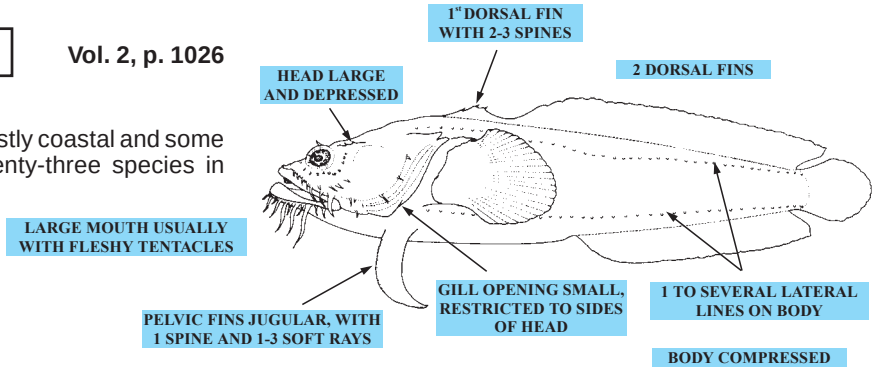
Order BATRACHOIDIFORMES - Toadfishes

BATRACHOIDIDAE

Vol. 2, p. 1026

Toadfishes

To 57 cm. Demersal, mostly coastal and some in brackish waters. Twenty-three species in the area.



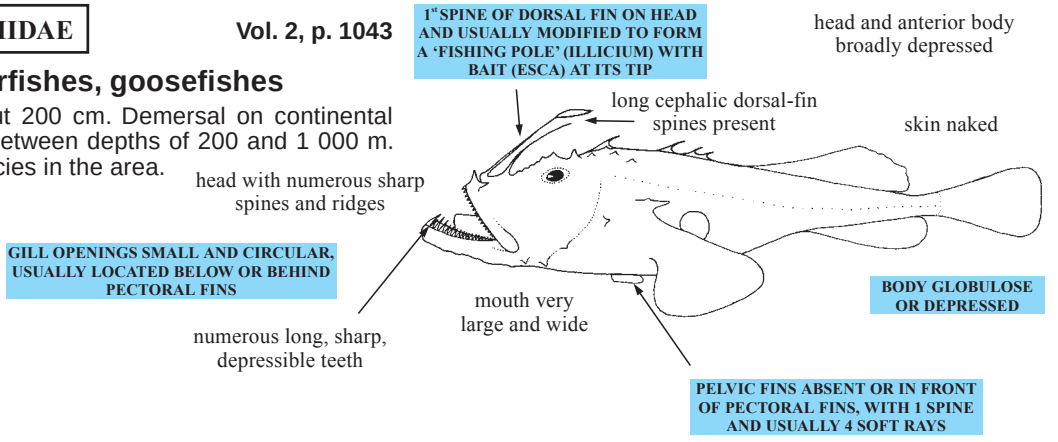
Order LOPHIIFORMES - Anglerfishes and allies

LOPHIIDAE

Vol. 2, p. 1043

Anglerfishes, goosefishes

To about 200 cm. Demersal on continental slope, between depths of 200 and 1 000 m. Six species in the area.

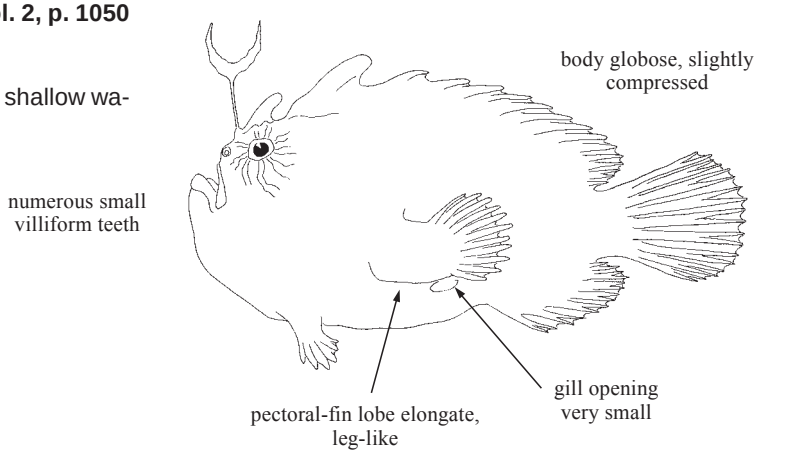


ANTENNARIIDAE

Vol. 2, p. 1050

Frogfishes

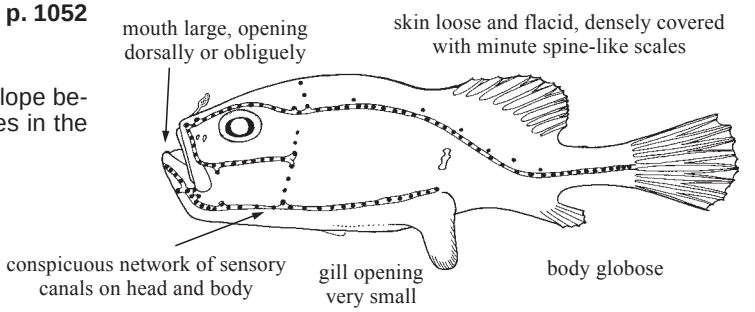
To about 50 cm. Mostly demersal shallow waters. Seven species in the area.



CHAUNACIDAE **Vol. 2, p. 1052**

Sea toads

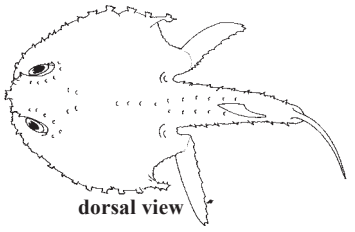
To 30 cm. Demersal on continental slope between 90 and 2 600 m. Three species in the area.

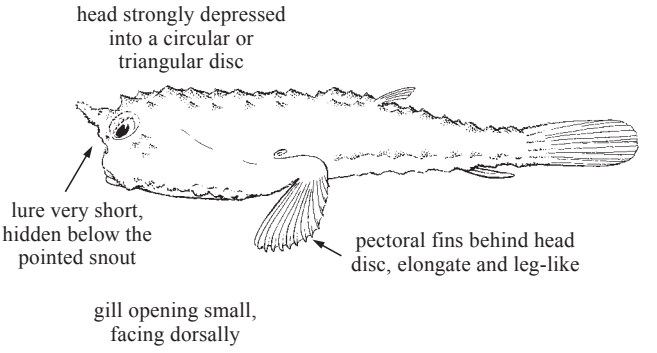


OGCOCEPHALIDAE **Vol. 2, p. 1054**

Batfishes

To 25 cm. Demersal, typically in less than 200 m, some species to over 1 000 m. Fourteen species in the area.

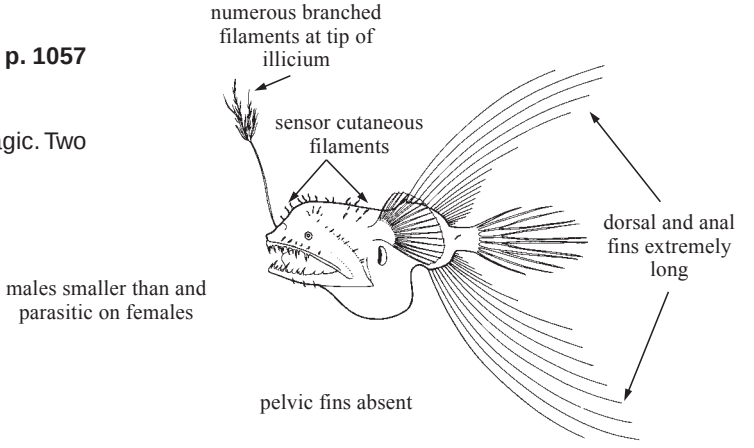




CAULOPHRYNIDAE **Vol. 2, p. 1057**

Fanfin anglerfishes

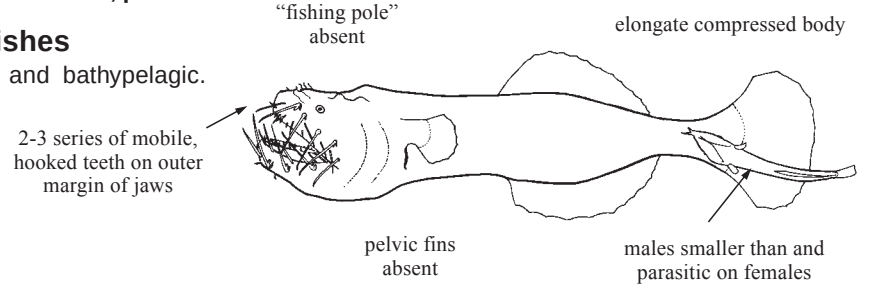
To 17 cm. Mesopelagic and bathypelagic. Two species in the area.



NEOCERATIIDAE **Vol. 2, p. 1058**

Neoceratiid anglerfishes

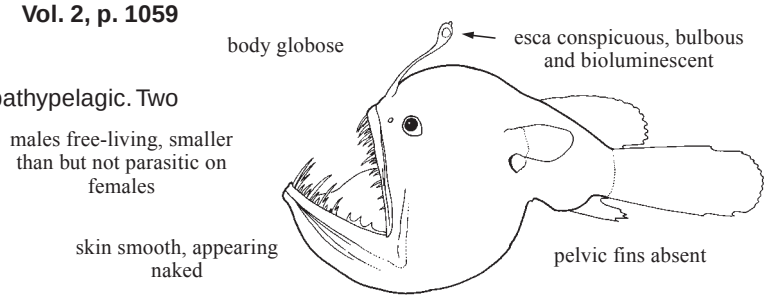
To 7.5 cm. Mesopelagic and bathypelagic. One species in the area.



MELANOCETIDAE **Vol. 2, p. 1059**

Black devils

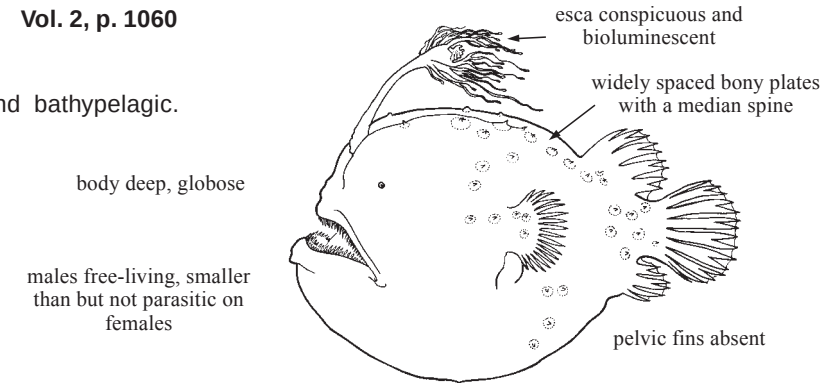
To 12 cm. Mesopelagic and bathypelagic. Two species in the area.



HIMANTOLOPHIDAE **Vol. 2, p. 1060**

Footballfishes

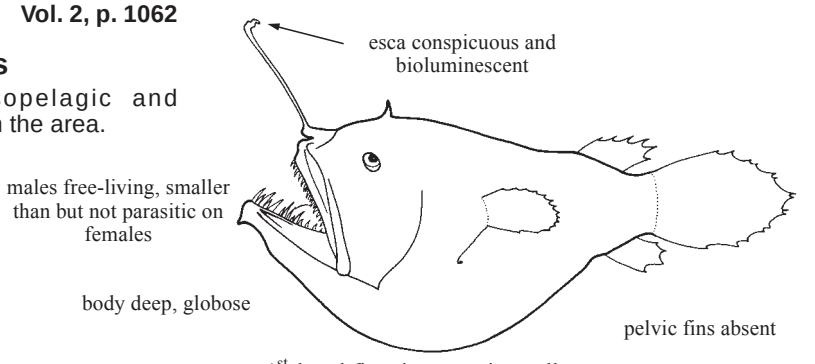
To 47 cm. Mesopelagic and bathypelagic. Nine species in the area.



DICERATIIDAE **Vol. 2, p. 1062**

Diceratid anglerfishes

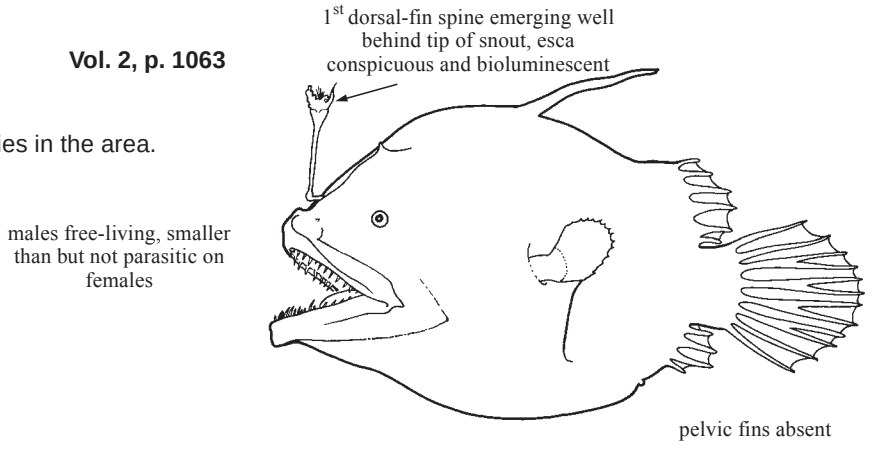
To about 24 cm. Mesopelagic and bathypelagic. Two species in the area.



ONEIRODIDAE **Vol. 2, p. 1063**

Dreamers

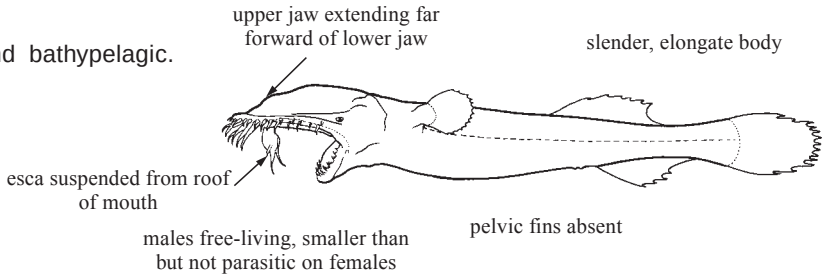
To 28 cm. Twenty species in the area.



THAUMATICHTHYIDAE Vol. 2, p. 1065

Wonderfishes

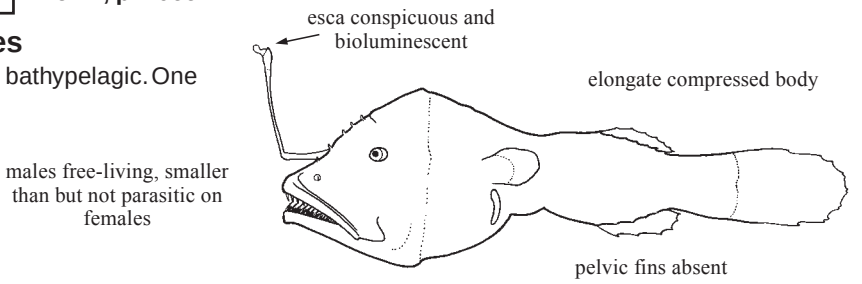
To 30 cm. Mesopelagic and bathypelagic. Four species in the area.



CENTROPHRYNIDAE Vol. 2, p. 1066

Deepsea anglerfishes

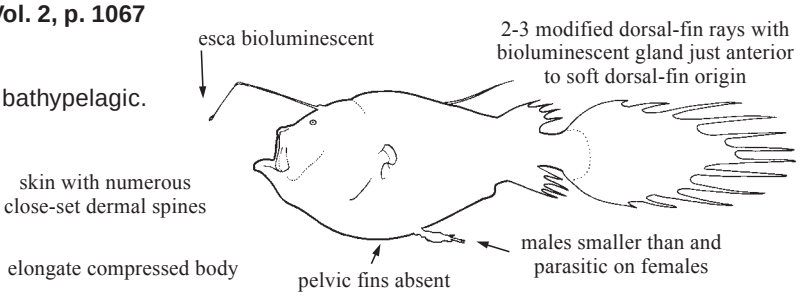
To 23 cm. Mesopelagic and bathypelagic. One species in the area.



CERATIIDAE Vol. 2, p. 1067

Sea devils

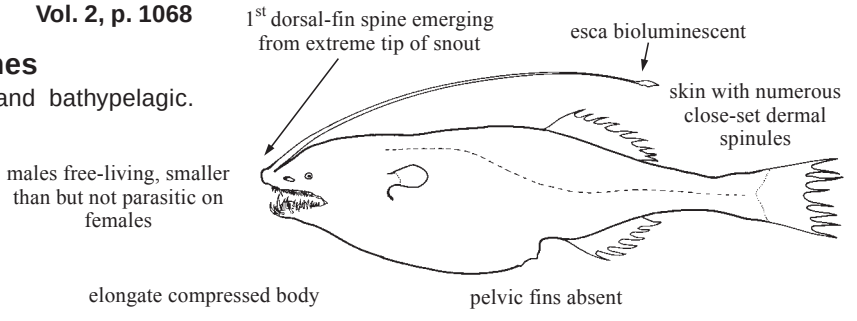
To 77 cm. Mesopelagic and bathypelagic. Three species in the area.



GIGANTACTINIDAE Vol. 2, p. 1068

Whipnose anglerfishes

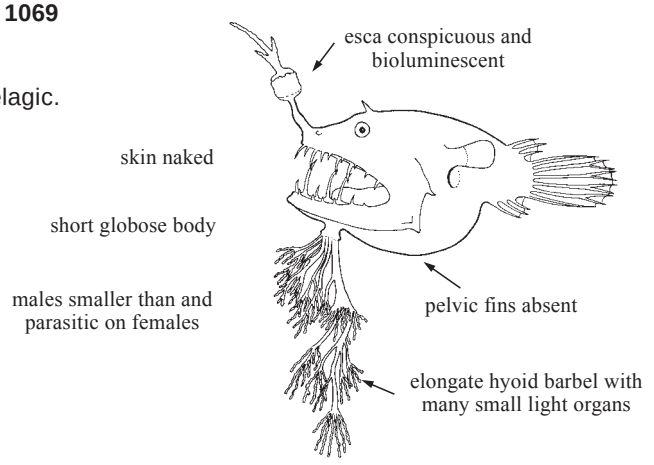
To 40 cm. Mesopelagic and bathypelagic. Eight species in the area.



LINOPHRYNIDAE **Vol. 2, p. 1069**

Netdevils

To 23 cm. Mesopelagic and bathypelagic. Eleven species in the area.

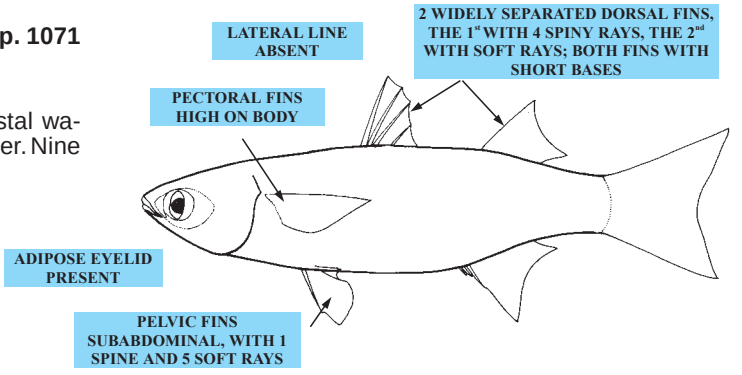


Order MUGILIFORMES - Mullets

MUGILIDAE **Vol. 2, p. 1071**

Mullets

To 120 cm. Usually demersal in coastal waters, but also in brackish and fresh water. Nine species in the area.

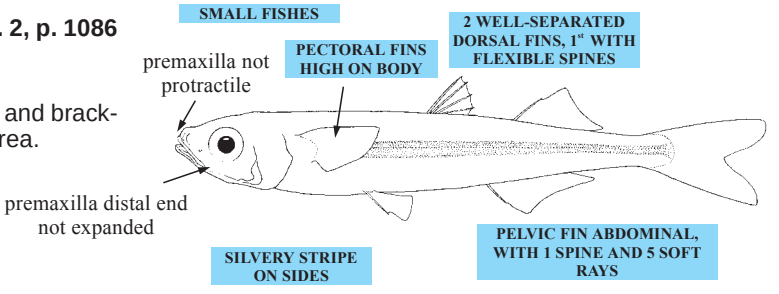


Order ATHERINIFORMES - Silversides

ATHERINIDAE **Vol. 2, p. 1086**

Silversides

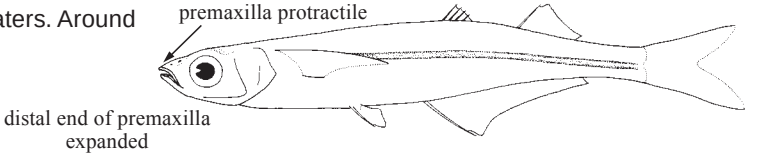
To about 10 cm. Pelagic in coastal and brackish waters. Three species in the area.



ATHERINOPSIDAE **Vol. 2, p. 1090**

New World silversides

To about 15 cm. Pelagic in coastal waters. Around 21 species.

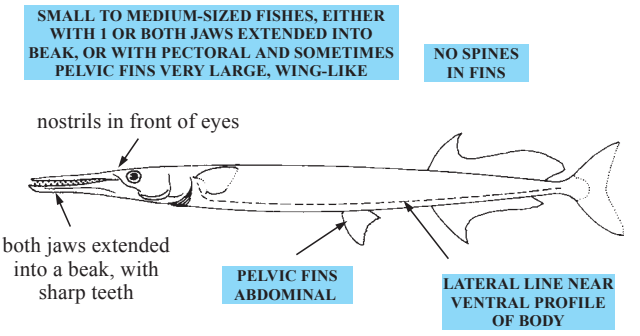


Order BELONIFORMES - Needlefishes, Flyingfishes, and allies

BELONIDAE **Vol. 2, p. 1104**

Needlefishes

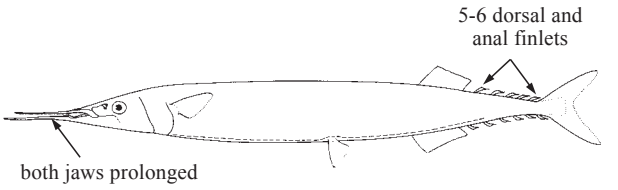
To about 200 cm. Epipelagic in coastal and oceanic waters. Seven species in the area.



SCOMBERESOCIDAE **Vol. 2, p. 1114**

Sauries

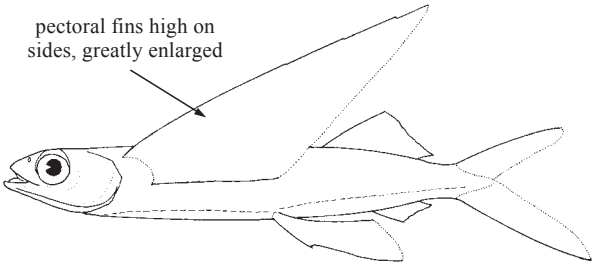
To about 76 cm. Pelagic in oceanic surface waters.



EXOCOETIDAE **Vol. 2, p. 1116**

Flyingfishes

To about 45 cm. Epipelagic in coastal and oceanic waters. Fourteen species in the area.



HEMIRAMPHIDAE **Vol. 2, p. 1135**

Halfbeaks

To 44 cm. Epipelagic in coastal and offshore waters. Ten species in the area.



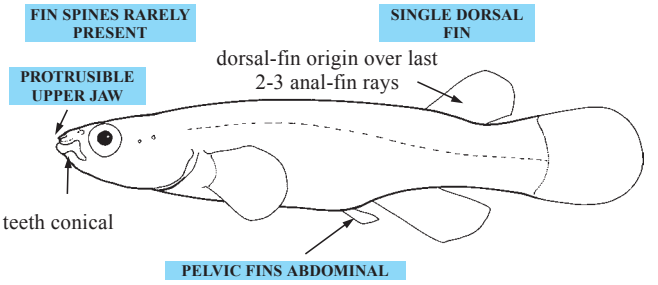
Order CYPRINODONTIFORMES - Killifishes and allies

RIVULIDAE

Vol. 2, p. 1145

New World rivulines

To 10 cm. Most species found in fresh water but 2 species in the area found in mangrove swamps and salt marshes.

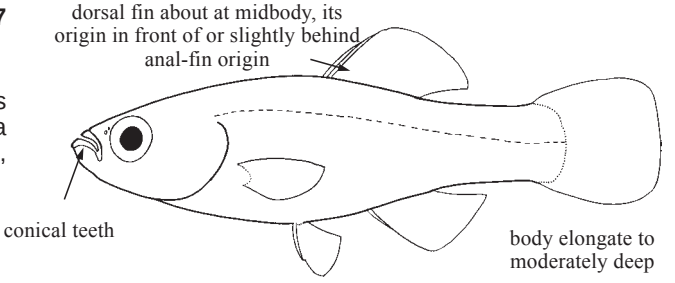


FUNDULIDAE

Vol. 2, p. 1147

Fundulid killifishes

To 30 cm, typically smaller. Most species found in fresh water but 13 species in the area are found in estuaries, salt marshes, hypersaline waters, and coastal areas.

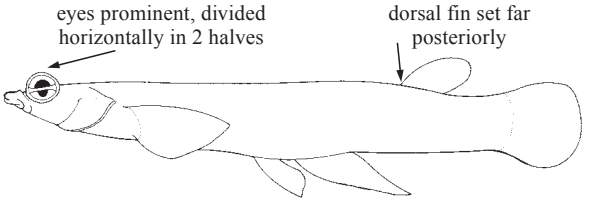


ANABLEPIDAE

Vol. 2, p. 1152

Foureyed fishes

To about 35 cm. Mostly fresh-water fishes but 2 species in the area also found in shallow coastal and estuarine waters.

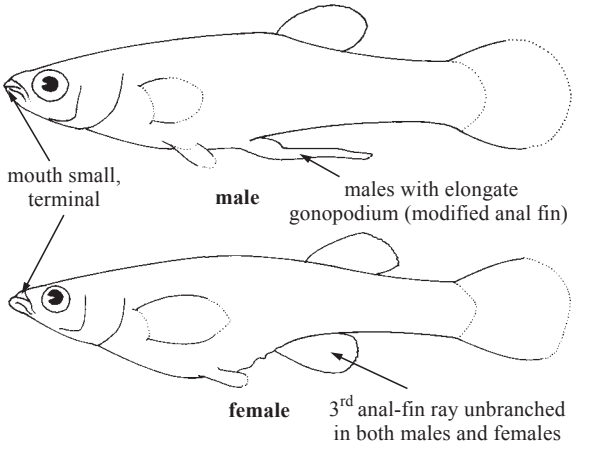


POECILIIDAE

Vol. 2, p. 1154

Poeciliids

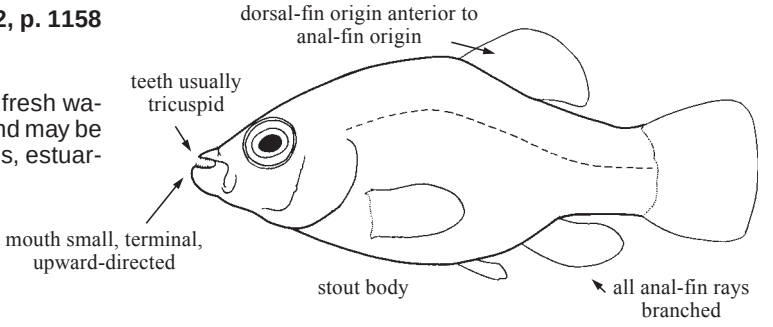
To 20 cm length. Most species are found in fresh water but 24 species in the area are tolerant to brackish or marine salinity and may occasionally be found in coastal waters.



CYPRINODONTIDAE Vol. 2, p. 1158

Pupfishes

To 8 cm. Most species restricted to fresh water, but 8 species in the area enter and may be common in salt marshes, mangroves, estuaries, and coastal marine waters.



Order STEPHANOBERYCIFORMES - Whalefishes and allies

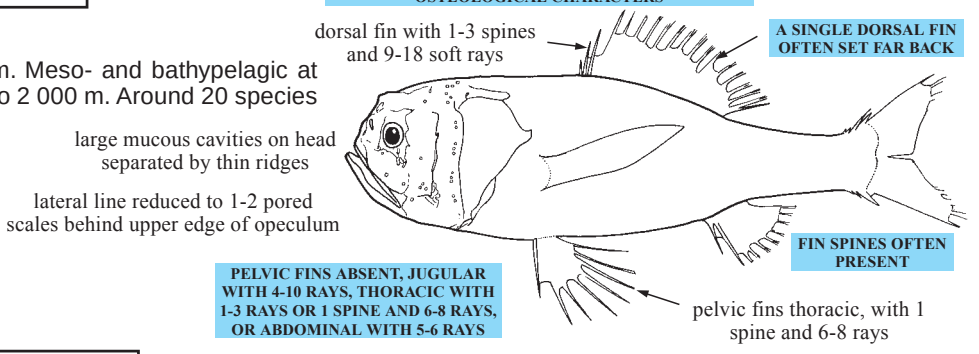
MOSTLY MESO-, BATHY-, AND BENTHOPELAGIC FISHES: AN ILL-DEFINED ORDER CLOSELY RELATED TO THE BERYCIFORMES, BASED CHIEFLY ON OSTEOLOGICAL CHARACTERS

BODY USUALLY ROUNDISH OR OBLONG

MELAMPHAIDAE Vol. 2, p. 1162

Bigscales

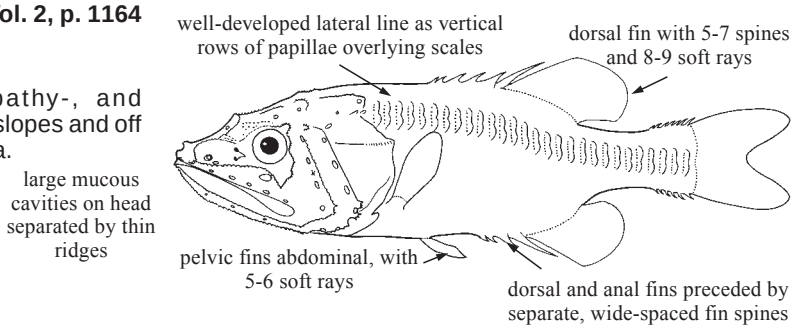
To about 16 cm. Meso- and bathypelagic at depths of 200 to 2 000 m. Around 20 species in the area.



GIBBERICHTHYIDAE Vol. 2, p. 1164

Gibberfishes

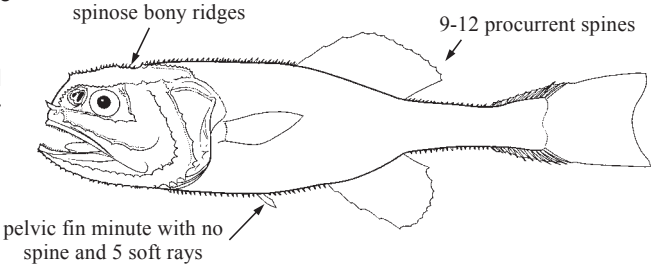
To about 9 cm. Meso-, bathy-, and benthopelagic over continental slopes and off islands. One species in the area.



STEPHANOBERYCIDAE Vol. 2, p. 1166

Pricklefishes

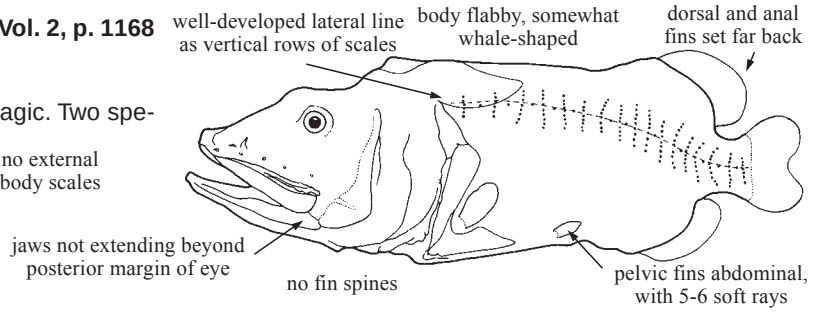
To about 14 cm. Benthopelagic or abyssal benthic at depths of 945 to 5 308 m. Two species in the area.



RONDELETIIDAE **Vol. 2, p. 1168**

Redmouth whalefishes

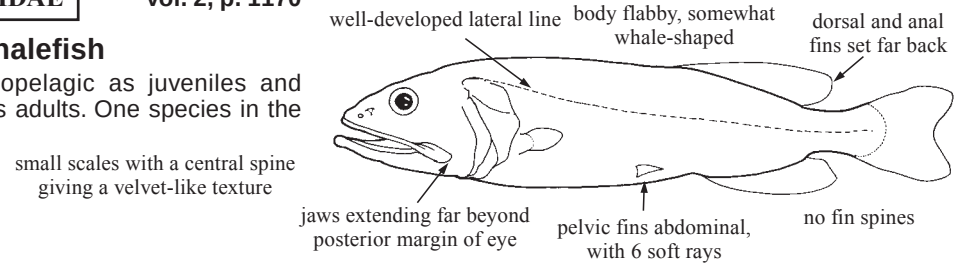
To 11 cm. Meso- and bathypelagic. Two species in the area.



BARBOURISIIDAE **Vol. 2, p. 1170**

Redvelvet whalefish

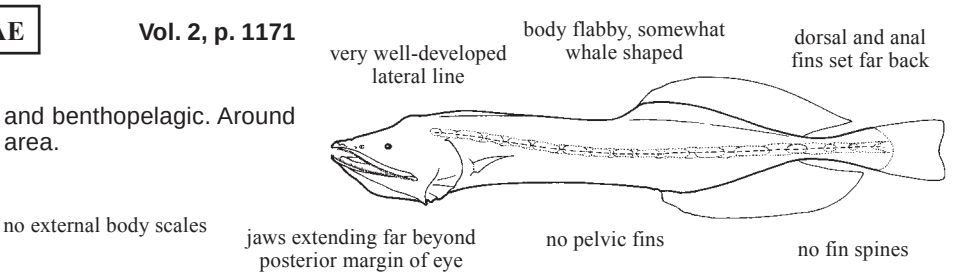
To 38 cm. Mesopelagic as juveniles and benthopelagic as adults. One species in the area.



CETOMIMIDAE **Vol. 2, p. 1171**

Whalefishes

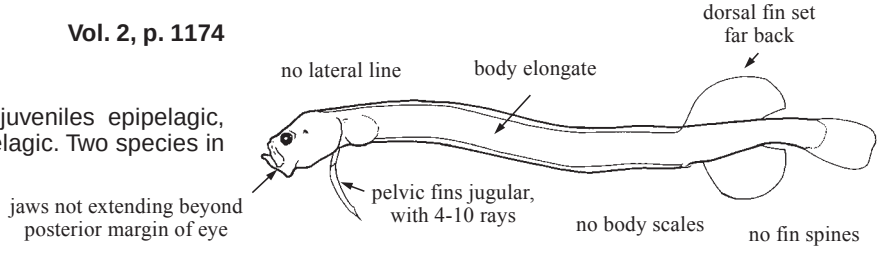
To 41 cm. Bathy- and benthopelagic. Around 12 species in the area.



MIRAPINNIDAE **Vol. 2, p. 1174**

Tapetails

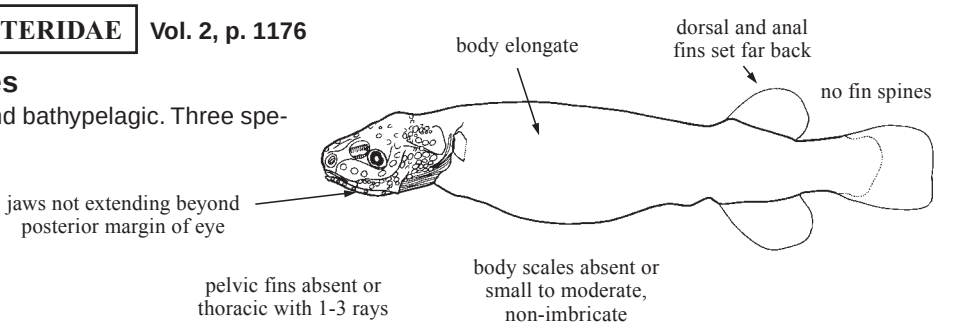
To 5 cm. Larvae and juveniles epipelagic, adults probably mesopelagic. Two species in the area.



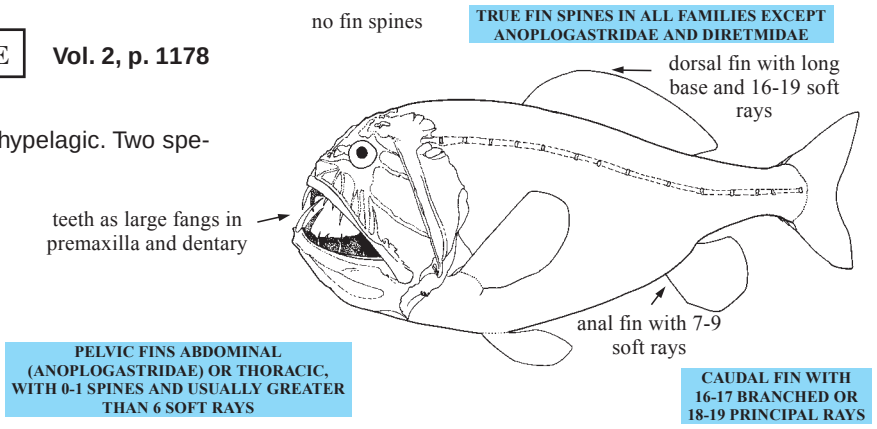
MEGALOMYCTERIDAE **Vol. 2, p. 1176**

Bignose fishes

To 7 cm. Meso- and bathypelagic. Three species in the area.



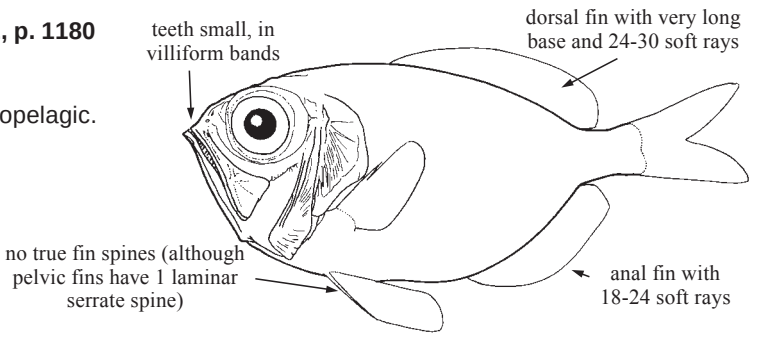
Order BERYCIFORMES - Squirrelfishes and allies



ANOPLOGASTRIDAE Vol. 2, p. 1178

Fangtooths

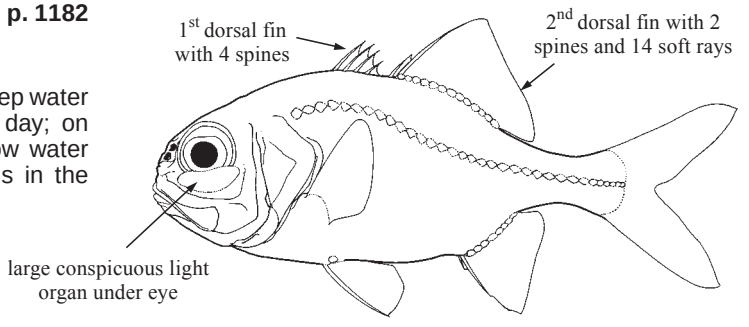
To 16 cm. Meso- and bathypelagic. Two species in the area.



DIRETMIDAE Vol. 2, p. 1180

Spinyfins

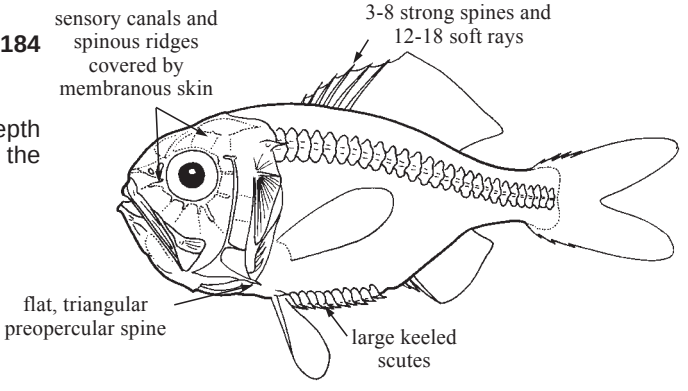
To 37 cm. Meso-, bathy-, and benthopelagic. Three species in the area.



ANOMALOPIDAE Vol. 2, p. 1182

Flashlight fishes

To 11 cm. Sheltering in caves or in deep water adjacent to coral reefs during the day; on moonless nights migrating to shallow water around coral reefs. A single species in the area.



TRACHICHTHYIDAE Vol. 2, p. 1184

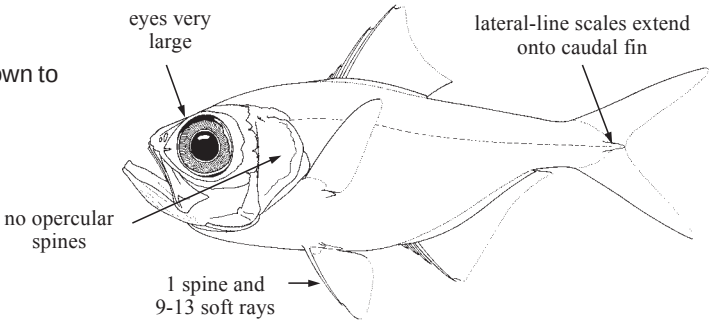
Slimeheads

To about 60 cm. Benthopelagic from a depth of about 75 to 1 500 m. Five species in the area.

BERYCIDAE **Vol. 2, p. 1189**

Alfonsinos

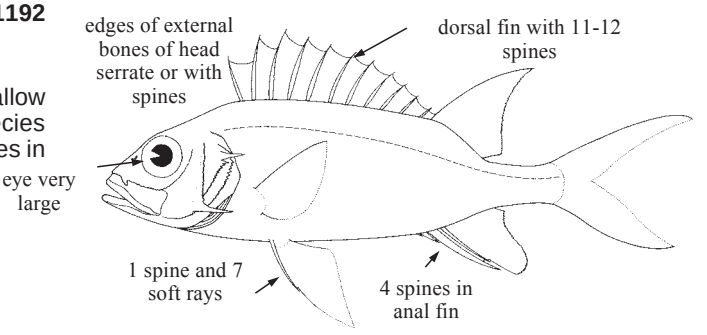
To 55 cm. Demersal or benthopelagic down to 1 300 m. Two species in the area.



HOLOCENTRIDAE **Vol. 2, p. 1192**

Squirrelfishes, soldierfishes

To about 35 cm. Demersal, mostly on shallow coral reefs or rocky bottoms but some species in depths of 200 m or more. Eleven species in the area.

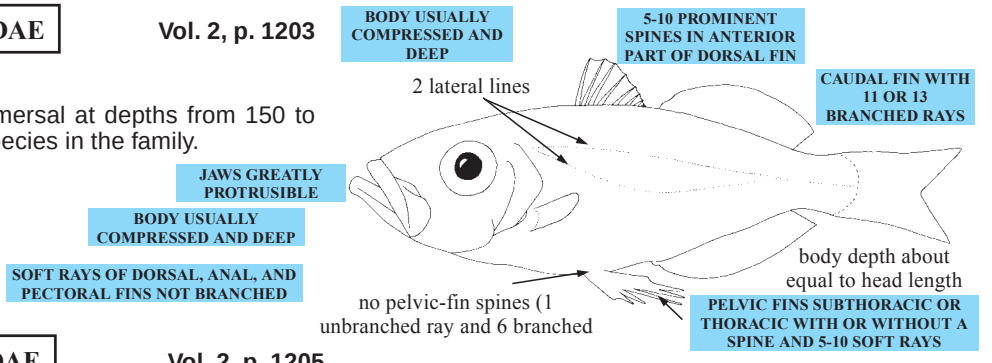


Order ZEIFORMES - Dories and allies

PARAZENIDAE **Vol. 2, p. 1203**

Parazen

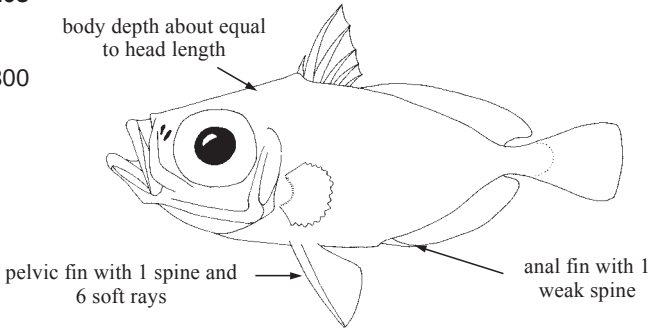
To 30 cm. Demersal at depths from 150 to 600 m. One species in the family.



ZENIONTIDAE **Vol. 2, p. 1205**

Zeniontids

To 10 cm. Demersal at depths between 300 and 600 m. A single species in the area.

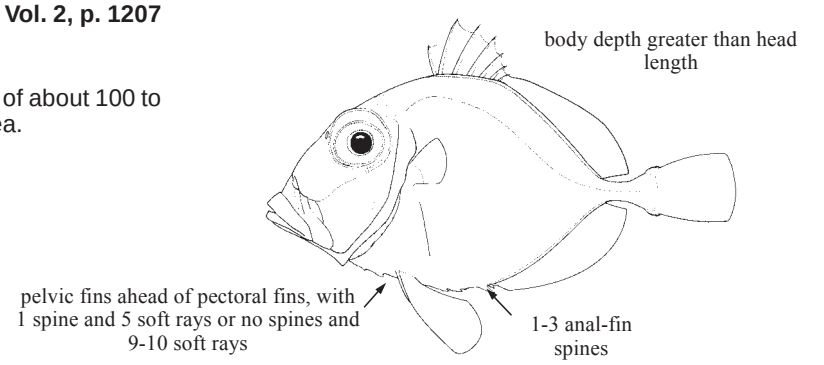


ZEIDAE

Vol. 2, p. 1207

Dories

To 90 cm. Demersal at depths of about 100 to 600 m. Two species in the area.

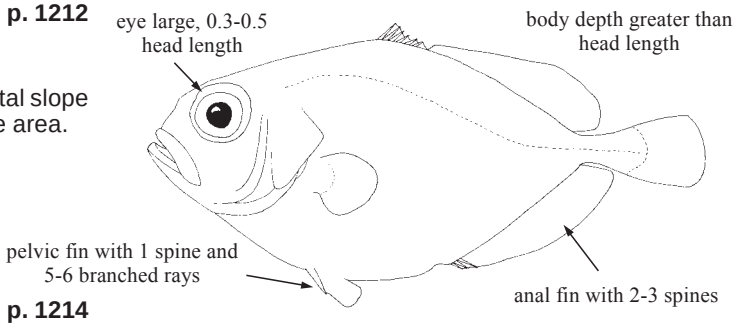


OREOSOMATIDAE

Vol. 2, p. 1212

Oreos

To 52 cm. Benthopelagic on continental slope in 400 to 1 500 m. Two species in the area.

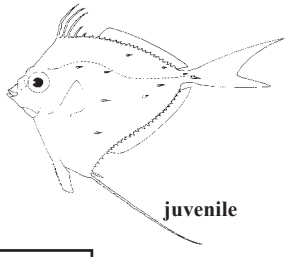


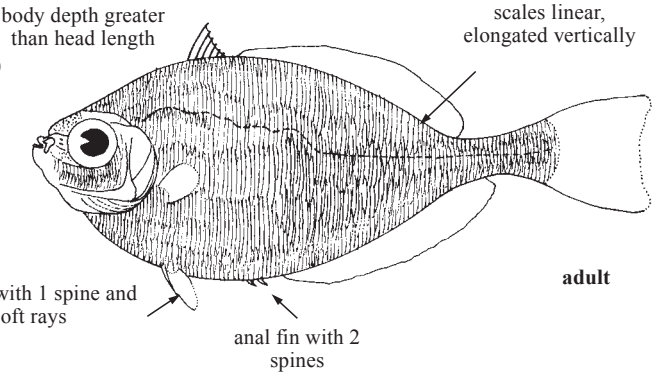
GRAMMICOLEPIDAE

Vol. 2, p. 1214

Tinselfishes

To 65 cm. Demersal at depth of about 90 to 900 m. Two species in the area.



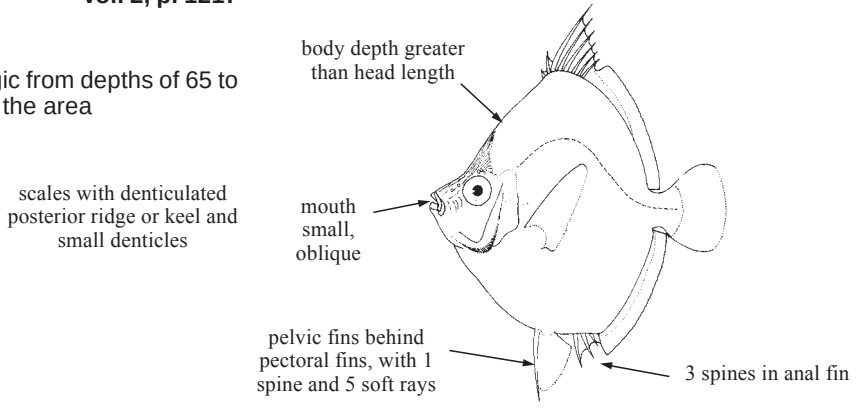


CAPROIDAE

Vol. 2, p. 1217

Boarfishes

To 22 cm. Benthopelagic from depths of 65 to 600 m. Two species in the area



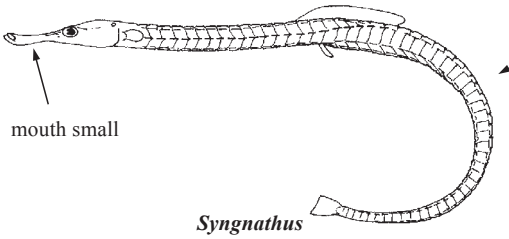
Order GASTEROSTEIFORMES - Pipefishes and allies

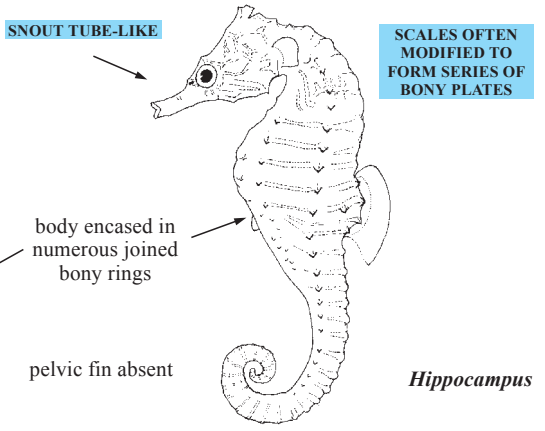
SYNGNATHIDAE

Vol. 2, p. 1221

Pipefishes and seahorses

To about 30 cm. Demersal in littoral and coastal waters. There are 27 pipefishes and 4 seahorse species in the area.



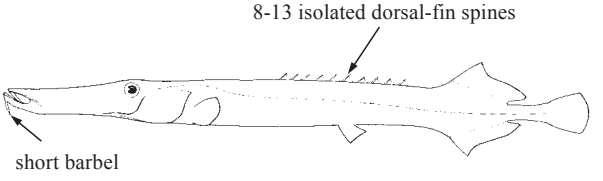


AULOSTOMIDAE

Vol. 2, p. 1226

Trumpetfishes

To 75 cm. Demersal in coastal waters. A single species in the area.

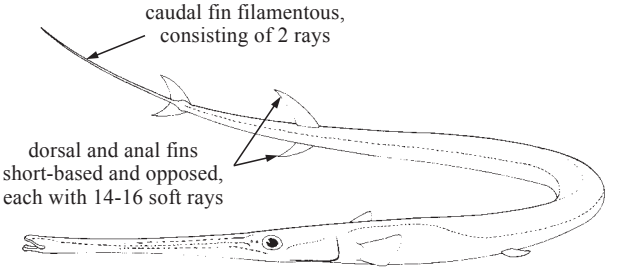


FISTULARIIDAE

Vol. 2, p. 1227

Cornetfishes

To 200 cm. Demersal from shallow seagrass beds and coral reefs and to depths over 10 m on soft bottoms. Two species in the area.

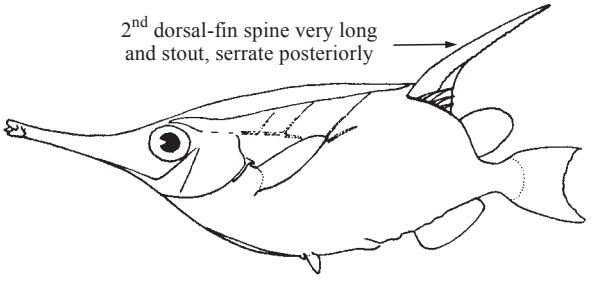


MACRORAMPHOSIDAE

Vol. 2,p.1229

Snipefishes

To 15 cm. Demersal to mesopelagic between depths of 25 and 600 m. A single species in the area.



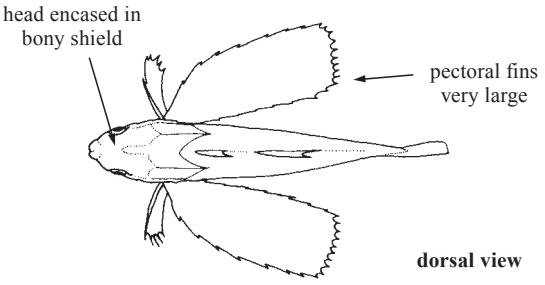
Order SCORPAENIFORMES - Scorpionfishes, Searobins, and allies

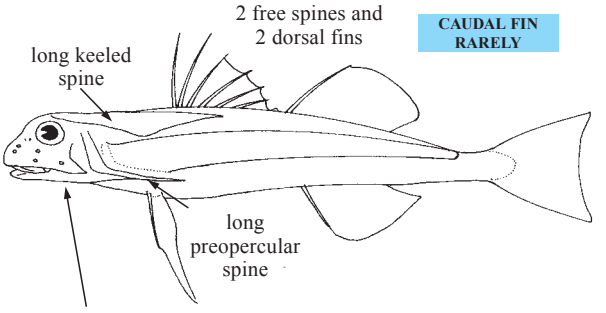
USUALLY WELL-DEVELOPED SPINES ON HEAD, AND PROMINENT SPINES IN DORSAL FIN

DACTYLOPTERIDAE Vol. 2, p. 1230

Flying gurnards

To 45 cm. Demersal on sandy or muddy bottoms to depths of about 80 m. A single species in the area.

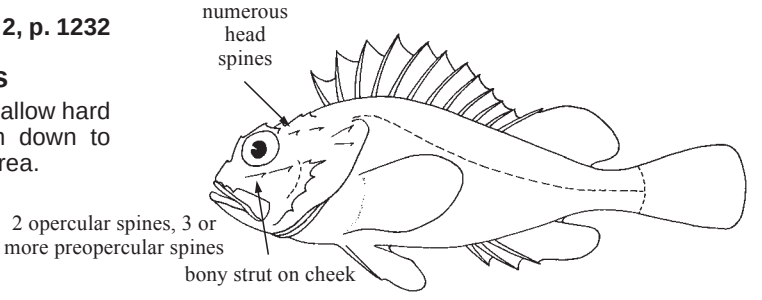




SCORPAENIDAE Vol. 2, p. 1232

Scorpionfishes, rockfishes

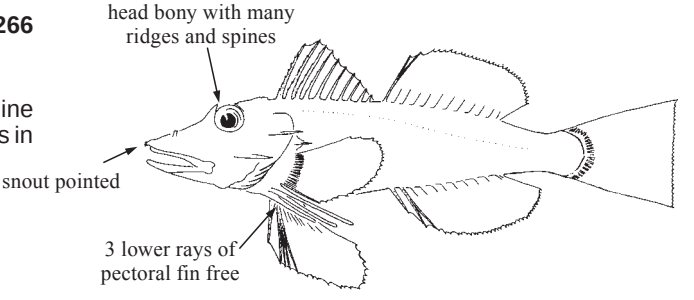
To 45 cm. Demersal, typically in shallow hard bottom but some on soft bottom down to 800 m. Around 30 species in the area.



TRIGLIDAE Vol. 2, p. 1266

Searobins

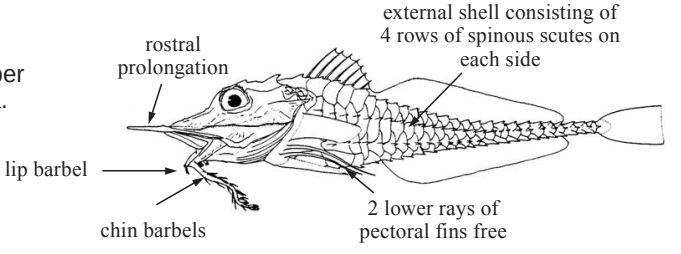
To about 45 cm. Demersal, from the coastline to a depth of about 180 m. Nineteen species in the area.



PERISTEDIIDAE Vol. 2, p. 1278

Armoured searobins

To 30 cm. Demersal, typically in water deeper than 180 m. Around 12 species in the area.



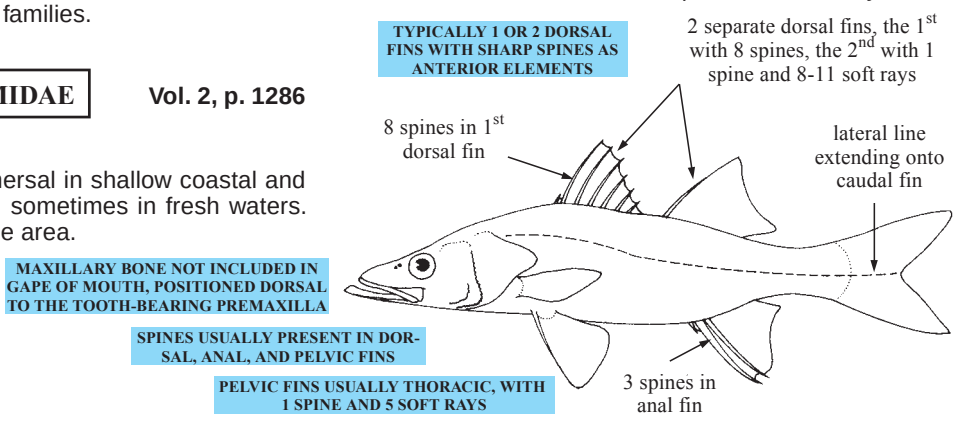
Order PERCIFORMES: Suborder PERCOIDEI - Perch-like fishes

The order Perciformes is the most diverse order of fishes with a little over 65 families represented in the Western Central Atlantic. Therefore, the order is broken down into its component suborders to make this guide to families easier to use. The first suborder, the Percoidei, contains the bulk of the perciform diversity and includes around 35 families.

CENTROPOMIDAE Vol. 2, p. 1286

Snooks

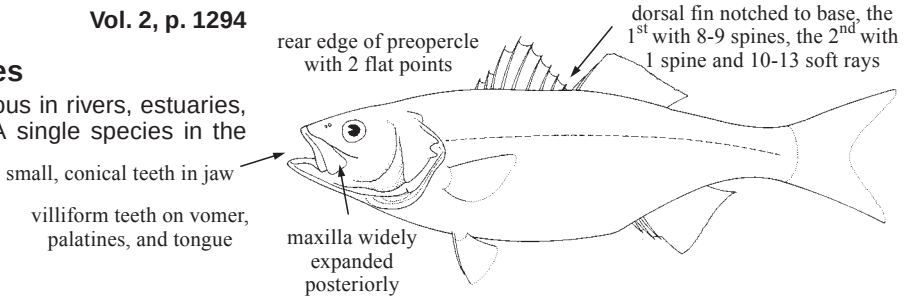
To 130 cm. Demersal in shallow coastal and brackish waters, sometimes in fresh waters. Six species in the area.



MORONIDAE Vol. 2, p. 1294

Temperate basses

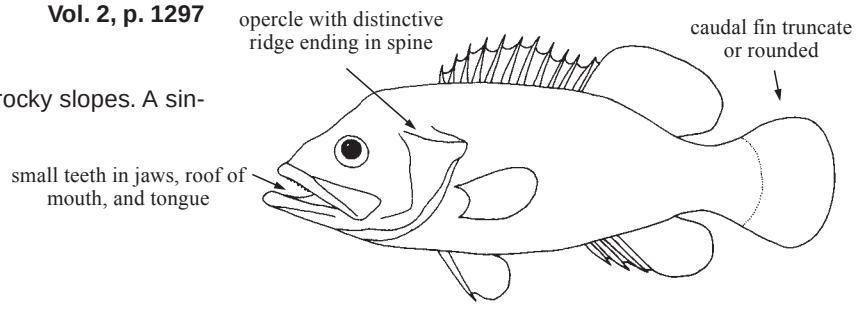
To 180 cm. Anadromous in rivers, estuaries, and coastal waters. A single species in the area.



POLYPRIONIDAE Vol. 2, p. 1297

Wreckfishes

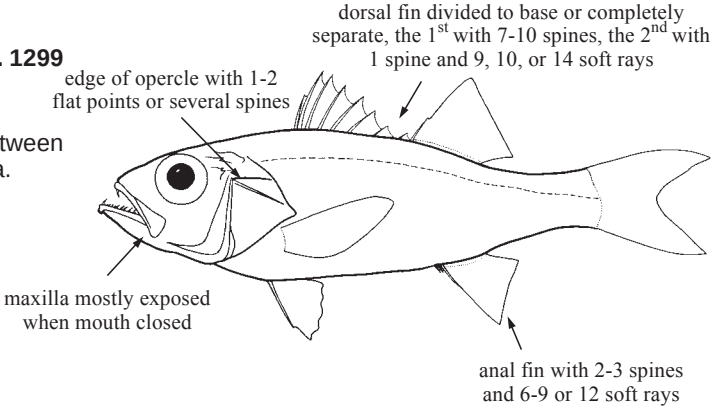
To 200 cm. Prefers deep rocky slopes. A single species.



ACROPOMATIDAE Vol. 2, p. 1299

Temperate ocean-basses

To 80 cm. Benthopelagic at depths between 87 and 910 m. Nine species in the area.

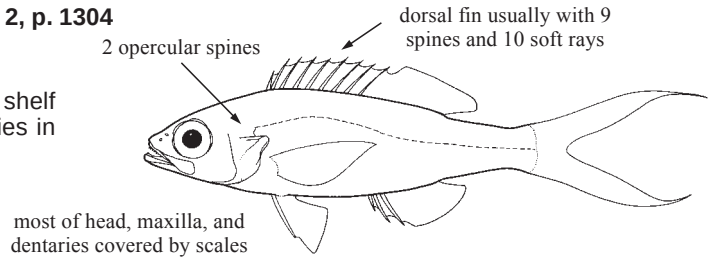


SYMPHYSANODONTIDAE

Vol. 2, p. 1304

Bunquelovelies

To about 15 cm. Demersal on continental shelf and upper continental slope. Two species in the area.

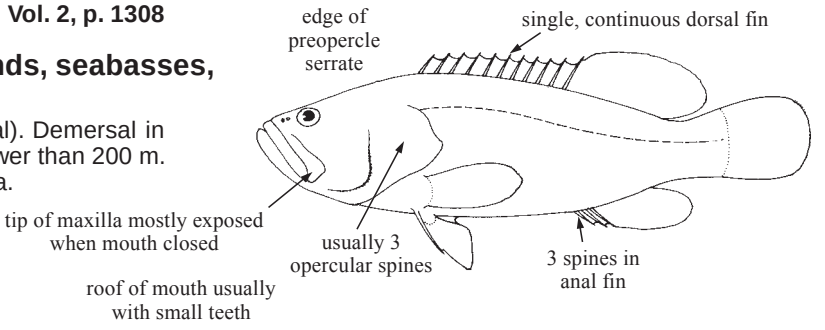


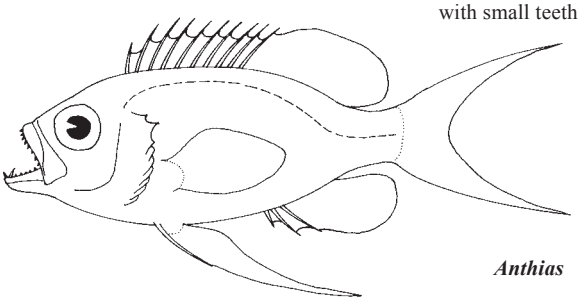
SERRANIDAE

Vol. 2, p. 1308

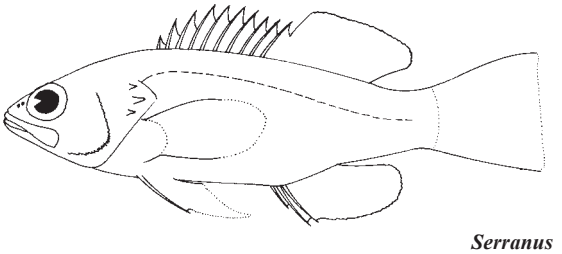
Groupers, hamlets, hinds, seabasses, sand-perches, tatleys

To about 250 cm (exceptional). Demersal in coastal waters usually shallower than 200 m. Around 90 species in the area.

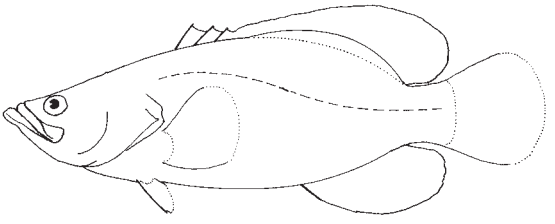




Anthias



Serranus



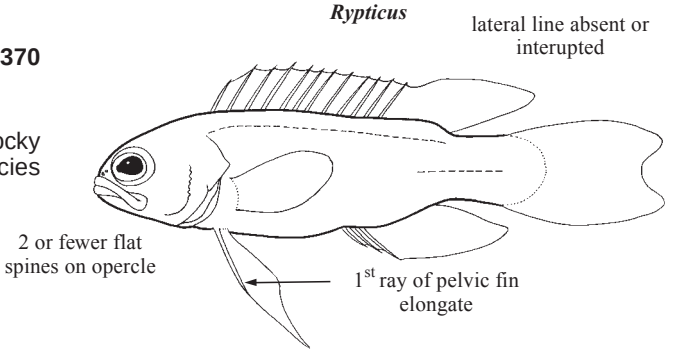
Rypticus

GRAMMATIDAE

Vol. 2, p. 1370

Basslets

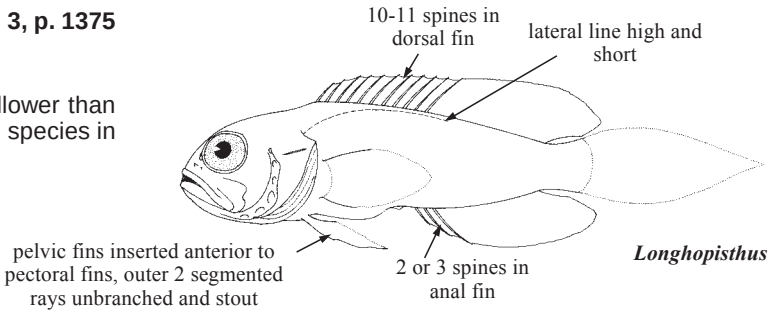
To 8 cm. Demersal mostly in coral and rocky reefs to a depth of about 50 m. Eleven species in the area.



OPISTOGNATHIDAE **Vol. 3, p. 1375**

Jawfishes

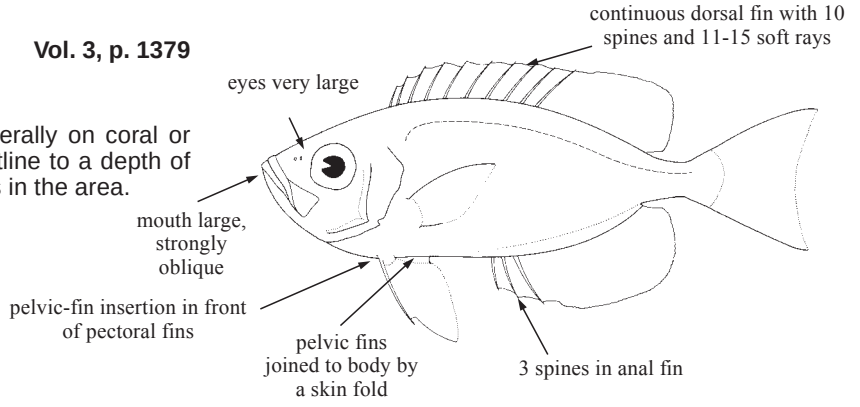
To 19 cm. Demersal typically shallower than 30 m, living in burrows. Seventeen species in the area.



PRIACANTHIDAE **Vol. 3, p. 1379**

Bigeyes

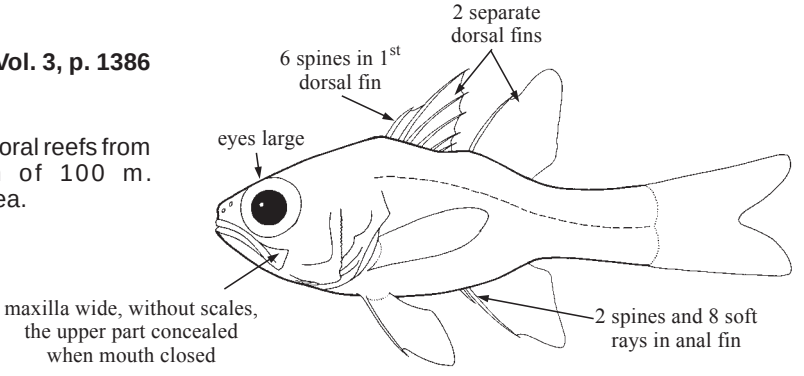
To 65 cm. Demersal, generally on coral or rocky reefs from the coastline to a depth of about 400 m. Four species in the area.



APOGONIDAE **Vol. 3, p. 1386**

Cardinalfishes

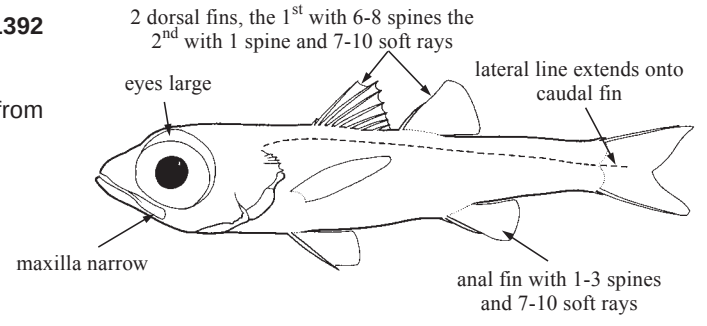
To 11 cm. Demersal mostly on coral reefs from the coastline to a depth of 100 m. Twenty-three species in the area.



EPIGONIDAE **Vol. 3, p. 1392**

Deepwater cardinalfishes

To about 50 cm. Near bottom at depths from 75 to 3 700 m. Eight species in the area.



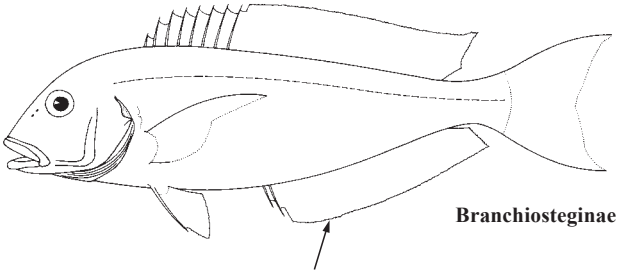
click for next page

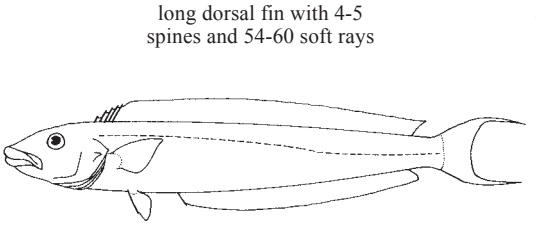
click for previous page

BRANCHIOSTEGIDAE Vol. 3, p. 1395

Tilefishes

Mostly on soft or rubble bottoms from 10 to 600 m. Branchiosteginae with 8 species and Malacanthinae with 1 species in the area.

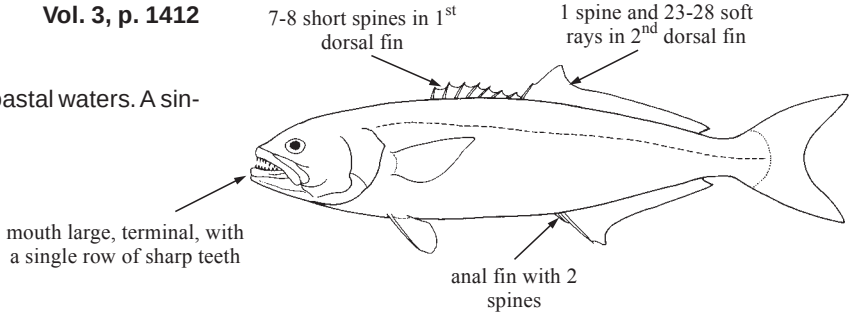




POMATOMIDAE Vol. 3, p. 1412

Bluefishes

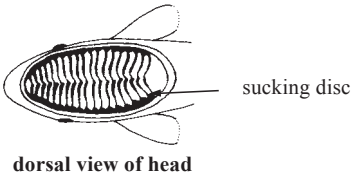
To 110 cm. Epipelagic in coastal waters. A single species



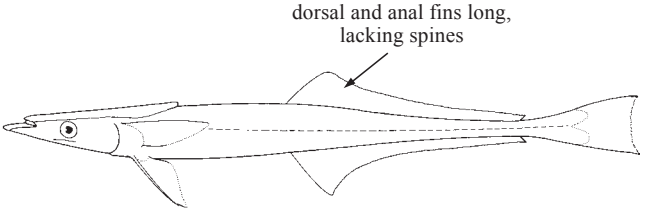
ECHENEIDAE Vol. 3, p. 1414

Remoras

To 90 cm. Pelagic in coastal and oceanic waters. They attach by means of their sucking disc to large fish, sea turtles, and marine mammals. Eight species in the area.



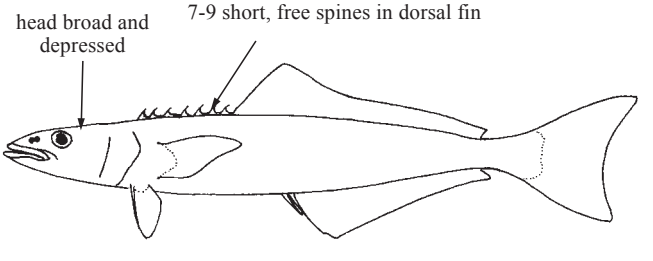
dorsal view of head



RACHYCENTRIDAE Vol. 3, p. 1420

Cobia

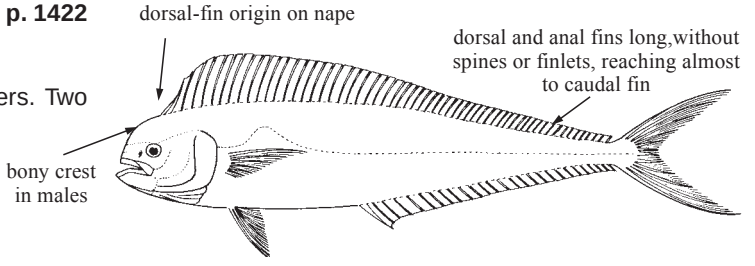
To 200 cm. Pelagic in coastal waters, from the surface to a depth of 50 m. A single species in the area.



CORYPHAENIDAE **Vol. 3, p. 1422**

Dolphinfishes

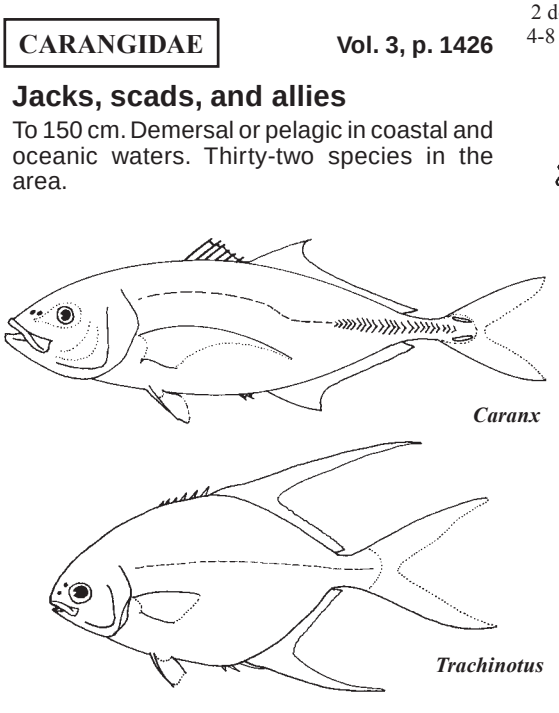
To 200 cm. Pelagic in oceanic waters. Two species, both in the area.



CARANGIDAE **Vol. 3, p. 1426**

Jacks, scads, and allies

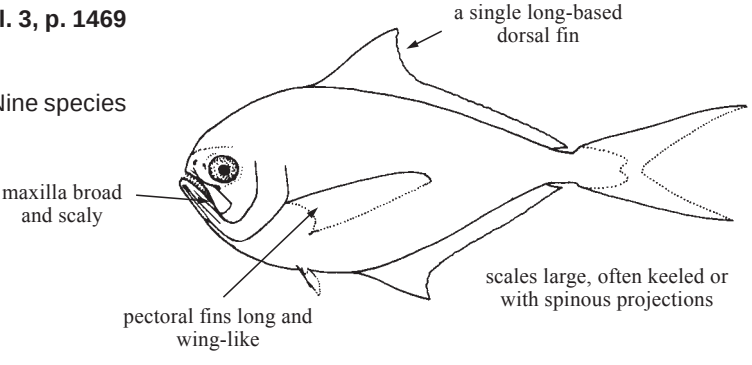
To 150 cm. Demersal or pelagic in coastal and oceanic waters. Thirty-two species in the area.



BRAMIDAE **Vol. 3, p. 1469**

Pomfrets

To 100 cm. Epi- or mesopelagic. Nine species in the area.

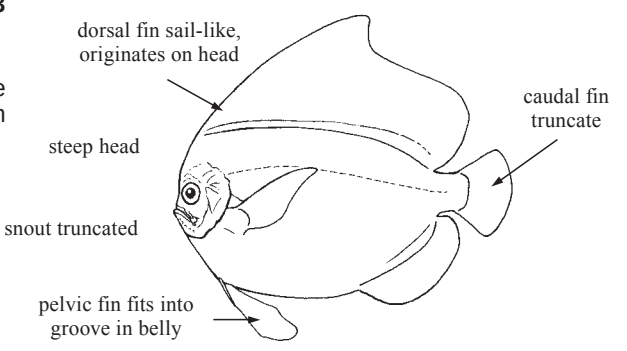


CARISTIIDAE

Vol. 3, p. 1473

Manefishes

To about 27 cm. Epi- to bathypelagic. A single species of questionable identity reported from the area.

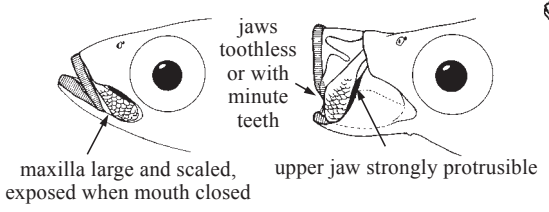


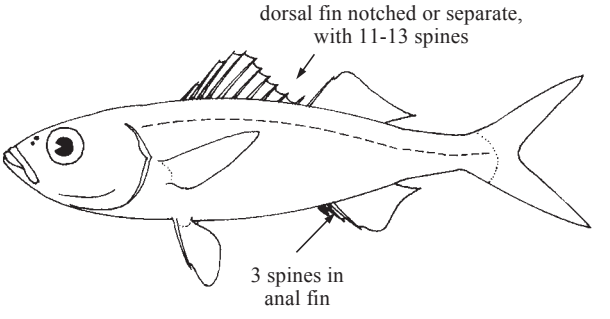
EMMELICHTHYIDAE

Vol. 3, p. 1475

Rovers, rubyfishes

To 55 cm. Near bottom at depths between 57 and 500 m. Two species in the area.



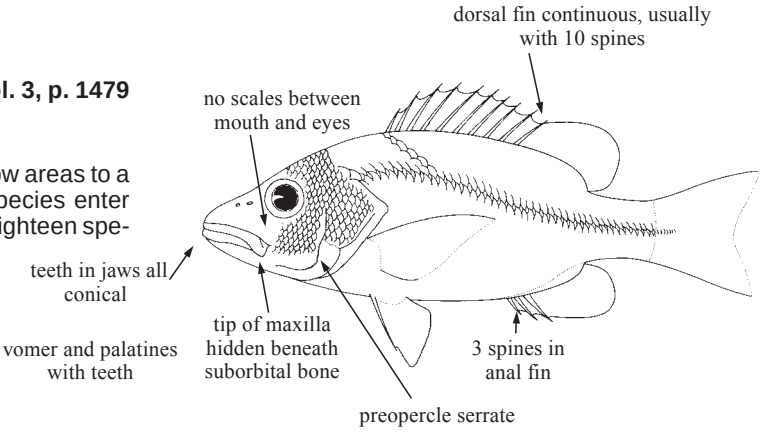


LUTJANIDAE

Vol. 3, p. 1479

Snappers

To 160 cm. Demersal, from shallow areas to a depth of around 550 m; some species enter brackish or hypersaline waters. Eighteen species in the area.

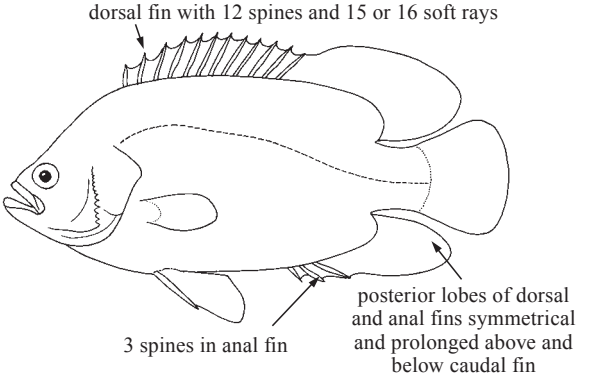


LOBOTIDAE

Vol. 3, p. 1505

Tripletails

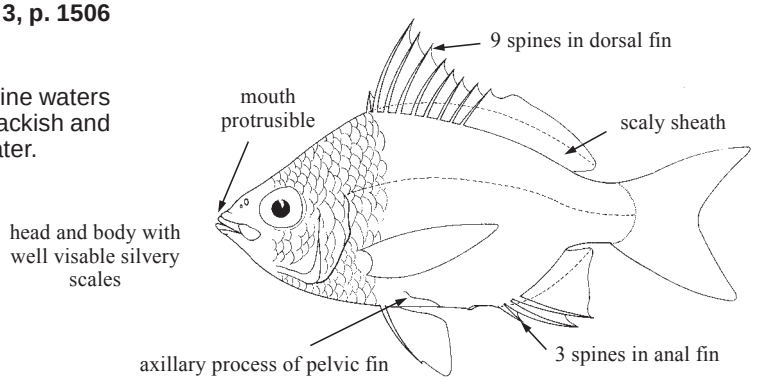
To 110 cm. Pelagic in coastal and brackish waters drifting near the surface. A single species in the area.



GERREIDAE **Vol. 3, p. 1506**

Mojarras

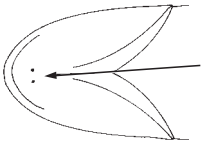
To 40 cm. Demersal in coastal marine waters to a depth of about 50 m; also in brackish and hypersaline waters and in fresh water.



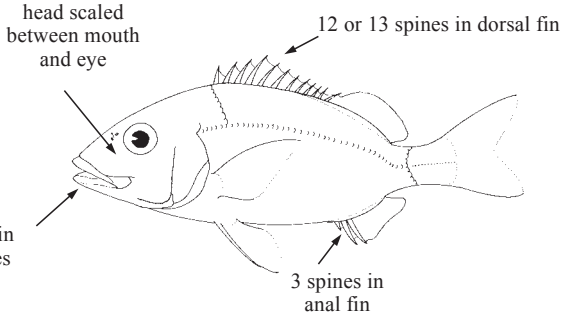
HAEMULIDAE **Vol. 3, p. 1522**

Grunts

To 75 cm. Demersal in marine waters from the coastline to a depth of about 100 m, but also in brackish waters and rarely in fresh water.



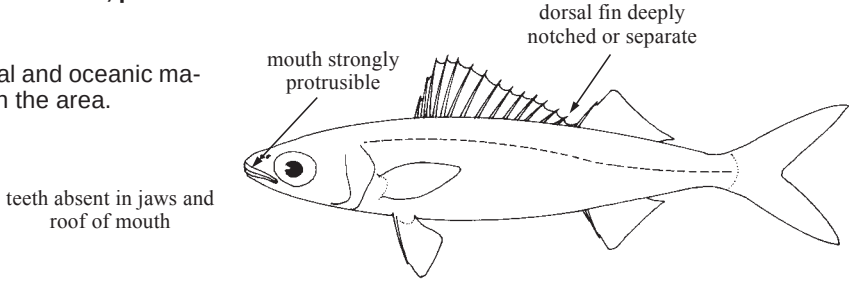
ventral view of head



INERMIIDAE **Vol. 3, p. 1551**

Bonnetmouths

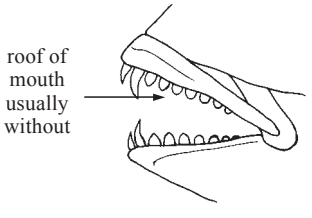
To 25 cm. Pelagic in coastal and oceanic marine waters. Two species in the area.

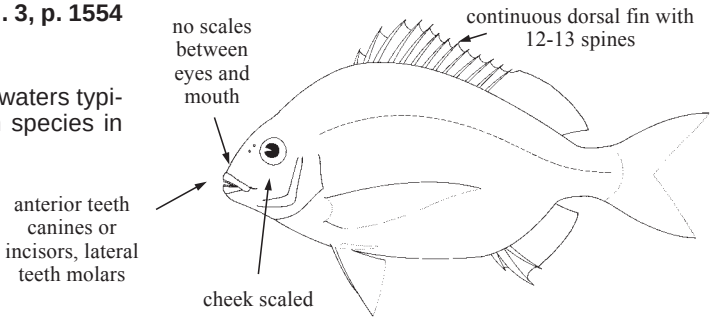


SPARIDAE **Vol. 3, p. 1554**

Porgies

To 75 cm. Demersal in in coastal waters typically over hard bottom. Nineteen species in the area.

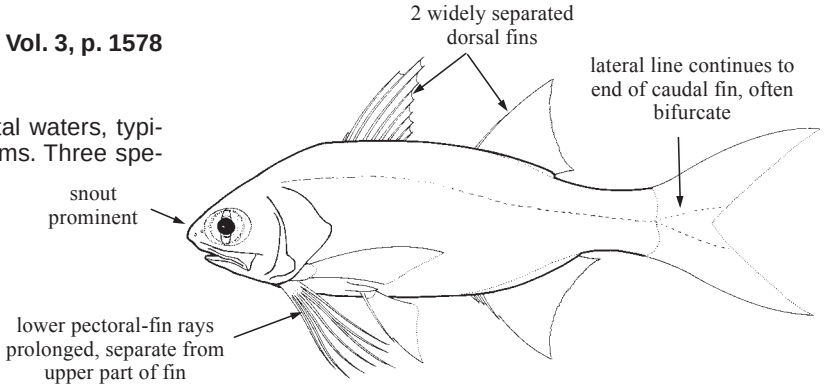




POLYNEMIDAE **Vol. 3, p. 1578**

Threadfins

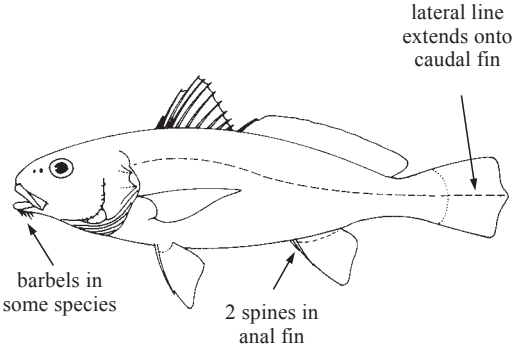
To 43 cm. Demersal in coastal waters, typically over sand or mud bottoms. Three species in the area.



SCIAENIDAE **Vol. 3, p. 1583**

Croakers

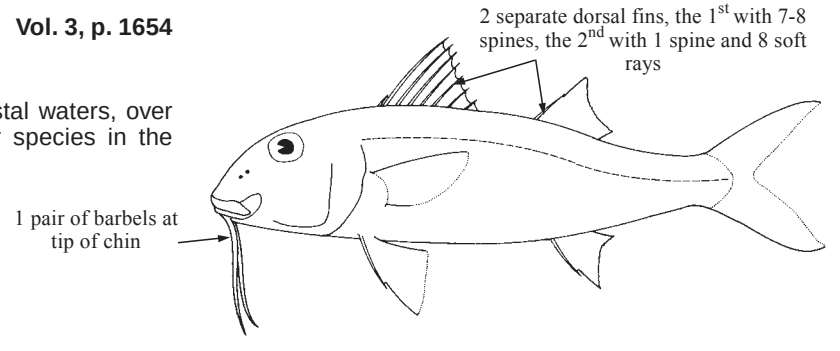
To 110 cm. Usually demersal in coastal waters, over sandy or muddy bottoms but some also on coral reefs. Around 60 species in the area.



MULLIDAE **Vol. 3, p. 1654**

Goatfishes

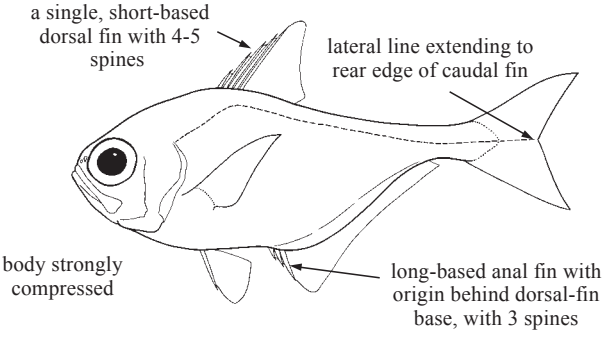
To 40 cm. Demersal in coastal waters, over sand or mud bottoms. Four species in the area.



PEMPHERIDAE **Vol. 3, p. 1660**

Sweepers

To 15 cm. Demersal in coastal waters, on rocky or coral reef bottoms to a depth of 30 m. Two species in the area.

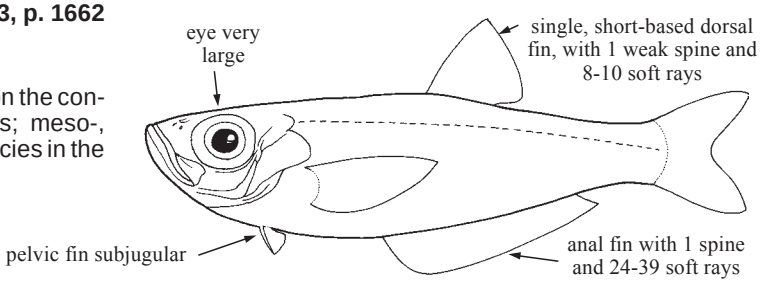


BATHYCLUPEIDAE

Vol. 3, p. 1662

Bathyclupeids

To around 21 cm. Deep-sea fishes on the continental slope and oceanic waters; meso-, bathy-, or benthopelagic. Three species in the area.

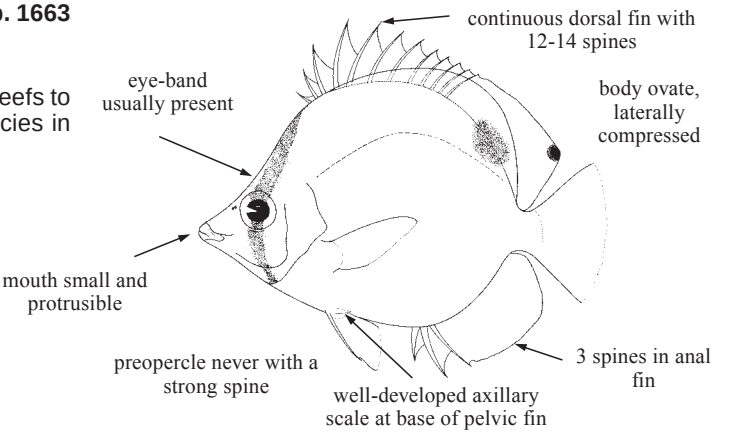


CHAETODONTIDAE

Vol. 3, p. 1663

Butterflyfishes

To 20 cm. Demersal on rocky or coral reefs to a depth of 200 m or more. Seven species in the area.

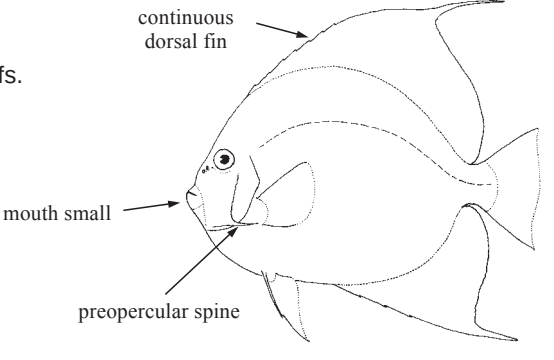


POMACANTHIDAE

Vol. 3, p. 1673

Angelfishes

To 60 cm. Demersal on rocky or coral reefs. Seven species in the area.

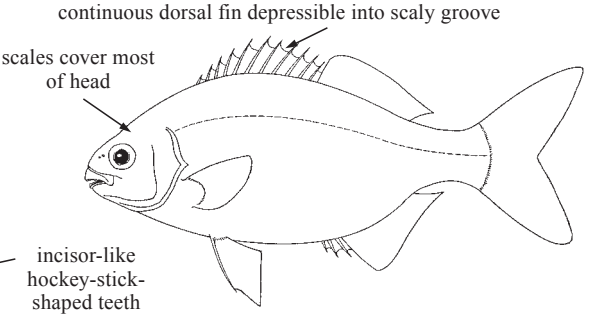


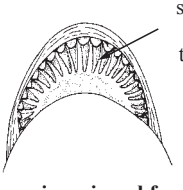
KYPHOSIDAE

Vol. 3, p. 1684

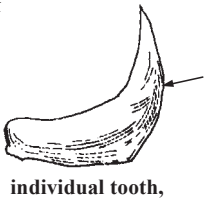
Sea chubs

To 76 cm. Demersal over coral or rocky reefs or schooling far offshore. Two species in the area.





upper jaw viewed from below

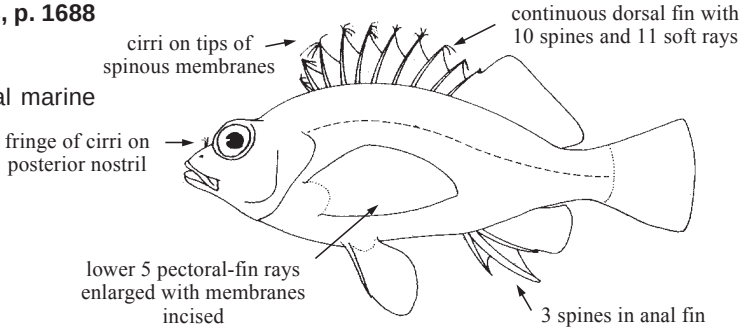


individual tooth, lateral view

CIRRHITIDAE **Vol. 3, p. 1688**

Hawkfishes

To about 9 cm. Demersal in coastal marine waters above a depth of 20 m.

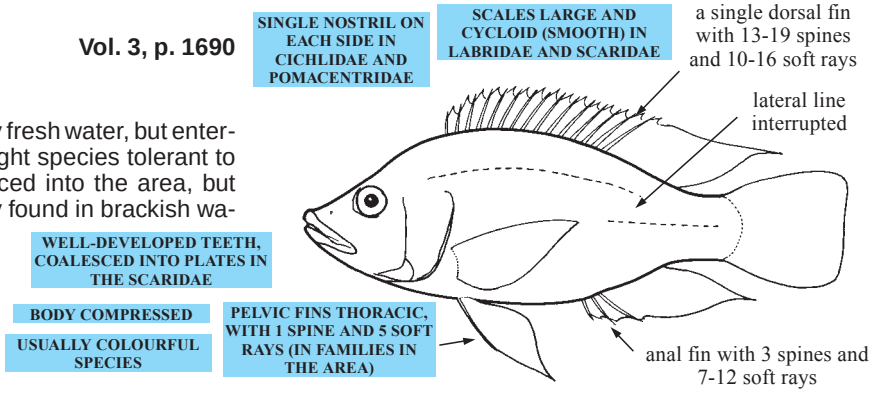


Order PERCIFORMES: Suborder LABROIDEI - Wrasses and allies

CICHLIDAE **Vol. 3, p. 1690**

Cichlids

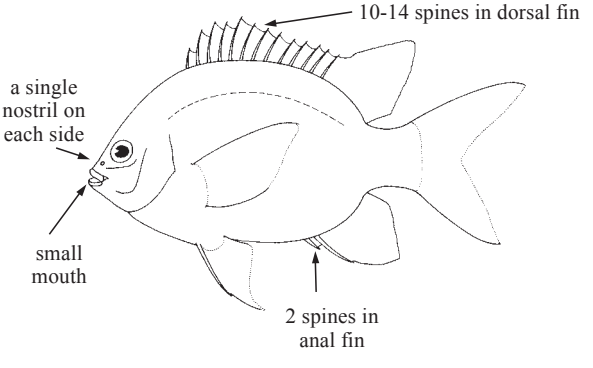
To about 74 cm. Usually fresh water, but entering brackish waters. Eight species tolerant to brackish water introduced into the area, but only 1species regularly found in brackish water.



POMACENTRIDAE **Vol. 3, p. 1694**

Damselfishes, sergeantfishes, chromis

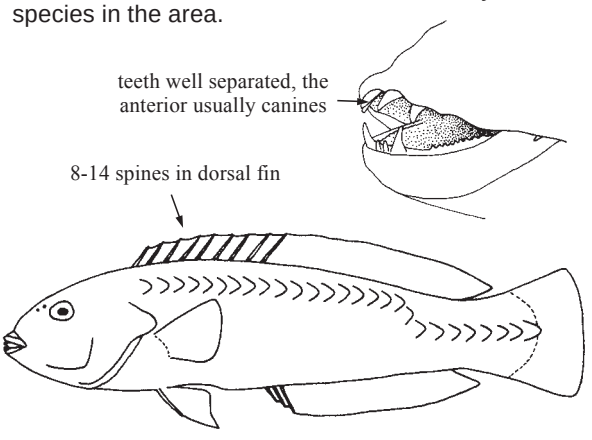
To 38 cm. Demersal on coral reefs. Twenty species in the area.

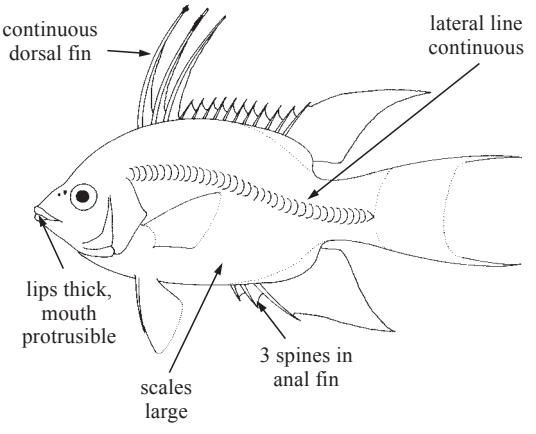


LABRIDAE Vol. 3, p. 1701

Wrasses

To 70 cm, but generally smaller than 20 cm. Demersal in shallow coastal habitats. Twenty species in the area.

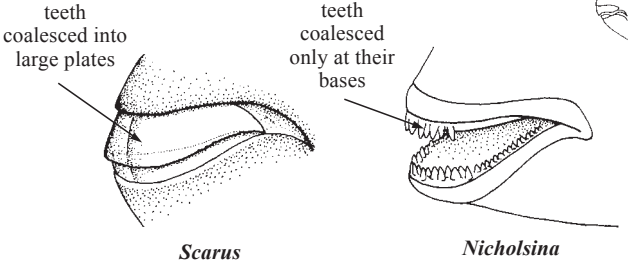


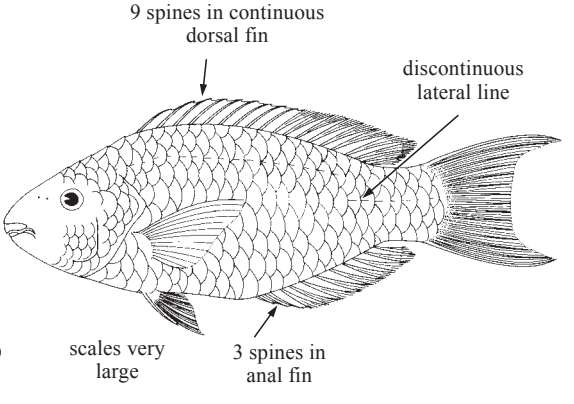


SCARIDAE Vol. 3, p.1723

Parrotfishes

To 90 cm. Demersal on coral reefs. Fourteen species in the area.



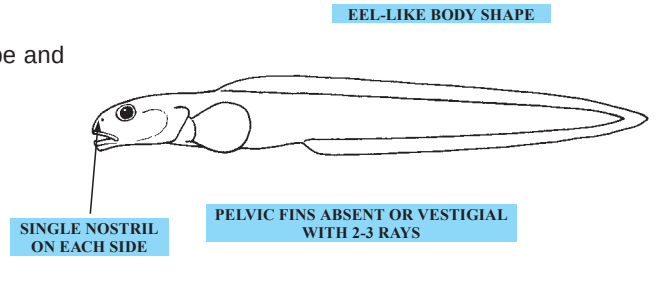


Order PERCIFORMES: Suborder ZOARCOIDEI - Eelpouts

ZOARCIDAE Vol. 3, p.1740

Eelpouts

To 40 cm. Demersal on upper continental slope and abyssal depths. Four species in the area.



Order PERCIFORMES: Suborder TRACHINOIDEI - Stargazers and allies

A diverse assemblage of families difficult to characterize as a group; the composition of this suborder is provisional.

BODY MODERATELY ELONGATE

SOFT DORSAL AND ANAL FIN ELONGATE

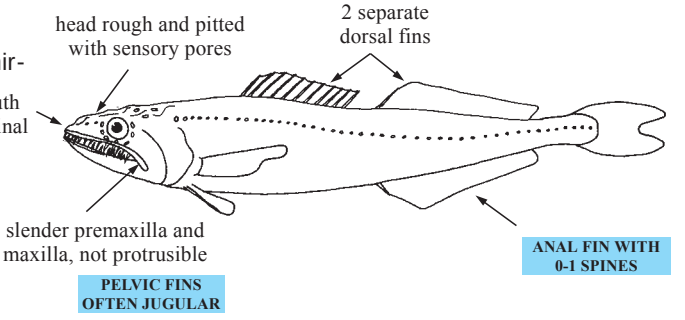
CHIASMODONTIDAE Vol. 3, p.1742

Swallowers

To about 26 cm. Meso- and bathypelagic. Thirteen species in the area.

LOWER JAW USUALLY PROJECTIONG BEYOND UPPER JAW

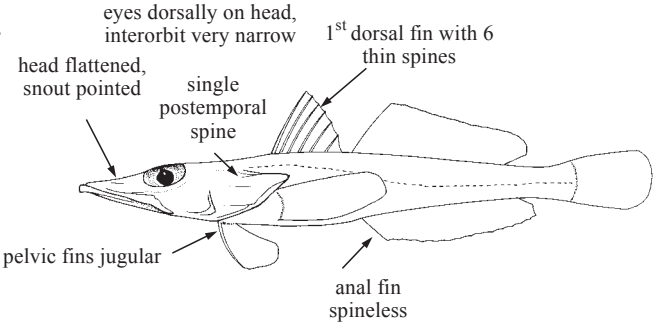
PELVIC FINS WITH 1 SPINE AND 5 SOFT RAYS (VERY SMALL IN AMMODYTIDAE)



PERCOPHIDAE Vol. 3, p. 1744

Flatheads

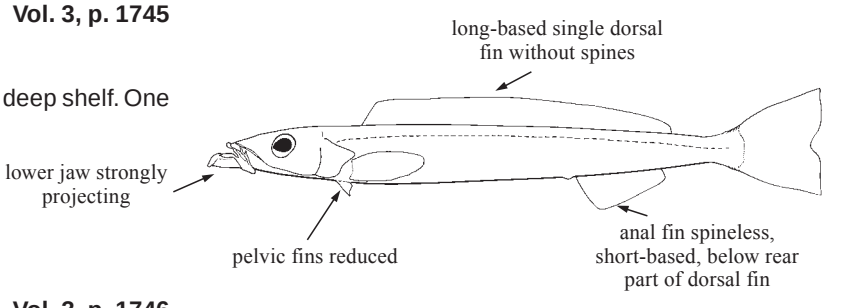
To about 25 cm. Demersal on continental shelves, between depths of 80 and 800 m.



AMMODYTIDAE Vol. 3, p. 1745

Sandlances

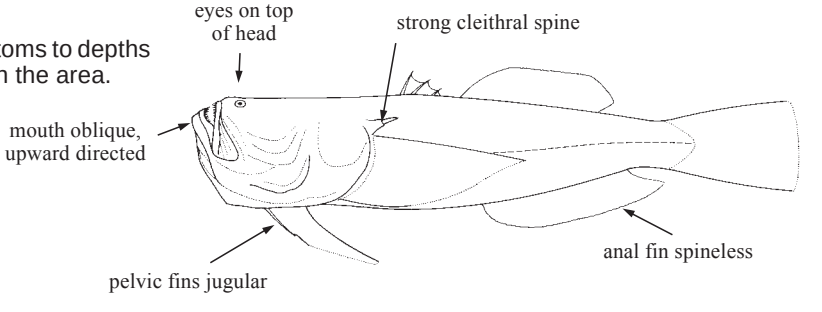
To about 12 cm. Demersal on deep shelf. One species in the area.



URANOSCOPIDAE Vol. 3, p. 1746

Stargazers

To 44 cm. Demersal on soft bottoms to depths of about 550 m. Four species in the area.



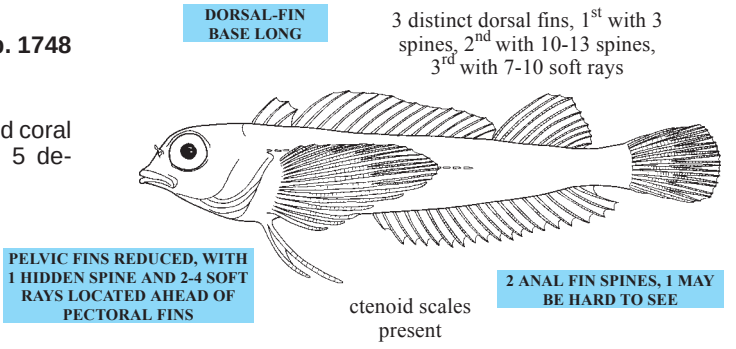
Order PERCIFORMES: Suborder BLENNIOIDEI - Blennies and allies

TRIPTERYGIIDAE

Vol. 3, p. 1748

Triplefins

To 3 cm. Demersal on shallow rocky and coral reefs. Around 9 species in the area, 5 described and at least 4 undescribed.

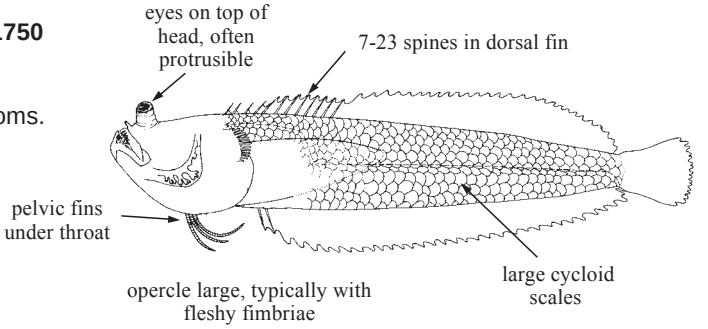


DACTYLOSCOPIDAE

Vol. 3, p. 1750

Sand stargazers

To about 15 cm. Demersal on sandy bottoms. Sixteen species in the area.

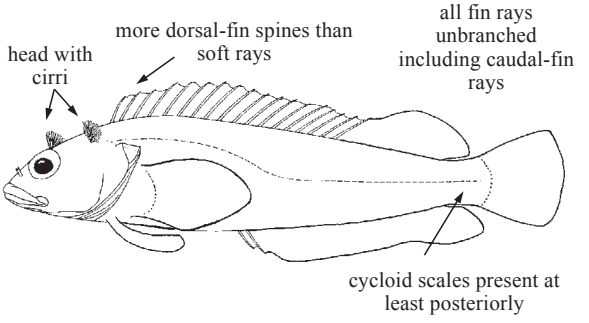


LABRISOMIDAE

Vol. 3, p. 1754

Labrisomids

To about 20 cm. Demersal on shallow, rocky, shelly, or reef habitats. At least 41 species in the area.

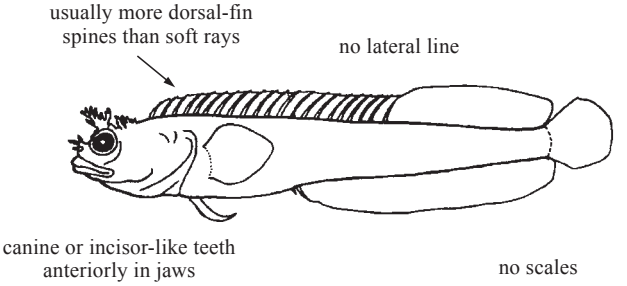


CHAENOPSIDAE

Vol. 3, p.1761

Tubeblennies

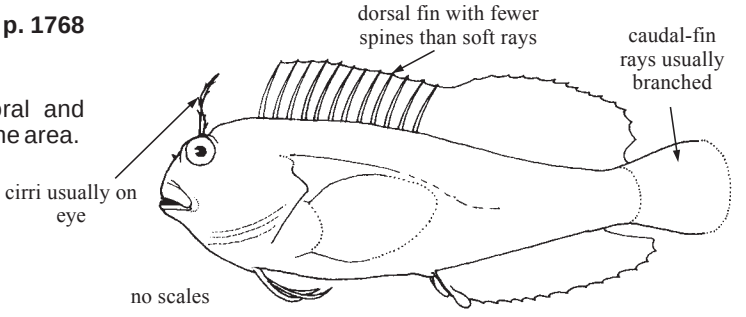
To about 12 cm. Demersal, usually in holes in hard substrates. Around 47 species in the area.



BLENNIIDAE **Vol. 3, p. 1768**

Combtooth blennies

To about 13 cm. Demersal in littoral and coastal waters. Twenty one spcies in the area.

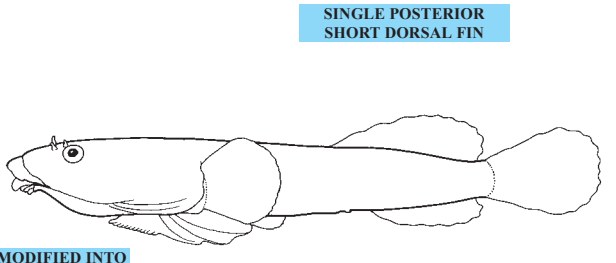


Order PERCIFORMES: Suborder GOBIESOCOIDEI

GOBIESOCIDAE **Vol. 3, p. 1773**

Clingfishes

To 30 cm. Shallow marine, brackish, and fresh water. Seventeen species in the area.

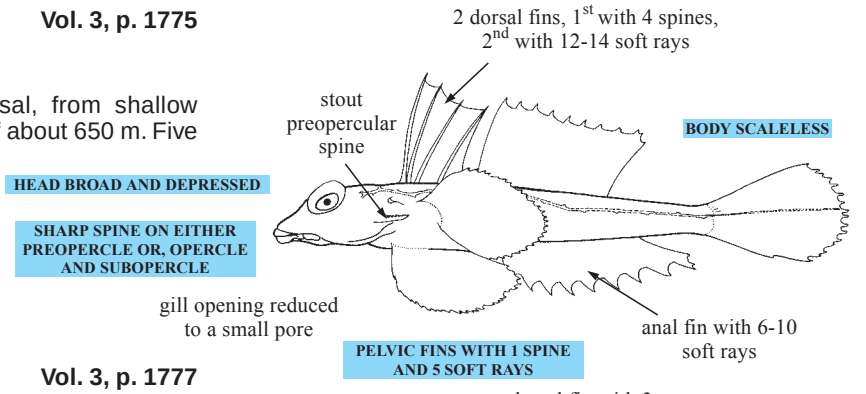


Order PERCIFORMES: Suborder CALLIONYMOIDEI

CALLIONYMIDAE **Vol. 3, p. 1775**

Dragonets

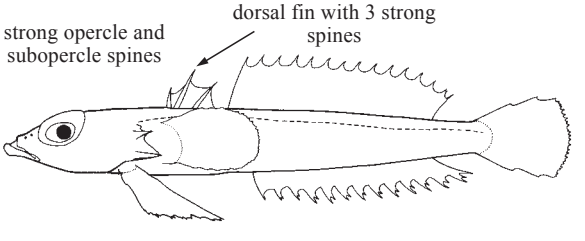
To about 30 cm. Demersal, from shallow coastal areas to a depth of about 650 m. Five species in the area.



DRACONETTIDAE **Vol. 3, p. 1777**

Deepwater draconetts

To 11 cm. Demersal in deep water between 300 and 550 m. Two species in the area.



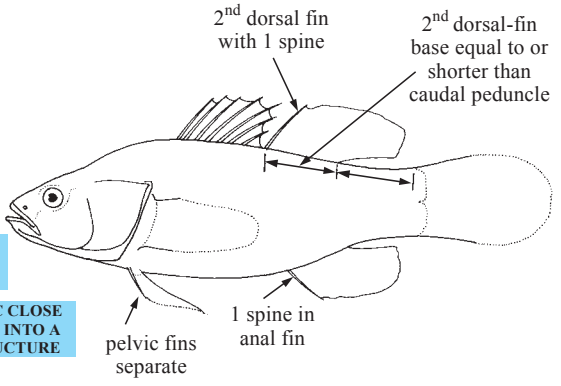
Order PERCIFORMES: Suborder GOBIOIDEI - Gobies and allies

ELEOTRIDAE

Vol. 3, p. 1778

Sleepers

To 60 cm, but generally much smaller. Demersal, mostly in freshwater, some species in coastal marine, brackish or hypersaline waters. Ten species in the area.

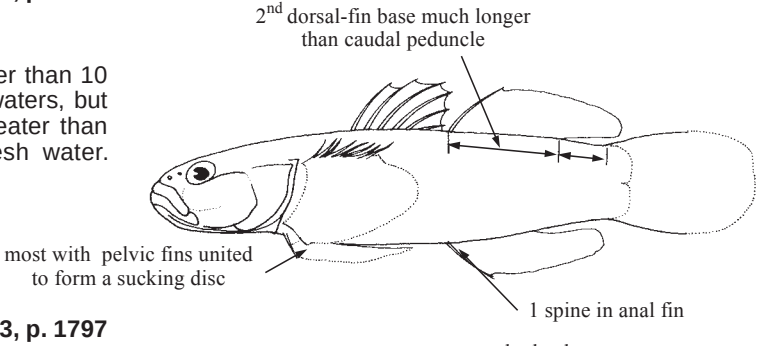


GOBIIDAE

Vol. 3, p. 1781

Gobies

To 18 cm, but most species smaller than 10 cm. Usually demersal in coastal waters, but some species found in depths greater than 500 m; also in brackish and fresh water. Around 124 species in the area.

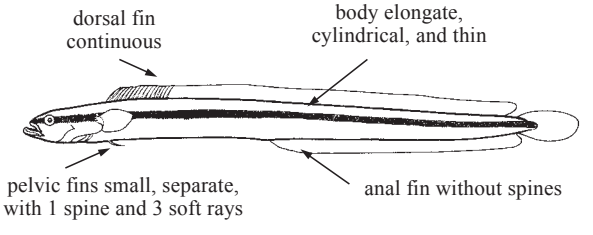


MICRODESMIDAE

Vol. 3, p. 1797

Wormfishes

To 27 cm. Demersal, burrowing in the substrate in coastal waters. Six species in the area.



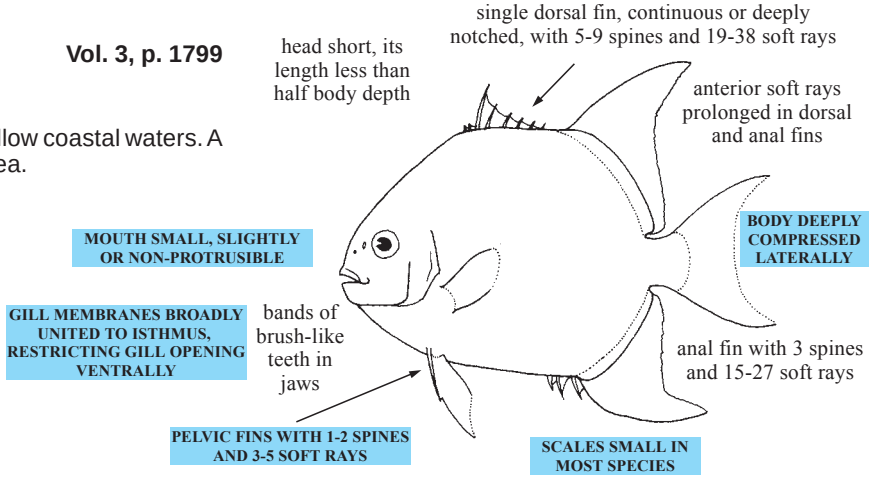
Order PERCIFORMES: Suborder ACANTHUROIDEI - Surgeonfishes and allies

EPHIPPIDAE

Vol. 3, p. 1799

Spadefishes

To 1 m. Demersal in shallow coastal waters. A single species in the area.

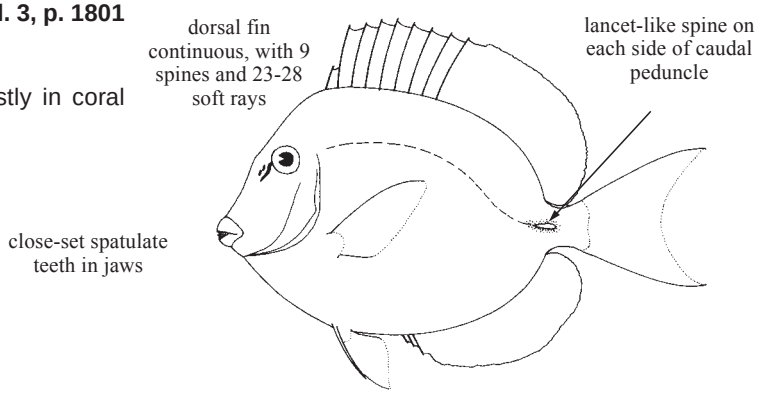


ACANTHURIDAE

Vol. 3, p. 1801

Surgeonfishes

To about 36 cm. Demersal, mostly in coral reefs. Three species in the area.



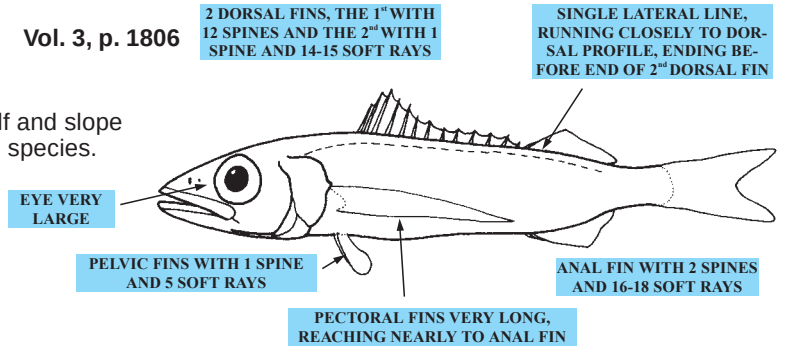
Order PERCIFORMES: Suborder SCOMBROLABRACOIDEI - Longfin escolars

SCOMBROLABRACIDAE

Vol. 3, p. 1806

Longfin escolar

To 30 cm. On the continental shelf and slope between 100 and 900 m. A single species.



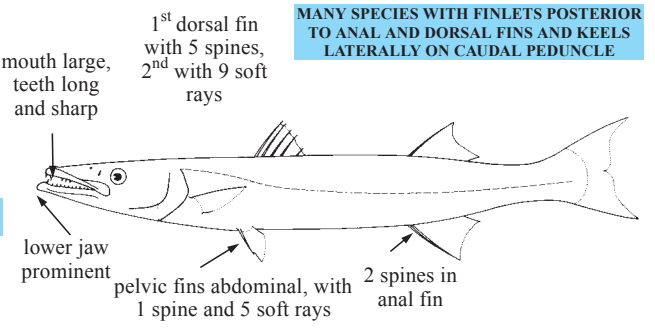
Order PERCIFORMES: Suborder SCOMBROIDEI - Tunas and allies

SPHYRAENIDAE

Vol. 3, p. 1807

Barracudas

To 200 cm. Pelagic and demersal in coastal waters to a depth of about 100 m. Three species in the area

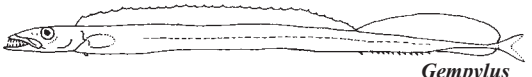


GEMPYLIDAE

Vol. 3, p. 1812

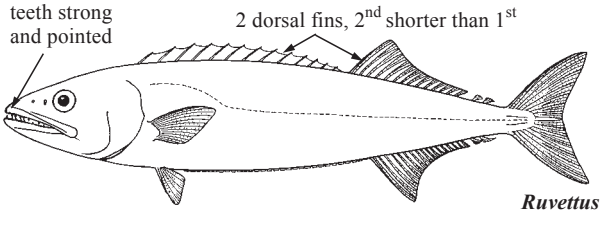
Snake mackerels

To about 300 cm. Pelagic in oceanic waters, typically between 200 and 500 m. Nine spcies in the area.



Gempylus

pelvic fins often reduced



Ruvettus

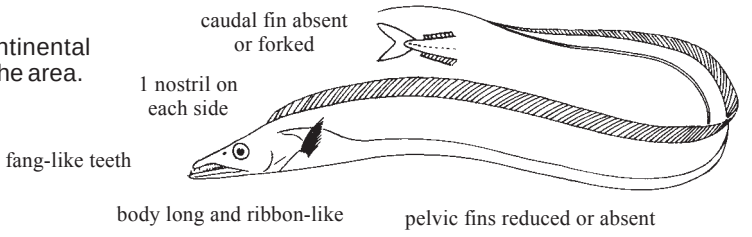
body usually brown, without distinct markings

finlets often present

TRICHIURIDAE **Vol. 3, p. 1825**

Cutlassfishes, hairtails

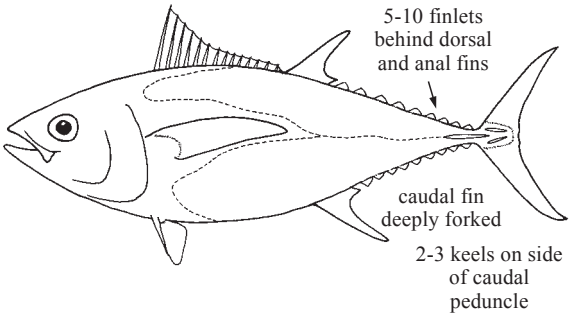
To 200 cm. Benthopelagic on continental shelves and slopes. Eight species in the area.



SCOMBRIDAE **Vol. 3, p. 1836**

Tunas

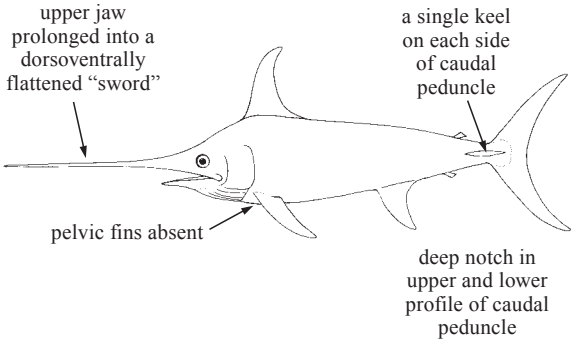
To 300 cm. Pelagic in coastal and oceanic waters. Sixteen species in the area.



XIPHIIDAE **Vol. 3, p. 1858**

Swordfishes

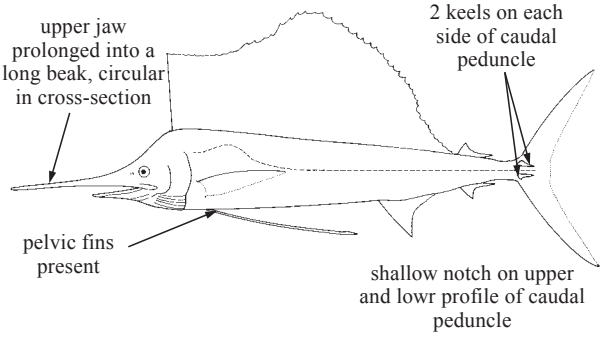
To 450 cm. Pelagic in oceanic waters. A single species in the family.



ISTIOPHORIDAE **Vol. 3, p. 1860**

Billfishes

To 400 cm. Epipelagic in oceanic waters. Four species in the area.



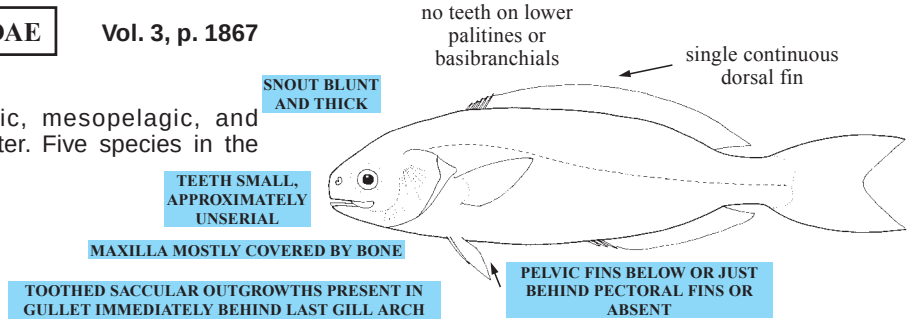
Order PERCIFORMES: Suborder STROMATEOIDEI - Butterfishes and allies

CENTROLOPHIDAE

Vol. 3, p. 1867

Medusafishes

To 120 cm. Pelagic, mesopelagic, and epibenthic deep water. Five species in the area.

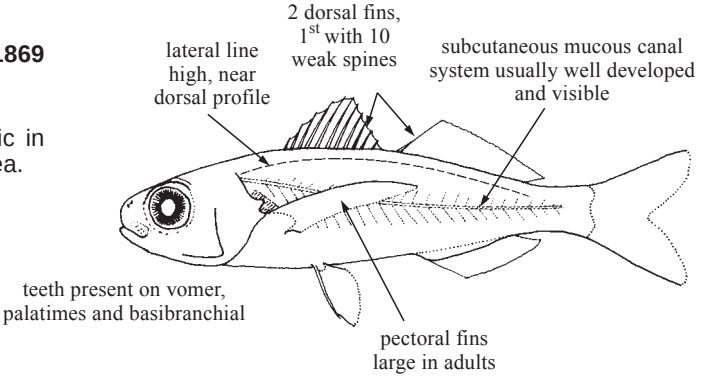


NOMEIDAE

Vol. 3, p. 1869

Driftfishes

To about 100 cm. Epi- and mesopelagic in oceanic waters. Seven species in the area.

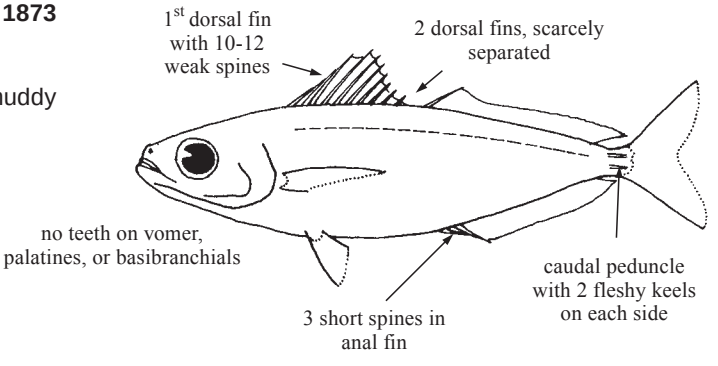


ARIOMMATIDAE

Vol. 3, p. 1873

Ariommas

To 20 cm. Demersal in deep water over muddy bottoms. Three species in the area.

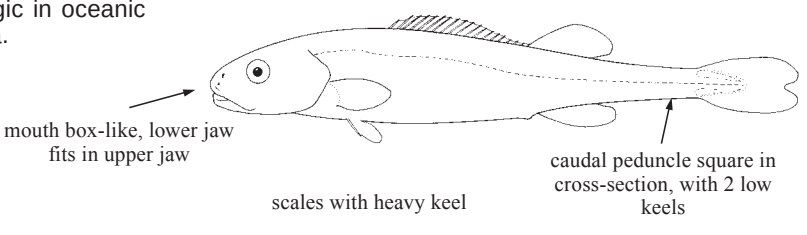


TETRAGONURIDAE

Vol. 3, p. 1878

Squaretails

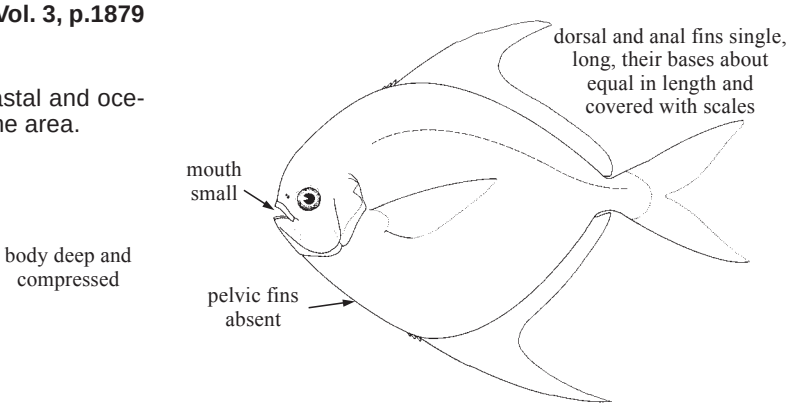
To 70 cm. Epi- and mesopelagic in oceanic waters. Two species in the area.



STROMATEIDAE **Vol. 3, p.1879**

Butterfishes

To 30 cm. Adults pelagic in coastal and oceanic waters. Three species in the area.

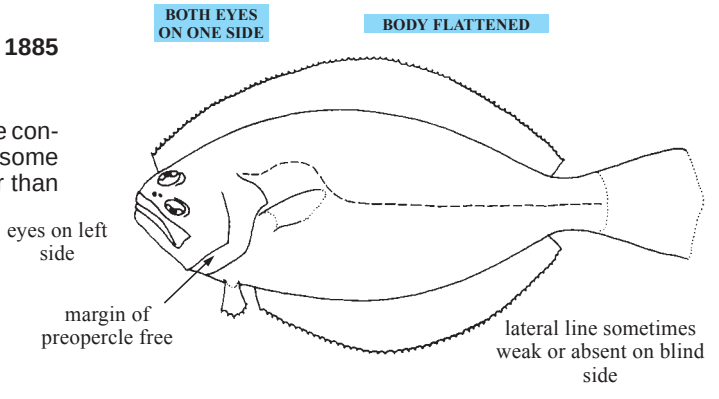


Order PLEURONECTIFORMES - Flatheads

BOTHIDAE **Vol. 3, p. 1885**

Lefteye flounders

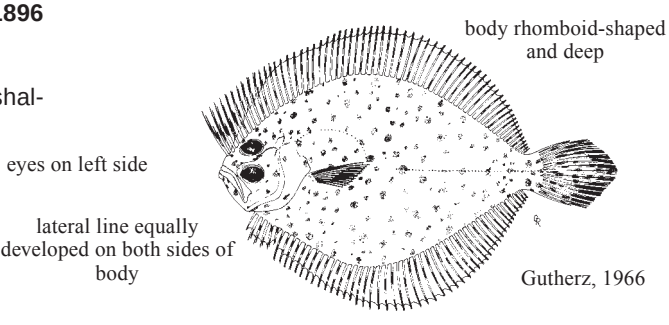
To about 50 cm. Demersal, usually on the continental shelf to a depth of 200 m, but some species may be found in depths greater than 500 m. Around 15 species in the area.



SCOPHTHALMIDAE **Vol. 3, p. 1896**

Turbots

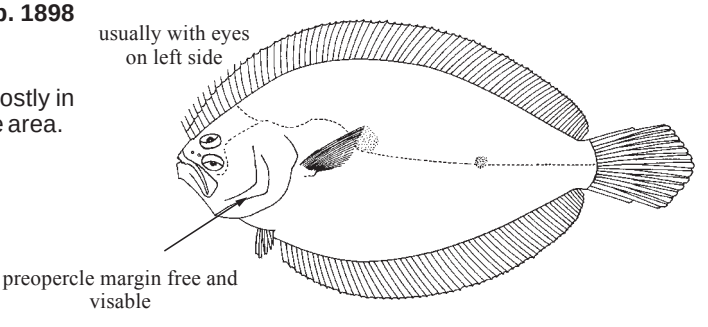
To 46 cm. Demersal on soft sediment in shallow waters. A single species.



PARALICHTHYIDAE **Vol. 3, p. 1898**

Sand flounders

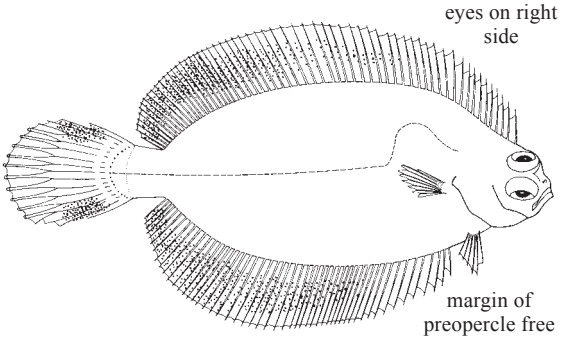
To 77 cm. Demersal on soft bottoms mostly in shallow water. Around 33 species in the area.



POECILOPSETTIDAE **Vol. 3, p. 1922**

Righteye flounders

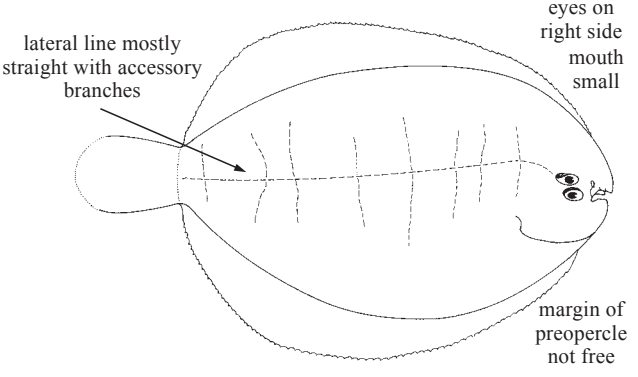
To about 18 cm. Demersal on soft bottoms, typically at depths between 180 and 1 600 m. Two species in the area.



ACHIRIDAE **Vol. 3, p. 1925**

American soles

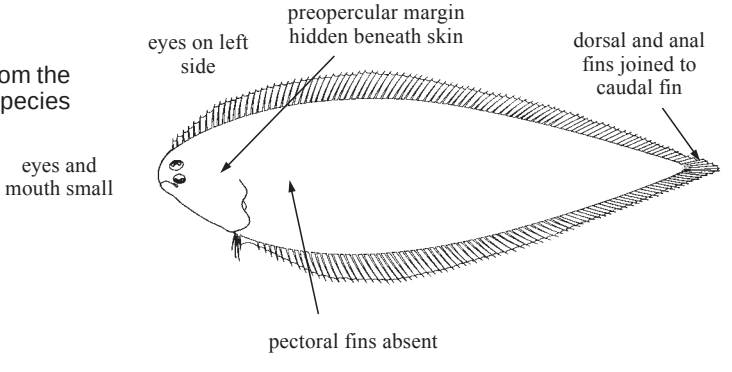
To around 35 cm. Demersal on soft bottoms in estuarine and coastal habitats to depths of 300 m. Twelve species in the area.



CYNOGLOSSIDAE **Vol. 3, p. 1934**

Tongue soles

To 23 cm. Demersal on soft bottoms, from the shore to a depth of 1 500 m. About 21 species in the area.

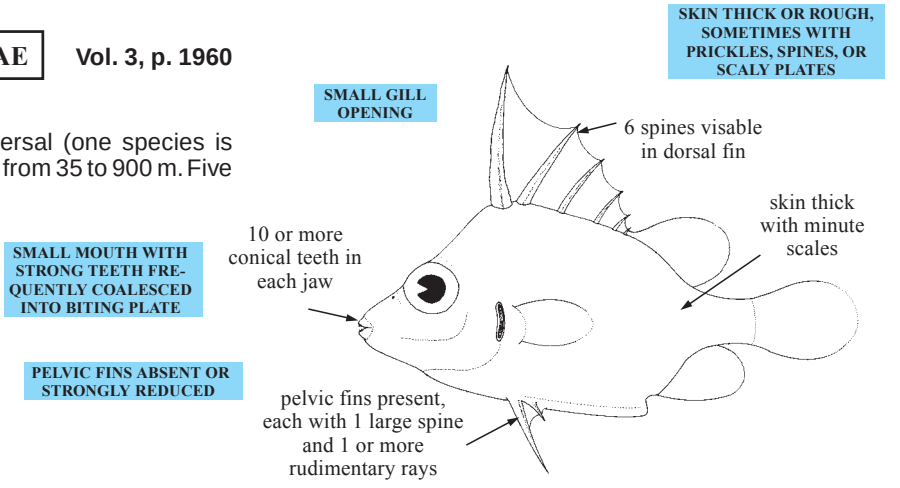


Order TETRAODONTIFORMES - Pufferfishes and allies

TRIACANTHODIDAE Vol. 3, p. 1960

Spikefishes

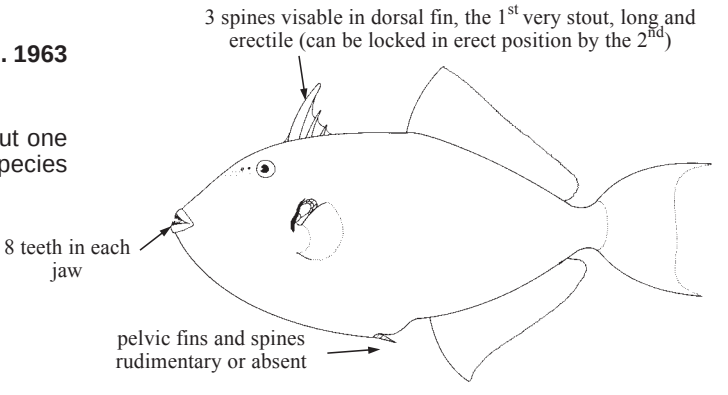
To 20 cm. Mostly demersal (one species is bathypelagic) at dpeths from 35 to 900 m. Five species in the area.



BALISTIDAE Vol. 3, p. 1963

Triggerfishes

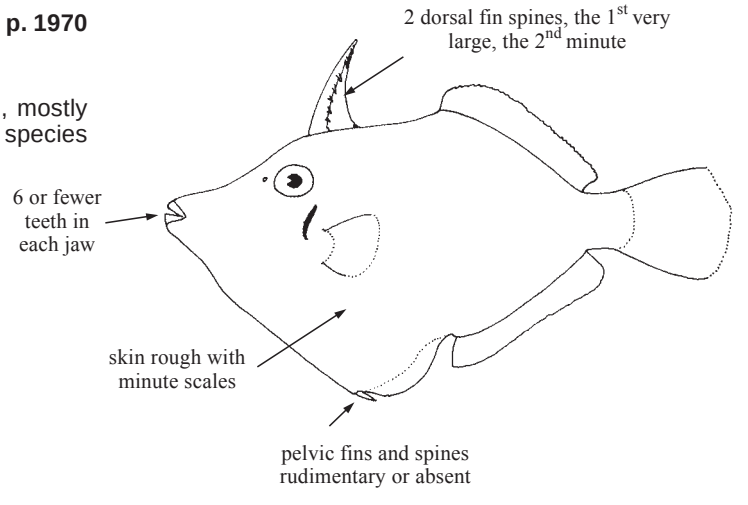
To 55 cm. Mostly demersal on reefs but one species in the area is epipelagic. Six species in the area.



MONACANTHIDAE Vol. 3, p. 1970

Filefishes

To 80 cm, mostly smaller. Demersal, mostly on reefs, to a depth of about 80 m. Ten species in the area.

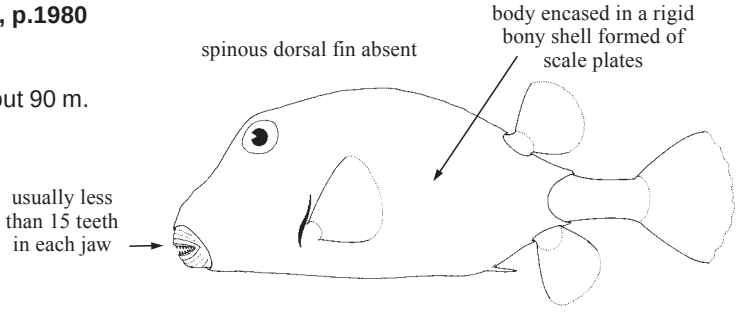


OSTRACIIDAE

Vol. 3, p.1980

Boxfishes

To 45 cm. Demersal to a depth of about 90 m. Five species in the area.

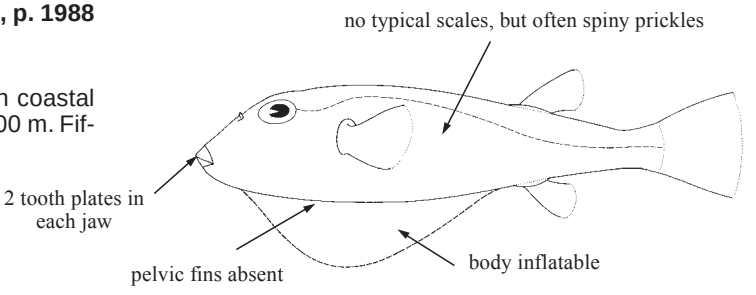


TETRAODONTIDAE

Vol. 3, p. 1988

Puffers

To 100 cm. Demersal and pelagic in coastal marine waters to a depth of about 100 m. Fifteen species in the area.

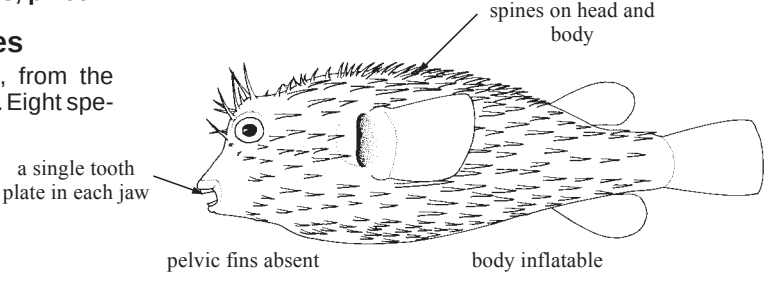


DIODONTIDAE

Vol. 3, p.2007

Porcupinefishes, burrfishes

To 100 cm. Demersal or pelagic, from the coastline to a depth of about 100 m. Eight species in the area.

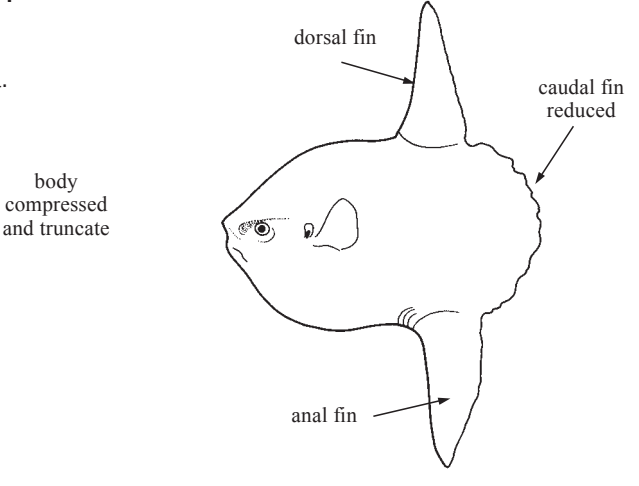


MOLIDAE

Vol. 3, p. 2014

Molas

To 350 cm. Pelagic. Three species in the area.



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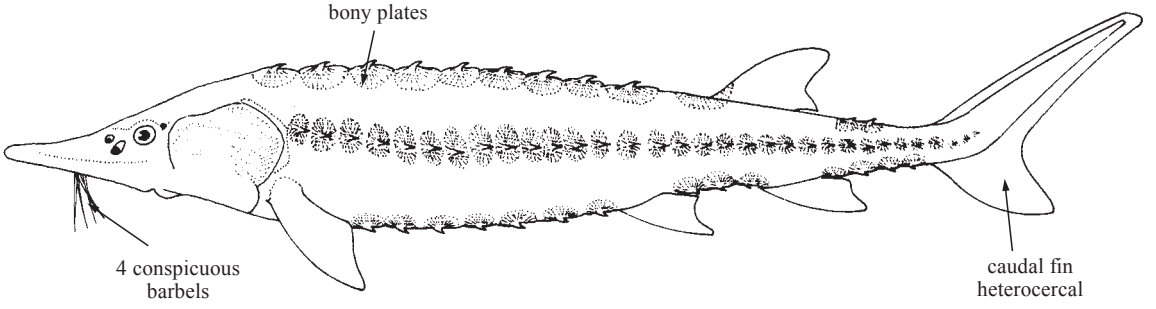
Order ACIPENSERIFORMES

ACIPENSERIDAE

Sturgeons

by W.B. Scott, Kingston, Ontario, Canada

Diagnostic characters: Body heavy, elongate and subcylindrical in section. **Head ending in a hard extended snout**; a spiracle (small opening above and behind eyes) present in *Acipenser*; **mouth inferior, protrusible, preceded by 4 conspicuous barbels**; gill memebranes joined to isthmus, not free. A single dorsal fin set far back on body; **caudal fin more or less deeply forked and distinctly asymmetrical, heterocercal, with a fleshy axis bending upward at base of fin and extending rearward to tip of upper lobe, the fin being much wider below than above fleshy axis**; pectoral fins set low; pelvic fins abdominal in position; all fins spineless, except for first pectoral-fin ray which is ossified in some species. Skeleton cartilaginous for the most part. **Head and body covered with bony plates, shields, or bucklers, those on body in 5 rows, 1 row along midline of back, 1 row along each side, and another along the ventrolateral margin of each side. Colour:** variable, light brown to dark brown, almost black or slate grey to blue-black.



Habitat, biology, and fisheries: Sturgeons are medium- to large-sized fishes (sexually mature individuals in Area 31 range from 80 to slightly over 200 cm in total length), inhabiting lakes, river basins, and coastal marine waters; generally but not always near the bottom, feeding on benthic organisms, insects, molluscs, crustaceans, and occasionally plant material. All sturgeons spawn in fresh water, those species occurring as adults in estuaries or the sea being anadromous. Of the 3 species occurring in brackish and marine waters along the eastern coast of the USA, the Atlantic sturgeon, *Acipenser oxyrinchus*, is the one which has been most important commercially. Its range extends from Labrador to Florida and the northern Gulf of Mexico (the population to the west of Florida is considered by some authors as a distinct subspecies, *A. oxyrinchus de sotoi*). It grows to about 267 cm in total length (estimated age at that size is 60 years); adults move upriver for spawning and the young spend 4 years in fresh water before gradually returning to the estuaries or nearby coastal waters. This species is highly tolerant of sharp changes in salinity. Most of the catch is taken to the north of Area 31, but the landings today are well below the level of the last century when the Atlantic sturgeon was considered and important commercial fish. The flesh is of good quality and the eggs are sold as caviar. The shortnose sturgeon, *Acipenser brevirostrum*, is a smaller species rarely exceeding 30 cm in total length (at an estimated age of 27 years), although sizes up to 122 cm have been reported. It ranges from New Brunswick to eastern Florida and is most often seen in large tidal rivers, but also taken in brackish and salt water. It is nowhere abundant today and is considered an endangerd species in some areas. The flesh is of good quality; the eggs, although not great in number, are suitable for caviar. A third species, the pallid sturgeon, *Scaphirhynchus albus*, which occurs in the Mississippi and Missouri rivers has only once been reported from brackish water. The remaining American sturgeons are either restricted to fresh water, or are found along the Pacific coast.

Similar families occurring in the area

None, no other fish in the area with heterocercal tail, head and body with bony plates, and 4 conspicuous barbels on snout.

Key to the genera and species of Acipenseridae occurring in the area

Note: Only representatives reported from marine or brackish waters.

1a. Spiracles absent, caudal peduncle long, depressed (flattened dorsoventrally) and completely covered with bony plates (Fig. 1a); snout depressed, shovel-like; gill rakers fan-shaped; barbels fringed (Fig. 1b) . . . . . ***Scaphirhynchus albus***

1b. Spiracles present, caudal peduncle short, laterally compressed, and partially covered with bony plates; snout subconical (Figs. 2a, 3a); gill rakers lanceolate; barbels not fringed (Figs. 2b, 3b) . . . . . → ***2***

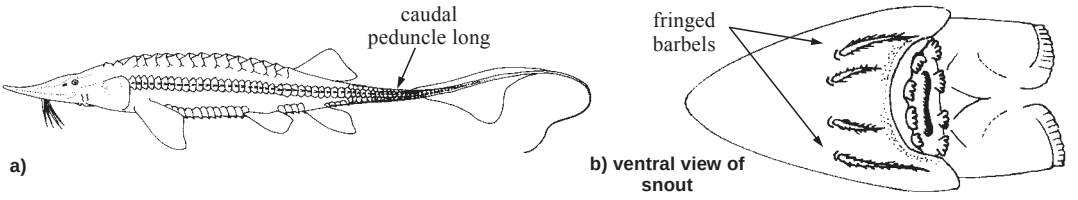


Fig. 1 ***Scaphirynchus albus***

2a. Dorsal plates or bucklers widely spaced (up to 1/2 the length of plates), post-dorsal plates usually absent; post-anal plates in a single row when present; soft rays in anal fin 19 to 22; snout short and rounded; peritoneum and viscera blackish; size larger, up to 12 cm (Fig. 2) . . . . . ***Acipenser brevirostrum***

2b. Dorsal plates or bucklers crowded; post-dorsal and post-anal plates in pairs; 23 to 30 soft rays in anal fin; snout long and pointed; peritoneum and viscera pale; size larger, to over 250 cm (Fig. 3) . . . . . ***Acipenser oxyrinchus***

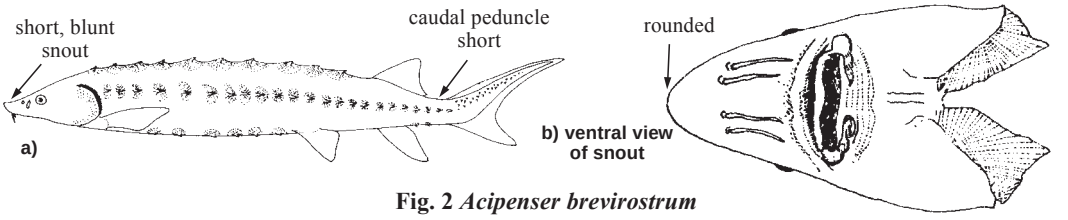


Fig. 2 ***Acipenser brevirostrum***

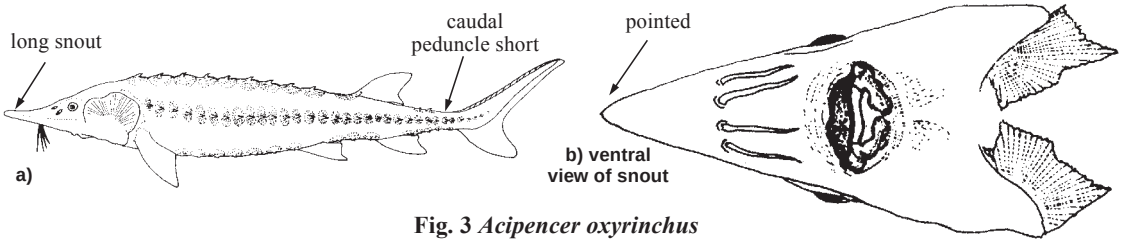


Fig. 3 ***Acipencer oxyrinchus***

List of species occurring in the area

Acipenser brevirostrum Lesueur, 1818. To 143 cm. E coast of N America, Canada to Florida.

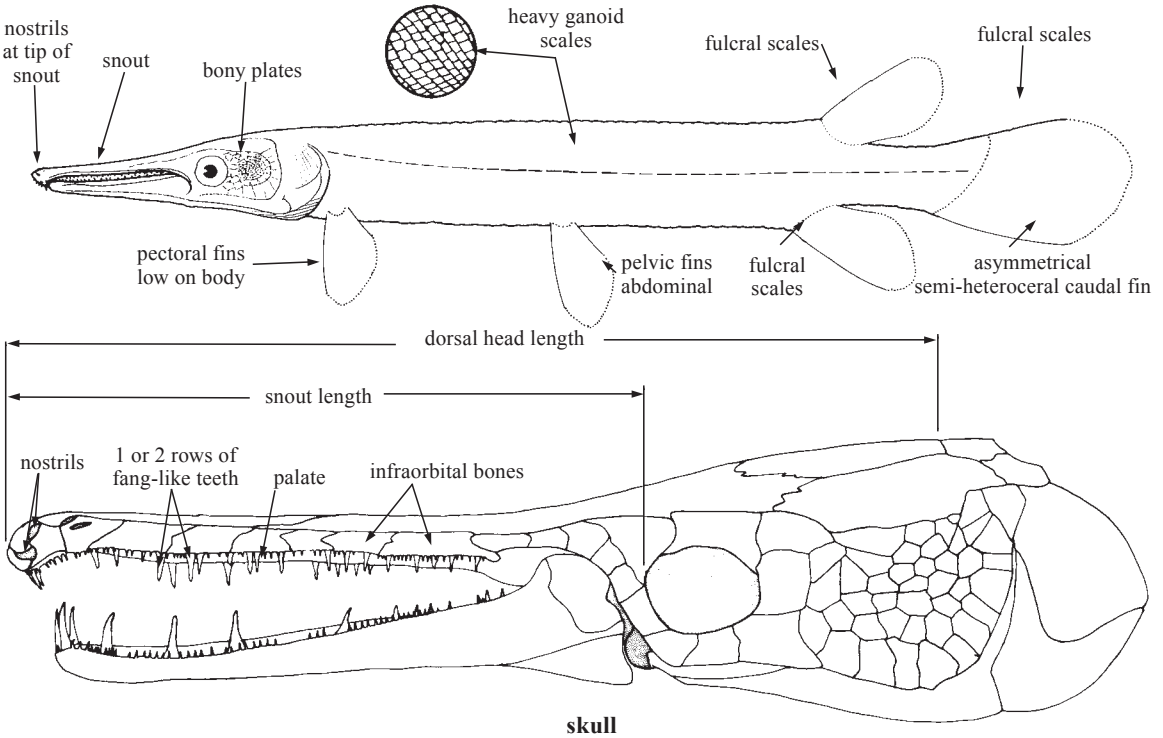
Acipenser oxyrinchus Mitchill, 1815. To 403 cm. Canada to N Gulf of Mexico, Bermuda, and French Guiana.

Scaphirhynchus albus (Forbes and Richardson, 1905). To 168 cm. Mississippi and Missouri Rivers.

Order SEMIONTIFORMES
LEPISOSTEIDAE
Gars

E.O. Wiley, Museum of Natural History, University of Kansas, USA

Diagnostic characters: Large, attenuated, round-bodied fishes. **Ethmoid region of skull and lower jaw elongated to form a snout bordered by large fangs, with nostril at tip of snout; gill arch with a bilobed 'tongue'**. No spines in fins; dorsal and anal fin short-based and set far back on body, nearer the caudal fin than the pelvic fins; caudal fin rounded, asymmetrical (semiheteroceral, with end of vertebral column upturned); **all medial fins with fulcral scales bordering first ray**; pectoral and pelvic fins placed very low on body, the latter abdominal in position. **Body completely encased in armour of large, heavy, rhombic, not imbricating, ganoid scales, most of which are hinged by an articulation**; this armour considerably reduced flexibility of body; **cheeks covered with numerous plates. Colour:** species commonly taken in brackish or coastal marine waters (with the exception of *Lepisosteus oculatus*) usually tan to dark brown above, grading into light tan to almost white below; fins often spotted and a few dark pigment spots are found on the posterior half of the body (but *Lepisosteus osseus* is very variable and may show many spots or none); *Lepisosteus oculatus* differs in having large brown spots on body and top of head.

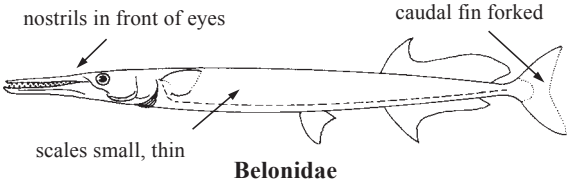


skull

Habitat, biology, and fisheries: Gars inhabit fresh, brackish, and coastal waters, but spawning takes place entirely in fresh water. Although capable of swift movements, gars are moderately sluggish fishes dwelling near the surface during the summer and moving to deeper water during the winter. They can frequently be seen rolling at the surface where they supplement their respiratory requirements with atmospheric oxygen. All are lurking predators feeding largely on other fishes, but food items are as diverse as crabs and water birds. The species entering brackish or marine waters are caught with a variety of gear, mostly for local consumption, but one species, *Atractosteus spatula*, is of commercial importance along the coast of Texas where it is usually taken in gill nets. A related species, *Atractosteus tristoechus*, may be of commercial value in Cuba. Apart from the flesh, the scales are used for jewelry and other decorative items; the eggs are reported to be toxic.

Similar families occurring in the area

Belonidae: generally smaller than gars; nostrils directly in front of eyes (on tip of snout in gars); scales small, thin, and imbricated, not ganoid; pectoral fins placed midlaterally on body, their bases nearly vertical (low on body and nearly horizontal bases in gars); caudal fin forked and no medial fins with fulcral scales bordering the first fin ray.



Belonidae

Key to the species of marine and brackish water Lepisosteidae occurring in the area

1a. Adults with 2 rows of enlarged fangs along the snout (Fig. 1a); an outer row on the infraorbital bones and an inner row along the palatine; gill rakers large and ornate (Fig. 2a, b), 59 to 81 rakers in outer row of first arch . . . . . → *2*

1b. Adults with a single row of enlarged fangs along the infraorbital bones (outer row); palatine toothed but lacking enlarged fangs (Fig. 1b); gill rakers small and pear-shaped (Fig. 2c, d), 14 to 33 rakers in outer row of first arch . . . . . → *4*

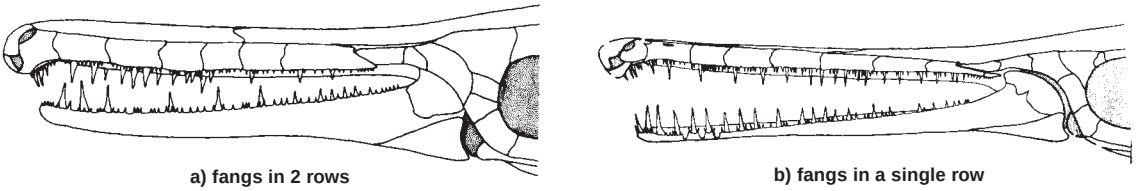

a) fangs in 2 rows **b) fangs in a single row**

Fig. 1 lateral view of jaws

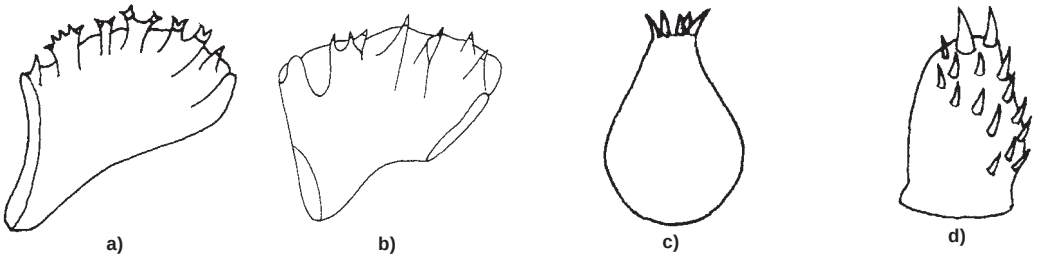

a) **b)** **c)** **d)**

Fig. 2 shapes of gill rakers

2a. Lateral-line scales 58 to 62, predorsal scales 48 to 54 . . . . . → *3*

2b. Lateral-line scales 51 to 56, predorsal scales 43 to 48 (usually 44 to 47) . . . . *Atractosteus tropicus*

3a. Total gill rakers on left outside arch 59 to 66 . . . . . *Atractosteus spatula*

3b. Total gill rakers on left outside arch 67 to 81 . . . . . *Atractosteus tristoechus*

4a. Snout length 79 to 83% of head length (Fig. 3a) . . . . . ***Lepisosteus osseus***

4b. Snout length less than 75% of head length (Fig. 3b, c) . . . . . → ***5***

5a. Adults with bony plates on ventral surface of isthmus . . . . ***Lepisosteus oculatus***

5b. Adults lacking bony plates on ventral surface of isthmus . ***Lepisosteus platyrhincus***

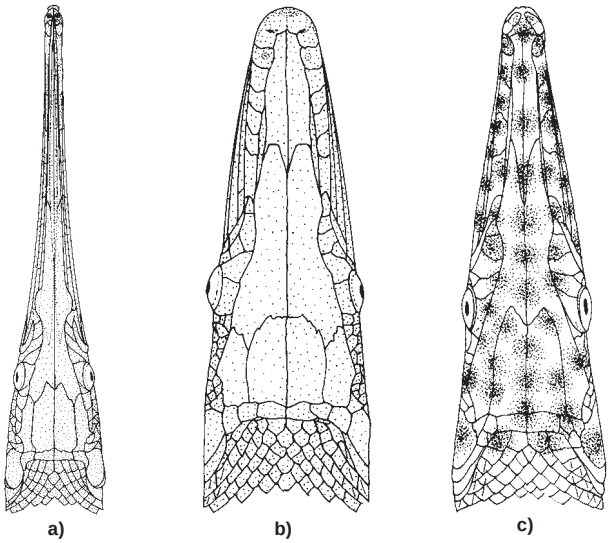


Fig. 3 dorsal view of head

List of species occurring in the area

Atractosteus spatula (Lecepède, 1803).

Atractosteus tristoechus (Bloch and Schneider, 1801).

Atractosteus tropicus Gill, 1863. A middle American species found in brackish waters of the Pacific drainages but has not been reported from brackish waters in Atlantic drainages.

Lepisosteus oculatus Winchell, 1864.

Lepisosteus ossues (Linnaeus, 1758).

Lepisosteus platostomus Rafinesque, 1820.To 80 cm. Restricted to fresh waters.

Lepisosteus platyrhincus DeKay, 1842. To 86 cm. Occasionally found in brackish waters of Florida but not fished extensively.

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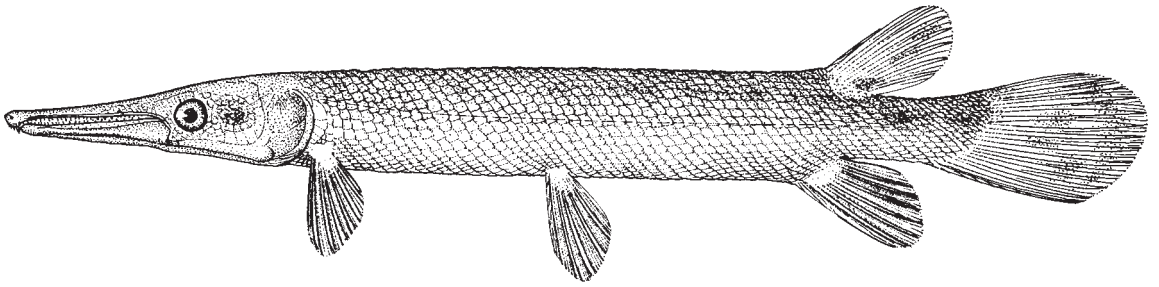
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Wiley, E.O. 1976. The systematics and biogeography of fossil and recent gars (Acintopterygii: Lepisosteidae). *Misc. Publ. Mus. Nat. Hist. Univ. Kansas*, 64:1-111.

Wiley, E.O. and H.P. Schultze. 1984. Family Lepisosteidae (Gars) as living fossils. In *Casebook on Living Fossils*, edited by N. Eldredge and S. Stanley. New York, Springer-Verlag, pp. 160-165.

Atractosteus spatula (Lacepède, 1803) LLS

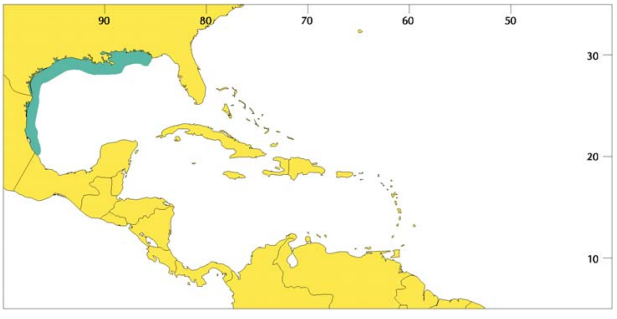
Frequent synonyms / misidentifications: *Lepisosteus spatula* Lacepède, 1803 / None.
FAO names: En - Alligator gar; **Fr** - Garpique alligator; **Sp** - Gaspar baba.



Diagnostic characters: A large round-bodied fish. **Snout elongate, but broad and relatively short (less than 60% of dorsal head length)** with nostrils at tip and **2 rows of enlarged fangs on either side** (1 outer on infraorbitals, 1 inner on palatines). Roofing bones of skull large and covered with small, rounded, enameloid tubercles; **59 or 60 ornate gill rakers in outer row of first gill arch**. No spines on fins; dorsal and anal fins short-based and set far back on body, caudal fin rounded, slightly asymmetrical; pelvic and pectoral fins placed very low on body, pectoral fins abdominal in position; fucral scales on all medial fins. Body totally encased in an armour of large, heavy, rhomboid, non-imbricating ganoid scales; cheeks covered with numerous plates; **predorsal scales (those in midline in front of dorsal fin) 49 to 54**; scales in lateral line 58 to 62. **Colour:** back dark brown to tan, belly white to yellowish; occasionally large brown pigment blotches on caudal peduncle and fins.

Size: Maximum: over 300 cm; common 200 cm.

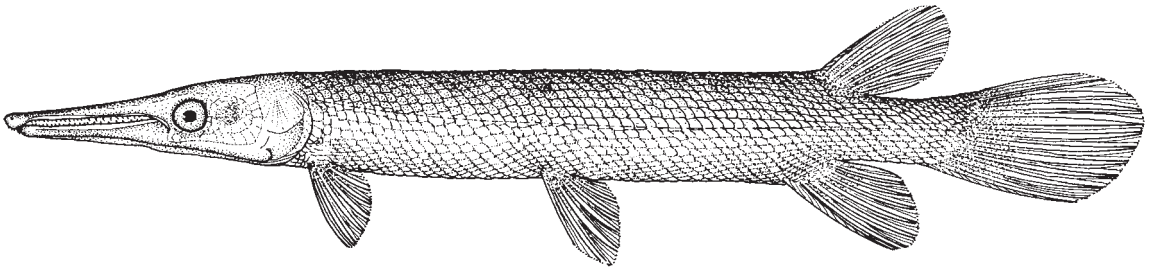
Habitat, biology, and fisheries: Of the western central Atlantic gars, this is the most tolerant of higher salinities and is relatively common in brackish and marine waters. Spawning, however, occurs entirely in fresh water. Sluggish, but a voracious predator feeding on fishes and crustaceans as well as birds. Separate statistics are not reported for this species. Caught mainly with gill nets and on hook-and-line; occasionally with bottom trawls. Marketed live and fresh for local consumption. The eggs are poisonous. There is a limited sportfishery. The scales have been used for jewelry and other decorative items.



Distribution: Gulf of Mexico from Choctawhatchee Bay, western Florida, to the vicinity of Veracruz, Mexico; in fresh water northward along the Mississippi River drainage to the lower reaches of the Ohio and Missouri rivers. Large fresh-water reservoirs, coastal bays and estuaries, especially along the coasts of Texas and Louisiana. A single specimen (not examined) reported from the Rio Sapoa, Nicaragua.

Atractosteus tristoechus (Bloch and Schneider, 1801) LET

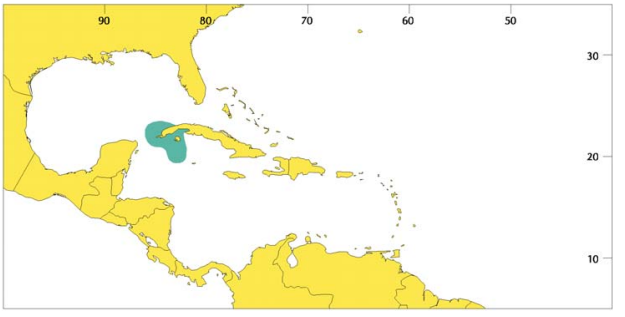
Frequent synonyms / misidentifications: *Lepisosteus tristoechus* Bloch and Schneider, 1801 / None.
FAO names: En - Cuban gar; **Fr** - Garpique cubain; **Sp** - Gaspar manjuarí.



Diagnostic characters: A fairly large round-bodied fish. **Snout elongate, but broad and relatively short (less than 60% of dorsal head length)** with nostrils at tip and **2 rows of enlarged fangs on either side** (1 outer row on infraorbitals, 1 inner row on palatines). Roofing bones of skull large, lacking enameloid tubercles; **67 to 81 ornate gill rakers in the outer row of first gill arch**. No spines on fins; dorsal and anal fins short-based and set far back on body, caudal fin rounded, slightly asymmetrical; pelvic and pectoral fins placed very low on body, pectoral fins abdominal in position; fucral scales on all medial fins. Body totally encased in an armour of large, heavy, rhomboid, not imbricating ganoid scales; cheeks covered with numerous plates; **predorsal scales (those in midline in front of dorsal fin) 49 to 51**; scales in lateral line 56 to 62. **Colour:** back dark, belly light: detailed colour pattern not described.

Size: Maximum: probably over 200 cm; common to 100 cm.

Habitat, biology, and fisheries: Found mainly in fresh waters. Adults prey on fishes and even birds. Behaviour probably similar to *Atractosteus spatula*. Some attempts to cultivate this species were made some years ago. It showed a moderate growth rate (to about 30 cm at the end of the first year). The young were preyed upon by *Micropterus salmoides* (introduced to Cuba). Separate statistics are not reported for this species. Caught mainly with gill nets and on hook-and-line. The flesh is edible, but not of best quality; the eggs are poisonous.

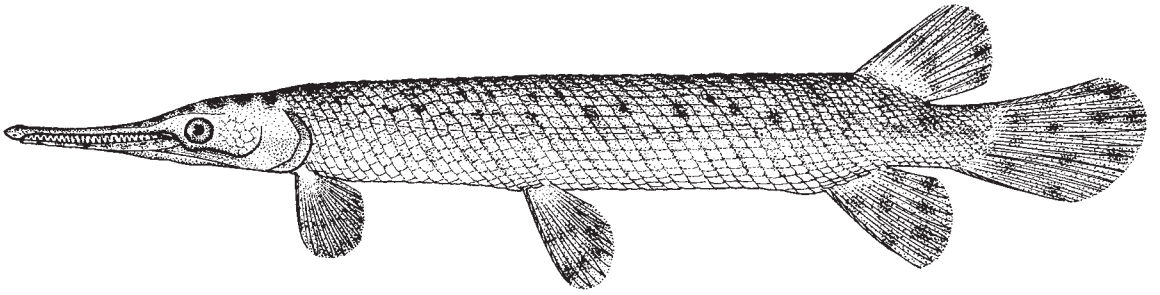


Distribtion: So far, only reported from the northwestern part of Cuba and the Isle of Youth.

Lepisosteus oculatus Winchell, 1864

Frequent synonyms / misidentifications: None / None.

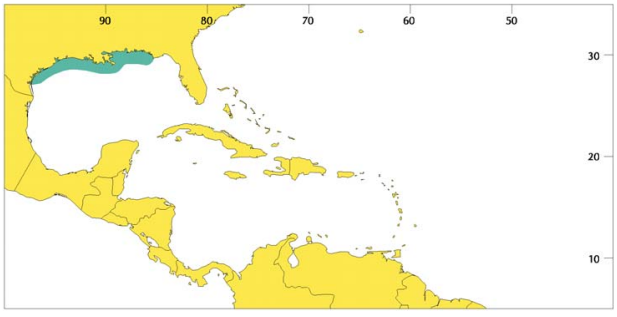
FAO names: En - Spotted gar; **Fr** - Garpique tacheté; **Sp** - Gaspar pintado.



Diagnostic characters: A fairly large round-bodied fish. **Snout moderately elongate (57 to 65% of dorsal head length) and moderately narrow** with nostrils at tip. **Adults with a single row of enlarged fangs on either side (on infraorbitals, 2 rows may be present on young). Isthmus (fleshy projection of body separating the gill openings) with small bony ossicles; 15 to 24 small pear-shaped gill rakers in the outer row of first gill arch**. No spines in fins; dorsal and anal fins short-based and set far back on body, pelvic and pectoral fins placed very low on body, pectoral fins abdominal in position; caudal fin rounded, slightly asymmetrical; fucral scales on all medial fins. Body totally encased in an armour of large, heavy, rhomboid, not imbricating ganoid scales; cheeks covered with numerous plates. **Colour: top of head with large, oblong pigment blotches**, body either uniformly dark or blotched above grading into light tan or dark brown below; usually with two brown stripes on either side, one running as a solid stripe or series of blotches from eye to caudal fin, the other on lower body from pectoral fin to caudal fin (this stripe occasionally obliterated by uniform dark pigment on belly).

Size: Maximum: probably over 90 cm; common to 70 cm.

Habitat, biology, and fisheries: Found mainly in fresh waters. Often found in the lower reaches of rivers and estuaries, but less tolerant of salt water conditions than *Atractosteus spatula* or *Lepisosteus osseus*. Largely allopatric from the closely related *Lepisosteus platyrhincus* which inhabits the Florida Peninsula west from the Apalachicola River and north along the eastern coastline to southern Georgia. A voracious predator feeding primarily on fishes and crustaceans. Separate statistics are not reported for this species. Caught mainly with gill nets and on hook-and-line. Marketed fresh for local consumption, but not valued as a food fish.

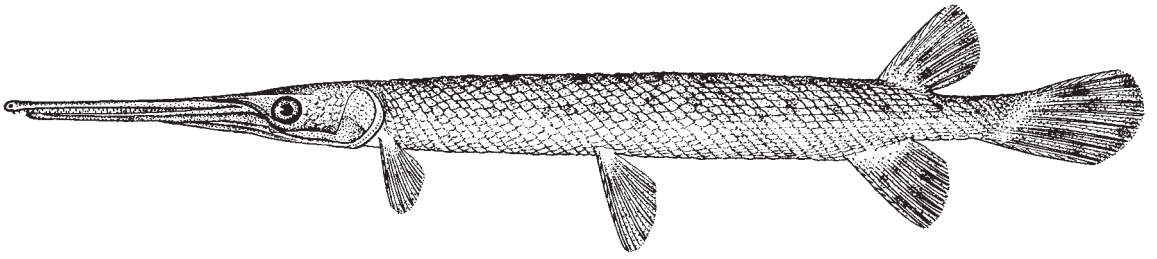


Distribution: Northern coastline of the Gulf of Mexico from western Florida (Apalachicola River drainage) to central Texas (San Antonio Bay drainage), inland in fresh waters north to Lake Erie.

Lepisosteus osseus (Linnaeus, 1758) LLO

Frequent synonyms / misidentifications: None / None.

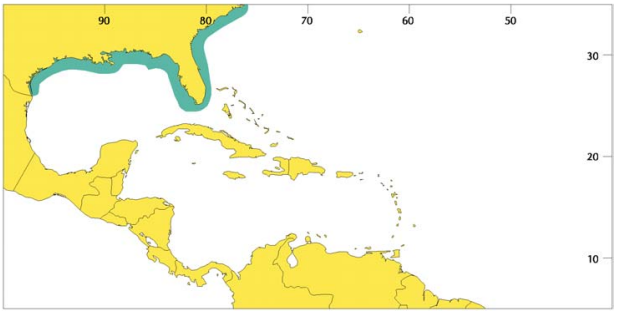
FAO names: En - Longnose gar; **Fr** - Garpique longnez; **Sp** - Gaspar picudo.



Diagnostic characters: A fairly large round-bodied fish. **Snout extremely narrow and elongate, its length (from tip of snout to anterior edge of orbit) 79 to 83% of dorsal head length (from tip of snout to posterior junction of parietal bones)**, with nostrils at tip. **Adults with a single row of enlarged fangs on either side (on infraorbitals, 2 rows may be present on young). Isthmus (fleshy projection of body separating the gill openings) with small bony ossicles; 14 to 31 small pear-shaped gill rakers in the outer row of first gill arch**. No spines in fins; dorsal and anal fins short-based and set far back on body, caudal fin rounded, slightly asymmetrical; pelvic and pectoral fins placed very low on body, pectoral fins abdominal in position; fulcral scales on all medial fins. Body totally encased in an armour of large, heavy, rhomboid, not imbricating ganoid scales; cheeks covered with numerous plates. **Colour:** colour variable; back darker, fading to light or silvery below; sides with or without a series of rounded pigment blotches; **head usually without blotches but if present they are small and rounded**; medial fins and posterior half of body usually with brown to black blotches.

Size: Maximum to probably over 200 cm; common to 150 cm.

Habitat, biology, and fisheries: Adults are frequently found in brackish waters and coastal marine waters, especially in the winter months when they frequent deeper waters. Spawning occurs entirely in fresh water. A voracious predator feeding primarily on fishes and crustaceans. Separate statistics are not reported for this species. Caught mainly with gill nets and on hook-and-line. Marketed fresh for local consumption. Generally considered detrimental to game fishes and a nuisance to fishermen because of the damage it causes to gill nets and trawls. The eggs are poisonous.



Distribution: The Atlantic coastline from New Jersey to southern Texas, inland throughout most of eastern North America from the Great Lakes region and to the Great Plains and south to the Pecos River drainage of New Mexico and the Rio Grande drainage of northern Mexico.

Order ELOPIFORMES

ELOPIDAE

Tenpounders (ladyfishes)

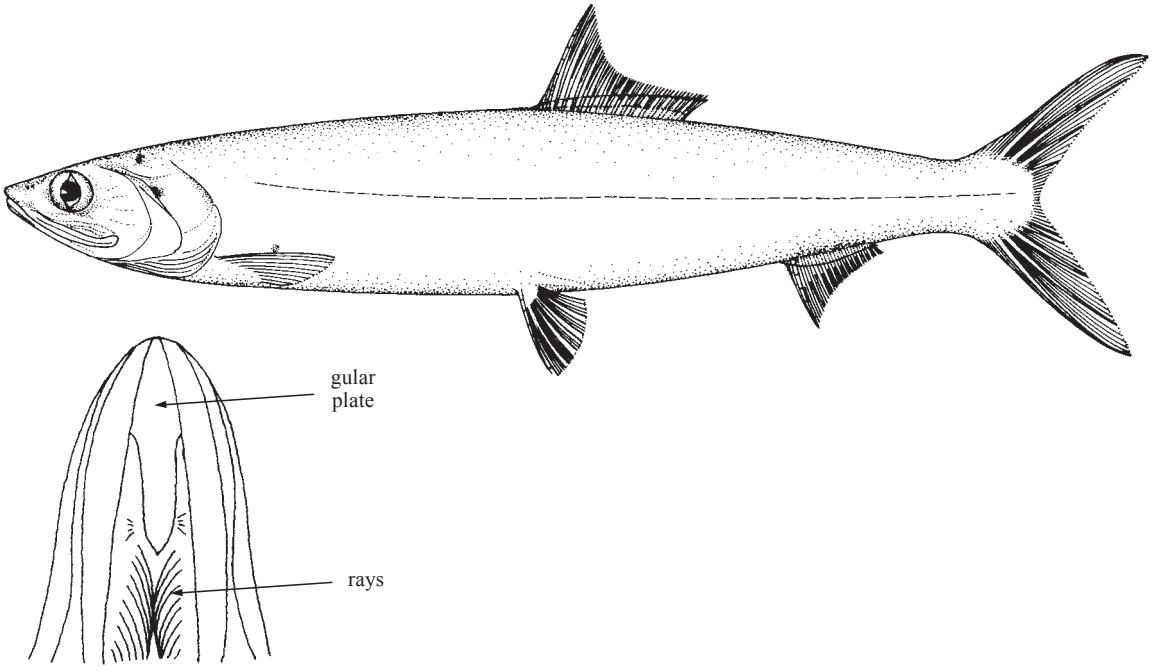
by D.G. Smith, National Museum of Natural History and R. Crabtree, National Marine Fisheries Service, USA

A single species occurring in the area.

Elops saurus Linnaeus, 1766 LAD

Frequent synonyms / misidentifications: None / None.

FAO names: En - Ladyfish; **Fr** - Guinée machète; **Sp** - Malacho.



ventral view of head

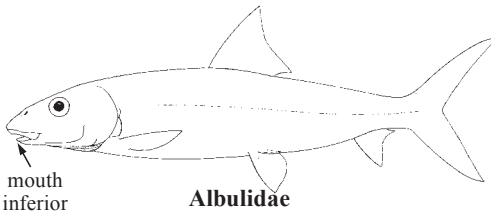
Diagnostic characters: Body elongate, fusiform, moderately compressed. Head low, flat above, curving smoothly into profile of body posteriorly. Eye large, 4.5 to 5.2 in head length. Mouth large, nearly horizontal and almost terminal, the lower jaw slightly shorter; gape ending behind posterior margin of eye; **a gular plate present between arms of lower jaw**. Teeth small and granular, present on jaws, roof of mouth, tongue, and basibranchials. Branchiostegal rays numerous, approximately 34. Gill rakers moderately long on first arch; scarcely denticulate, their entire surface rough, 6 to 8 on upper limb and 10 to 15 on lower limb (excluding rudiments). All fins without spines. Dorsal fin falcate, originating slightly behind midbody and directly over pelvic fins, with 21 to 25 rays. Anal fin falcate, shorter than dorsal fin, with approximately 14 to 17 rays. Caudal fin deeply forked, upper and lower lobes equal. Pectoral and pelvic fins inserted low on side of body, near ventral outline; pelvic fins abdominal, below origin of dorsal fin. Scales small, approximately 100 to 120 in lateral line. Lateral line complete, nearly straight, extending onto base of caudal fin. Vertebrae number around 74 to 86. **Colour:** blue or greenish grey above, silvery on sides; fins sometimes with a faint yellow tinge.

Similar families occurring in the area

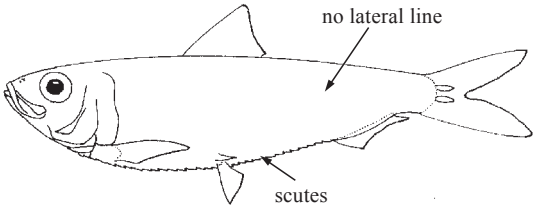
Albulidae: mouth inferior.

Clupeidae: lateral line absent; gular plate absent; most species have scutes along midline of belly.

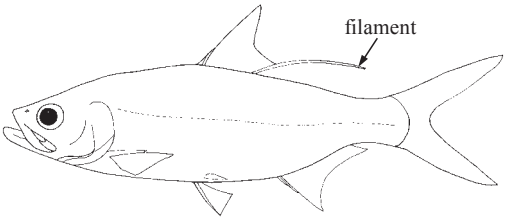
Megalopidae: scales much larger, 41 to 48 in lateral line; last dorsal-fin ray greatly prolonged.



Albulidae



Clupeidae

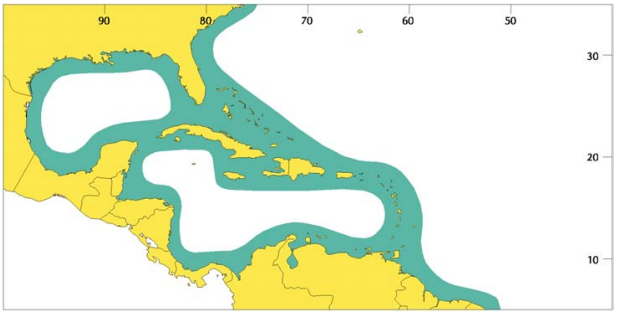


Megalopidae

Size: Maximum size 90 cm, but few are longer than 50 cm; despite the common name, seldom if ever reaches a weight of 10 pounds.

Habitat, biology, and fisheries: Ladyfish are common in estuaries and coastal waters of tropical and subtropical latitudes. The species can be extremely abundant and often occurs in large schools. Ladyfish are tolerant of a wide range of salinities but seldom occur in fresh water. They have been collected over a temperature range of 11 to 35°C. Ladyfish feed principally in midwater on pelagic prey, primarily fish, but decapod crustaceans are also consumed. Ladyfish spawn offshore and have a leptocephalus larva. In the Gulf of Mexico, spawning appears to take place in the autumn, and the metamorphic larvae move inshore the following spring. Little information is available on age and growth. Ladyfish are often caught by recreational anglers but are seldom a targeted species. The species is fished commercially in Florida and sold both for human consumption and as bait to recreational anglers. FAO statistics report landings ranging from 15 to 979 t from 1995 to 1999.

Distribution: Ladyfish occur from Brazil northward to southern New England but are rare north of North Carolina.



Remarks: Although *Elops saurus* has traditionally been treated as a single species, evidence suggests that at least 2 species are involved, distinguished mainly by the number of vertebrae. Individuals from the Gulf of Mexico and the east coast of the United States have 79 to 86 vertebrae, whereas those from the Caribbean have 74 to 78. Larvae of both forms have been found in Florida, where they seem to appear in different seasons. Further studies are needed to resolve the status of these 2 forms. If they turn out to be distinct species, the name *saurus* would apply to the northern one, as it was described from the Carolinas.

References

Hildebrand, S. F. 1963. Family Elopidae. In Fishes of the Western North Atlantic, edited by H.B. Bigelow. *Mem. Sears Found. Mar. Res.*, 1(3):111-131.

Smith, D. G. 1989. Order Elopiformes; families Elopidae, Megalopidae, and Albulidae: Leptocephali. In Fishes of the Western North Atlantic, edited by E.B. Böhlke. *Mem. Sears Found. Mar. Res.*, 1(9):961-972.

MEGALOPIDAE

Tarpons

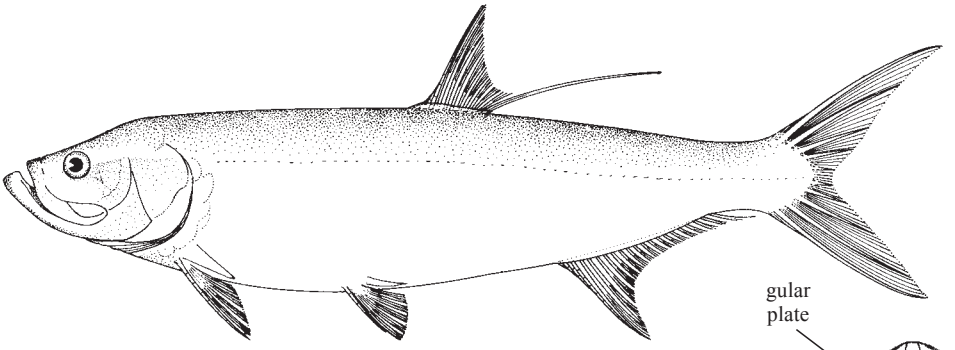
by D.G. Smith, National Museum of Natural History, USA and R.E. Crabtree, National Marine Fisheries Service, USA

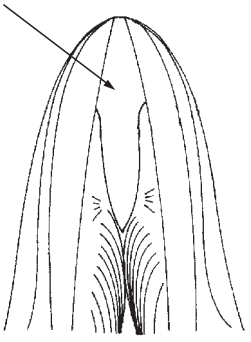
A single species occurring in the area.

Megalops atlanticus (Valenciennes, 1847) TAR

Frequent synonyms / misidentifications: None / None.

FAO names: En - Tarpon; **Fr** - Tarpon argenté; **Sp** - Tarpón.



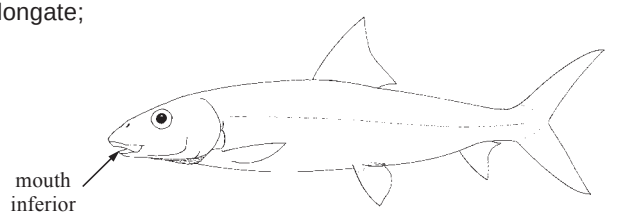


ventral view of head

Diagnostic characters: Body moderately elongate and highly compressed. Head moderately short and deep, its dorsal outline nearly straight and horizontal, the back somewhat elevated, the ventral outline strongly curved anteriorly. Eye large, 3.3 to 4.7 in head length. Mouth large and oblique, lower jaw prominently projecting; a gular plate present between arms of lower jaw. Teeth small, bluntly villiform, and present on jaws, vomer, palatines, pterygoids, tongue, and basibranchials. Branchiostegal rays numerous, approximately 23. Gill rakers long and slender, scarcely denticulate, 19 to 21 on upper limb and 36 to 40 on lower limb. All fins soft rayed. Dorsal fin short-based, with 13 to 15 rays, located behind pelvic fins but entirely before anal fin, falcate, **with a greatly prolonged final ray**. Anal fin strongly falcate, with 21 to 25 rays, final ray somewhat elongate, but much less so than that of the dorsal fin. Caudal fin deeply forked, lobes about equal in length. Pectoral and pelvic fins inserted low on body, with elongate axillary scales; pelvic fins abdominal in position. Scales large, firm, with crenulate anterior border and membranous posterior border. Lateral line complete and relatively straight, though anterior part slightly curved ventrally; pores branched; 41 to 48 scales. Gas bladder large, highly vascularized and modified to serve as an air-breathing organ. Vertebrae 53 to 57. **Colour:** bright silvery all over, the back darker than the belly.

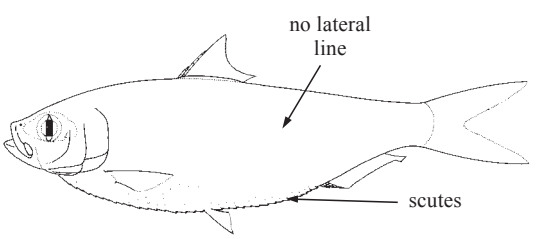
Similar families occurring in the area

Albulidae: mouth inferior; last dorsal-fin ray not elongate; scales smaller.

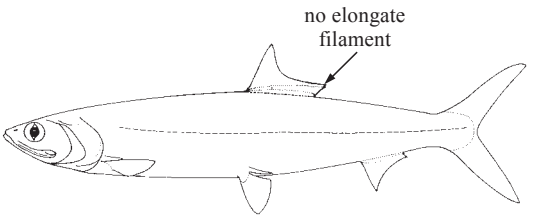


Albulidae

Clupeidae: lateral line absent; gular plate absent; most species with scutes on midline of belly.
Elopidae: scales much smaller, about 100 on lateral line; last dorsal-fin ray not elongate.



Clupeidae

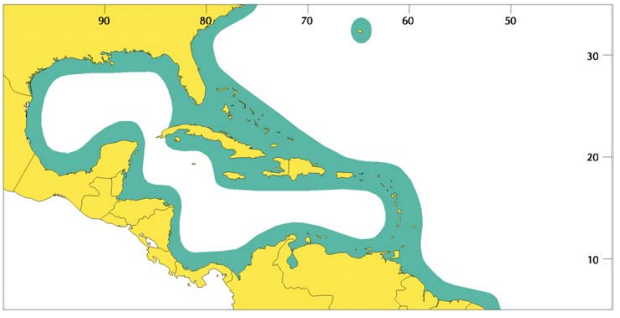


Elopidae

Size: Maximum over 220 cm and 120 kg. Males are smaller than females and rarely exceed 50 kg.

Habitat, biology, and fisheries: Tarpon occur in a wide variety of habitats ranging from fresh-water lakes and rivers to offshore marine waters. Large tarpon targeted by recreational anglers are most abundant in estuarine and coastal waters. Tarpon have a leptocephalus larva and spawn offshore. Spawning off Florida occurs from mid-May through mid-August, but off Costa Rica, spawning occurs year round. Metamorphic larvae are typically found inshore in mangrove-lined estuaries but also occur in temperate *Spartina* marshes. Young-of-the-year tarpon occur in small stagnant pools of varying salinity. In tropical areas, juvenile tarpon typically occur in mangrove habitats, often in water with low dissolved oxygen levels. Tarpon occur in salinities ranging from fresh water to more than 45‰ and are capable of surviving temperatures of at least 40°C. They suffer mortalities at temperatures of 10° to 12°C. The tarpon's habit of rising to the surface and breathing air is unusual among marine species. Anglers often detect the presence of schools of tarpon by observing individuals "rolling" at the surface. Air breathing is accomplished by way of a highly vascularized swimbladder that functions as an air-breathing organ. This adaptation allows tarpon to survive in water with low dissolved oxygen concentrations such as commonly encountered by juveniles. Tarpon are facultative air-breathers, and in well oxygenated waters are able to meet their oxygen requirements without breathing air. Tarpon are relatively long lived and can reach ages greater than 50 years. They reach sexual maturity at 80 to 120 cm. Tarpon are among the most highly esteemed recreational fishes in the world. Their large size, abundance in inshore waters, and spectacular leaps when hooked make them favourites of inshore anglers. FAO statistics report landings ranging from 16 to 283 t from 1995 to 1999. Fisheries for tarpon are best developed in Florida and Costa Rica but occur throughout the Gulf of Mexico and Caribbean Sea.

Distribution: Tarpon are restricted to the tropical and subtropical Atlantic. In the western Atlantic, tarpon regularly occur from the eastern shore of Virginia to central Brazil and throughout the Caribbean Sea and Gulf of Mexico. They have been observed in the Panama Canal for many years, and at least 1 capture on rod-and-reel has been reported from the Pacific coast of Panama at a location estimated to be 175 miles from the canal. There are numerous anecdotal accounts of tarpon occurring on the Pacific coast of Panama, but it is unclear if Pacific populations have become established. In the eastern Atlantic, tarpon occur from Mauritania to Angola.



References

Hildebrand, S. F. 1963. Family Elopidae. In Fishes of the Western North Atlantic, edited by H. B. Bigelow. *Mem. Sears Found. Mar. Res.*, 1(3):111-131.

Wade, R. A. 1962. The biology of the tarpon, *Megalops atlanticus*, and the ox-eye, *Megalops cyprinoides*, with emphasis on larval develoment. *Bull. Mar. Sci. Gulf and Carib.*, 12(4):545-622.

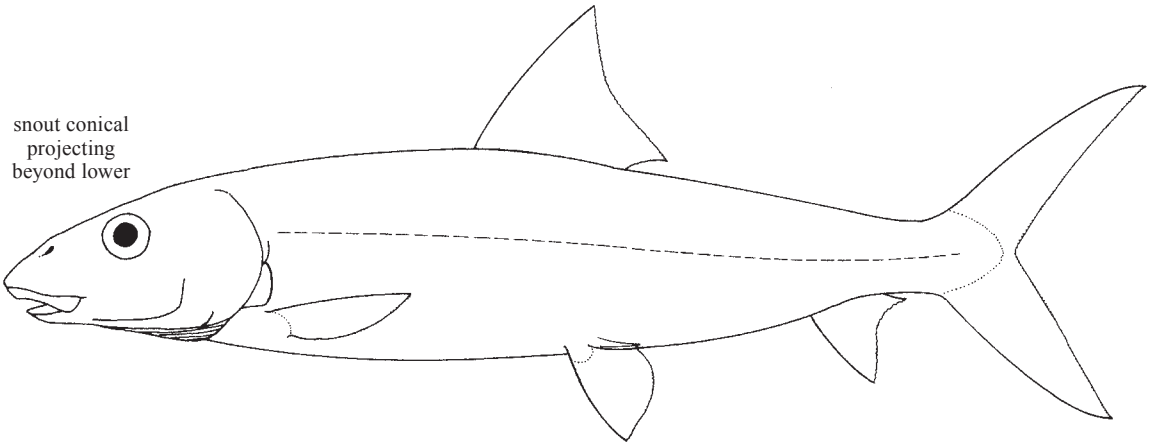
Order ALBULIFORMES

ALBULIDAE

Bonefishes

by D.G. Smith, National Museum of Natural History, USA and R.E. Crabtree, National Marine Fisheries Service, USA

Diagnostic characters: Maximum size 80 cm. Body moderately elongate, fusiform, little compressed, belly rounded. Head curving smoothly into profile of body. Eye large. **Snout conical, projecting well beyond lower jaw. Mouth inferior**; a small gular plate present between arms of lower jaw, small and often overlooked. Teeth small, granular, in patches on jaws and on roof and floor of mouth. Branchiostegal rays about 10 to 15. **Gill rakers rudimentary**, consisting of small patches of minute, villiform teeth. **All fins without spines**. Dorsal fin falcate, located at about midbody, originating slightly in front of pelvic fins, with about 16 to 21soft rays. Anal fin falcate, with 7 to 9 soft rays, located well behind dorsal fin. Caudal fin deeply forked, upper and lower lobes equal. Pectoral and pelvic fins inserted low on side of body, near ventral outline; pelvic fins abdominal, located under posterior part of dorsal fin. **Scales moderate in size, about 60 to 90 along lateral line. Colour:** bluish green dorsally, often with several faint saddles of slightly darker colour; silvery on sides, with several faint, narrow, longitudinal lines; belly white.



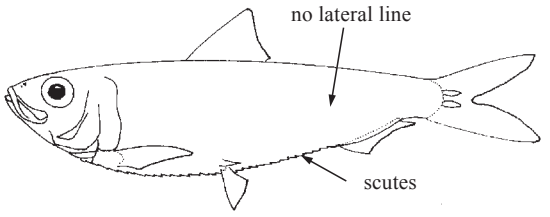
Habitat, biology, and fisheries: Bonefishes occur in coastal waters on sand or mud bottoms, in areas of relatively high salinity. They are bottom feeders, rooting in the substratum for crustaceans and various other small invertebrates and fishes. They are active fishes, generally travelling in small groups and covering large areas while foraging. Like *Elops, Megalops*, and the eels, bonefishes have a compressed, transparent leptocephalus larva. They spawn offshore and the young larvae are found in the open sea. They are caught in local fisheries, mainly with gill nets or occasionally cast nets; no separate statistics available; marketed fresh.

Remarks: The Albulidae contains 2 main groups of species, which at various times have been recognized as genera or subgenera. *Albula (Dixonina) nemoptera* lives in somewhat deeper water and is confined to the western Atlantic and eastern Pacific. The *Albula (Albula) vulpes* group lives in shallower water and is found in all tropical seas. It was formerly believed that *Albula vulpes* was a single cosmopolitan species. Recent work has shown that this “species” is actually a complex of several similar but genetically distinct species; the true *Albula vulpes* is found only in the Atlantic.

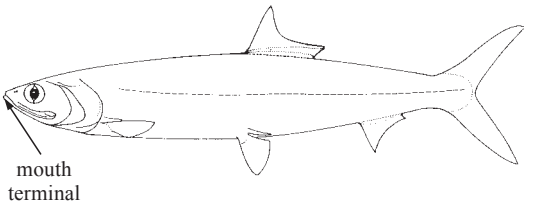
Similar families occurring in the area

Clupeidae: lateral line absent; gular plate absent; most species have scutes along midline of belly.

Elopidae and Megalopidae: mouth terminal.



Clupeidae



Elopidae

Key to the species of Albulidae occurring in the area

1a. Last ray of dorsal and anal fin not prolonged; snout only moderately conical, projecting only about 1/3 of its length beyond tip of lower jaw; posterior end of mouth not reaching eye (Fig. 1) . . . . . ***Albula (Albula) vulpes***

1b. Last ray of dorsal and anal fin markedly prolonged; snout sharply conical, projecting more than 1/3 of its length beyond tip of lower jaw; posterior end of mouth reaching nearly to middle of eye (Fig. 2) . . . . . ***Albula (Dixonina) nemoptera***

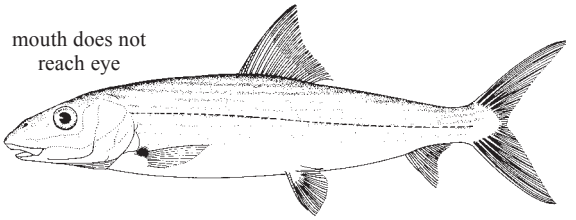


Fig. 1 ***Albula vulpes***

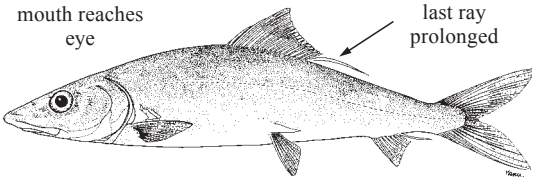


Fig. 2 ***Albula nemoptera***

List of species occurring in the area

The species structure of *Albula* is not well understood. Two species are currently recognized in the area, 1 in each subgenus, but evidence is accumulating that at least 1 other species exists. Myomere counts of larvae also indicate some differentiation between populations in the Gulf of Mexico and the Caribbean. Further study is needed to determine the number of species that exist in the western Atlantic.

Albula (Dixonina) nemoptera (Fowler, 1911). To 35 cm. Caribbean; the same or a similar species occurs in the E tropical Pacific.

Albula (Albula) vulpes (Linnaeus, 1758). To 75 to 80 cm. As understood here, this species occurs only in the tropical W Atlantic, from Florida to South America.

Reference

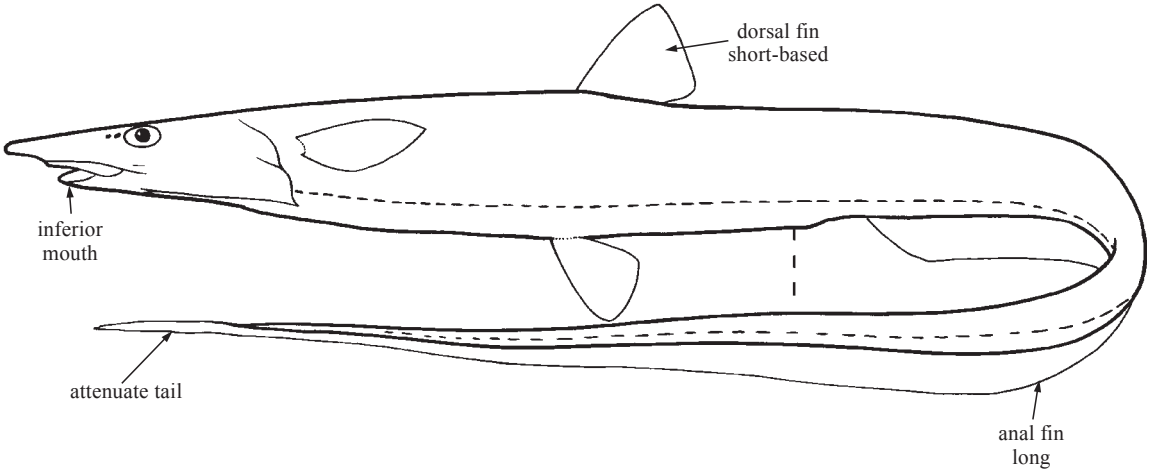
Hildebrand, S. F., 1963. Family Albulidae. In Fishes of the Western North Atlantic, edited by H.B. Bigelow. *Mem. Sears Found. Mar. Res.,* 1(3):132-147.

HALOSAURIDAE

Halosaurs

by D.G. Smith, National Museum of Natural History, Washington, D.C., USA

Diagnostic characters: Medium-sized fishes, to approximately 1 m in total length, but much of this consists of the attenuate tail. Body elongate; tail slender and attenuate, frequently broken and regenerated; anus slightly before midlength. Head elongate, its length contained approximately 3 times in preanal length. Eye well developed. Snout prolonged, extending well in front of mouth, tip rounded or pointed, often depressed. Anterior and posterior nostrils close together, in front of eye. **Mouth inferior, overhung by snout**, moderate in size, gape ending approximately under or slightly before front of eye. Teeth small, granular, in patches on jaws and palatopterygoid. **Dorsal fin short-based, on midtrunk, slightly closer to anus than to tip of snout, all rays segmented** (the anteriormost ray reduced and unsegmented in *Aldrovandia*); **anal fin long, extending from just behind anus to tip of tail**; pectoral fin well developed, on side of body at or above lateral midline; pelvic fins present, located abdominally, under or slightly in front of dorsal fin; caudal fin absent. Scales relatively large, overlapping, covering body in well-defined horizontal and vertically oblique rows; scales of lateral line enlarged; head partially scaled. Lateral line well developed, canals large and cavernous on head and body; lateral line runs along lower side of body, near ventral outline in lateral view. **Colour:** variable, ranging from black to light grey or tan; sides of body and opercle often silvery in fresh specimens; no bars, stripes, spots or other distinct markings. Inside of mouth and pharyngeal cavity sometimes black.

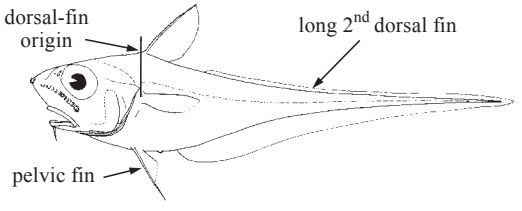


Habitat, biology, and fisheries: Halosaurs live on or near the bottom in moderate to deep water, usually between about 500 and 3 000 m. They are bottom feeders, preying mainly on crustaceans and other small invertebrates. Males develop markedly enlarged olfactory organs at maturity, suggesting that they locate their mates through pheromones. Like eels and elopiforms, halosaurs have a pelagic, leptocephalous larva. Although they are occasionally taken in deep bottom trawls, halosaurs have no commercial importance.

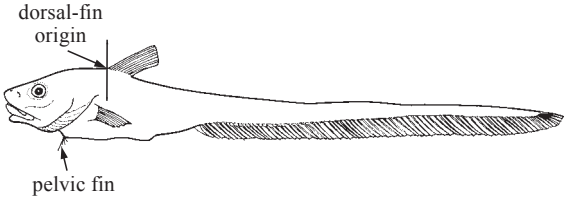
Similar families occurring in the area

Macrouridae: anterior dorsal fin directly above pectoral fin; a long, low second dorsal fin extending to end of tail; pelvic fin directly under pectoral fin; snout short.

Ateleopodidae: dorsal fin above pectoral fin; pelvic fin under or ahead of pectoral fin; snout short and bulbous; scales very small or absent.

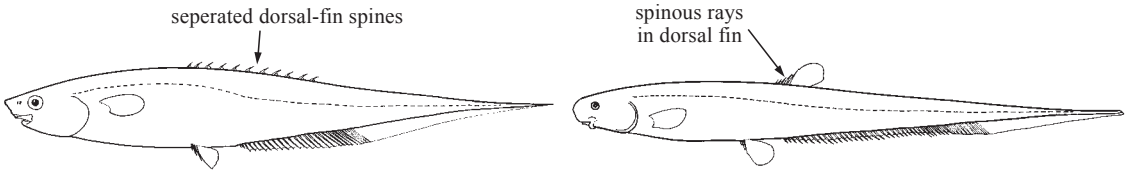


Macrouridae



Ateleopodidae

Notacanthidae: dorsal fin consists of a series of separated spines not connected by a membrane.
Lipogenyidae: dorsal fin with 4 to 6 unsegmented spines. Mouth sucker-like.



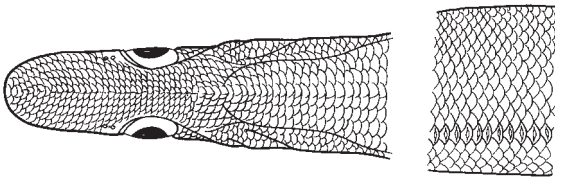
Notacanthidae **Lipogenyidae**

Key to the species of Halosauridae occurring in the area

Note: Trawled specimens often lose their scales; scale pockets remain, however, and these are usually sufficient to indicate where scales have been.

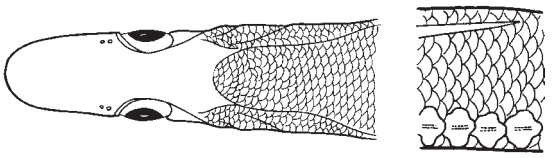
1a. Top of head scaled at least as far forward as level of nostrils (Fig. 1a); lateral-line scales slightly enlarged, 1 such scale for each transverse row of body scales (Fig. 1b) . . . . . → *2*

1b. Top of head naked (Fig. 2a); lateral-line scales markedly enlarged, 1 such scale for each 2 to 3 transverse rows of body scales (Fig. 2b) . . . . . → *3*



a) anteriodorsal view b) side of body

Fig. 1 ***Halosaurus***



a) anteriodorsal view b) side of body

Fig. 2 ***Aldrovandia***

2a. Dark colour on roof of mouth does not extend lateral to palatopterygoid arcade; dark colour on floor of mouth extends only slightly anterior to tongue, leaving anteriormost part pale (Fig. 3); 12 to 20 pale pyloric caeca . . . . . ***Halosaurus ovenii***

2b. Entire lining of mouth dark (Fig. 4); 8 to 12 dark pyloric caeca . . . . . ***Halosaurus guentheri***

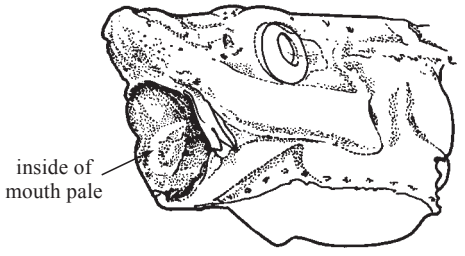


Fig. 3 oblique frontal view of head

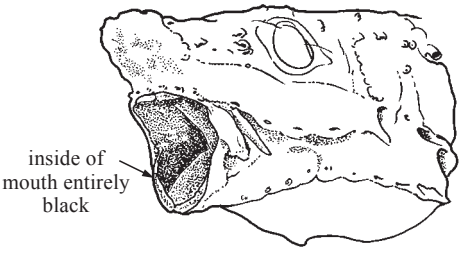


Fig. 4 oblique frontal veiw of head

3a. First dorsal-fin ray as long as second and segmented; scales on opercle; sheath of lateral line darkly pigmented in adults; pyloric caeca pale and in a double row . . . ***Halosauropsis macrochir***

3b. First dorsal-fin ray much shorter than second and unsegmented; no scales on opercle; sheath of lateral line unpigmented; pyloric caeca black and in a single row . . . . . → *4*

4a. Anal opening dark blue or black, surrounded by a white field . . . . . → ***5***

4b. Anal opening white, surrounded by a dark field . . . . . → ***6***

5a. Lateral-line scales contiguous; 1 lateral-line scale to every 2 body scales, 22 or 23 before anus; preoral portion of snout very long, less than 2 times in total snout length . . . . . ***Aldrovandia rostrata***

5b. Lateral-line scales not contiguous but separated by body scales; 1 lateral-line scale to every 3 body scales, 18 to 20 before anus; preoral portion of snout shorter, 2.25 to 2.5 in total snout length . . . . . ***Aldrovandia gracilis***

6a. Palatine tooth patches of the 2 sides in contact medially; 13 to 15 gill rakers on anterior arch; preoral portion of snout about 2 times in total snout length; dorsal origin over or very slightly behind base of pelvic fin . . . . . ***Aldrovandia affinis***

6b. Palatine tooth patches of the 2 sides separated medially; 19 to 23 gill rakers on anterior arch; preoral portion of snout about 3 times in total snout length; dorsal origin distinctly behind base of pelvic fin . . . . . → *7*

7a. Lateral-line scales before anus 24 to 28; palatine tooth patch separated from pterygoid patch by less than half its own length; pectoral rays 11 to 13 . . . . . ***Aldrovandia phalacra***

7b. Lateral-line scales before anus 16 to 21; palatine tooth patch separated from pterygoid patch by 1 to 4 times its own length; pectoral rays 9 to 11 . . . . . ***Aldrovandia oleosa***

List of species occurring in the area

Aldrovandia affinis (Günther, 1877). To 173 mm snout-vent length. Atlantic coast of US, Gulf of Mexico, and Caribbean; also E Atlantic and Indo-West Pacific. 700 to 2 200 m.

Aldrovandia gracilis (Goode and Bean, 1896). To 210 mm snout-vent length. Caribbean and Gulf of Mexico; 1 000 to 2 000 m.

Aldrovandia oleosa Sulak, 1977. To 167 mm snout-vent length. Atlantic coast of USA to N South America, also E Atlantic and possibly Indo-West Pacific; 1 200 to 2 000 m.

Aldrovandia phalacra (Vaillant, 1888). To 137 mm snout-vent length. Atlantic coast of USA to Bahamas, also E Atlantic and Indo-West Pacific; 500 to 2 500 m.

Aldrovandia rostrata (Günther, 1878). To 153 mm snout-vent length. One record from the area, off the S Bahamas; elsewhere in the middle and E Atlantic; 2 500 to 5 000 m.

Halosauropsis macrochir (Günther, 1878). To 271 mm snout-vent length. Atlantic coast of USA and Bahamas; also E Atlantic and Indian Ocean; 1 200 to 3 300 m.

Halosaurus guentheri Goode & Bean, 1896. To 240 mm snout-vent length. Caribbean, Gulf of Mexico, Atlantic coast of USA; also E Atlantic; 500 to 1 500 m.

Halosaurus ovenii Johnson, 1863. To 180 mm snout-vent length. Caribbean and Gulf of Mexico, also E Atlantic; 500 to 1 500 m.

References

McDowell, S. B. 1963. Family Halosauridae. In Fishes of the Western North Atlantic, edited by D.M. Cohen. *Mem. Sears Found. Mar. Res*. 1(6):32-123.

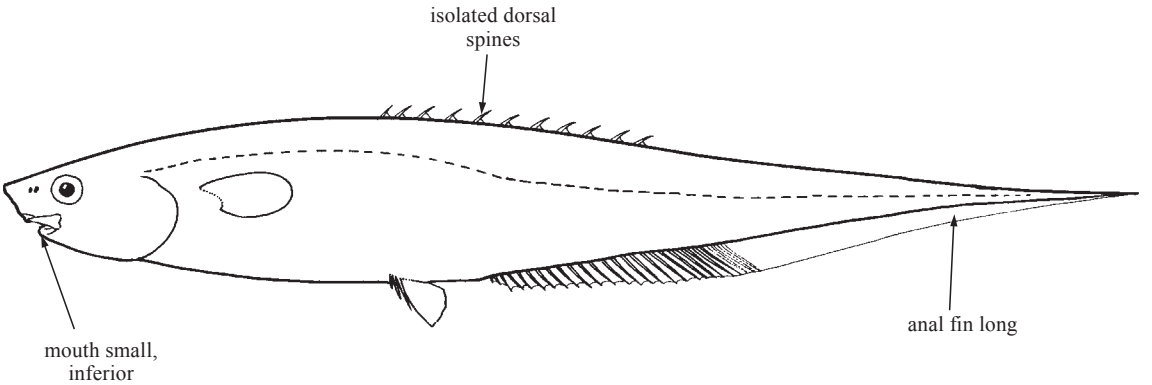
Sulak, K. J. 1977. *Aldrovandia oleosa*, a new species of the Halosauridae, with observations on several other species of the family. *Copeia*, 1977(1):11-20.

NOTACANTHIDAE

Spiny eels

by D.G. Smith, National Museum of Natural History, Washington, D.C., USA

Diagnostic characters: Maximum size 40 to 50 cm. Body moderate to moderately elongate; **tail slender and tapering to a point, often broken and regenerated**; anus somewhat before midlength. Head moderately deep to moderately elongate, somewhat compressed, its length contained 2 or 3 times in preanal length. Eye well developed. Snout projects beyond mouth, tapering to a rounded tip. Anterior and posterior nostrils close together, in front of eye. **Mouth relatively small, inferior, overhung by snout**, gape ending in front of or under eye; **maxilla without teeth, nearly excluded from gape by premaxilla**. Teeth small, pointed, in a single row on premaxilla, in one to several rows on palatine and dentary. **Dorsal fin consists of a series of unsegmented spines, isolated from each other and not connected by a membrane**, its length variable, beginning on head or trunk and extending behind anus, but ending well before end of tail; **anal fin long, extending from just behind anus to tip of tail, anterior rays spinous**; pectoral fin well developed, located on midside, a short but distinct distance behind gill opening; pelvic fins abdominal, slightly in front of anus; caudal fin absent. Scales small and overlapping, covering most of head and body. Lateral line complete, on dorsal half of body anteriorly, becoming midlateral on tail; canals and scales not notably enlarged. **Colour:** light grey to dark brown, lining of mouth and branchial chamber black; no distinct markings or patterns.



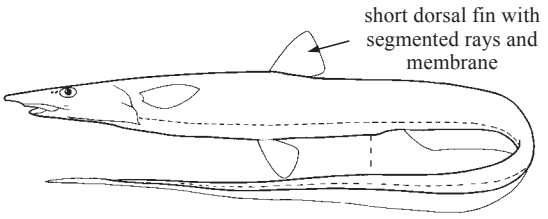
Habitat, biology, and fisheries: Notacanths live on the bottom at depths of approximately 200 to 3 500 m. They feed on various small invertebrates, including crustaceans, echinoderms, polychaetes, bryozoans, and hydrozoans. Their olfactory organs are well developed and are undoubtedly used in finding food. Notacanths show little sexual dimorphism, although males tend to be smaller than females and have a larger olfactory organ. The larva is a leptocephalus, similar to that of the halosaurs, eels, and elopiforms. Notacanths are occasionally taken in deep bottom trawls, but they have no commercial value.

Similar families in the area

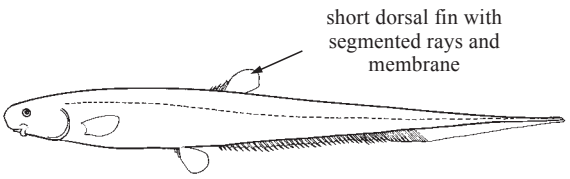
Notacanths are unlikely to be confused with any other fishes except perhaps the Halosauridae and Lipogenyidae. The peculiar spinous dorsal fin, without connecting membranes, the slender, tapering tail, and the long anal fin distinguish them from all other families in the area.

Halosauridae: dorsal fin short, with soft rays connected by membrane.

Lipogenyidae: dorsal fin with both spines and segmented soft rays, connected by a membrane and forming a single, short-based fin.



Halosauridae



Lipogenyidae

Key to the species of Notacanthidae occurring in the area

1a. Dorsal-fin spines 6 to 15; greatest body depth less than 3 in preanal length (Fig. 1) . . . . . ***Notacanthus chemnitzii***

1b. Dorsal-fin spines 26 to 40; greatest body depth more than 3 in preanal length (Fig. 2) . . . . . → ***2***

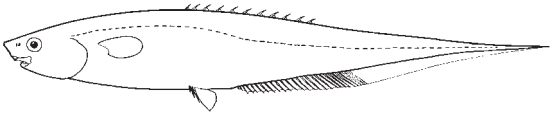


Fig. 1 ***Notacanthus***

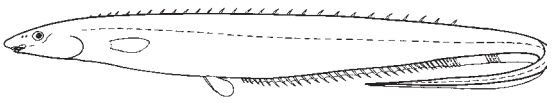


Fig. 2 ***Polyacanthonotus***

2a. Posterior end of mouth not reaching anterior margin of eye; 22 or more gill rakers on anterior arch . . . . . ***Polyacanthonotus rissoanus***

2b. Posterior end of mouth reaching to or beyond anterior margin of eye; 21 or fewer gill rakers on anterior arch . . . . . → ***3***

3a. Anterior and posterior nostrils close together, greatest distance between them 33 to 62% of horizontal eye diameter; maximum size 350 to 550 mm; vertebrae 254 or more . . . . . ***Polyacanthonotus challengeri***

3b. Anterior and posterior nostrils farther apart, greatest distance between them 67 to 103% of horizontal eye diameter; maximum size less than 300 mm; vertebrae 245 or fewer . . . . . ***Polyacanthonotus merretti***

List of species occurring in the area

Notacanthus chemnitzii Bloch, 1788. To 1 m. Worldwide, from subarctic to subantarctic latitudes; in the area Atlantic coast of US and Gulf of Mexico; 200 to 1 000 m.

Polyacanthonotus challengeri (Vaillant, 1888). To 55 cm. Occurs largely N of the area, but may extend into the northernmost part; also E Atlantic and Indo-Pacific; 1 300 to 3 700 m.

Polyacanthonotus merretti Sulak, Crabtree, and Hureau, 1984. To 30 cm. Atlantic coast of US, Gulf of Mexico, and Caribbean; 1 000 to 1 600 m.

Polyacanthonotus rissoanus (De Filippi and Vérany, 1859). To 40 cm. Occurs largely N of the area, but may extend into the northernmost part; also E Atlantic; 1 000 to 2 000 m.

References

McDowell, S. B. 1963. Family Notacanthidae. In Fishes of the Western North Atlantic, edited by D.M. Cohen. *Mem. Sears Found. Mar. Res*. 1(6):124-207.

Crabtree, R. E., K. J. Sulak, and J. A. Musick, 1985. Biology and distribution of species of *Polyacanthonotus* (Pisces: Notacanthiformes) in the western North Atlantic. *Bull. Mar. Sci*., 36(2):235-248.

Sulak, K. J., R. E. Crabtree, and J.-C. Hureau. 1984. Provisional review of the genus *Polyacanthonotus* (Pisces, Notacanthidae) with description of a new Atlantic species, *Polyacanthonotus merretti. Cybium,* 8(4):57-68.

LIPOGENYIDAE

Spiny sucker eel

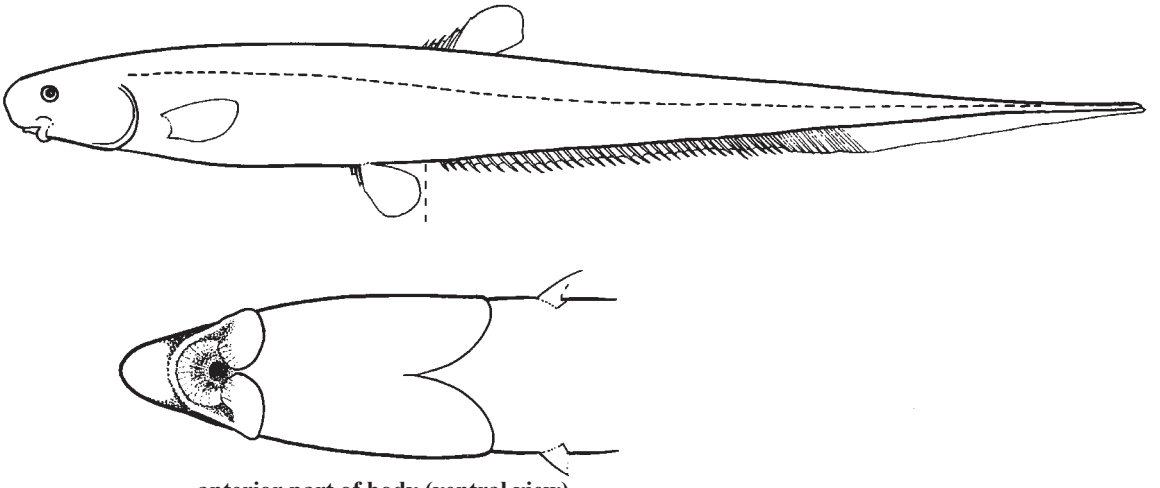
by D.G. Smith, National Museum of Natural History, Washington, D.C., USA

A single species in this family.

Lipogenys gillii Goode and Bean, 1896 NNL

Frequent synonyms / misidentifications: None / None.

FAO names: En - Spiny sucker eel.



anterior part of body (ventral view)

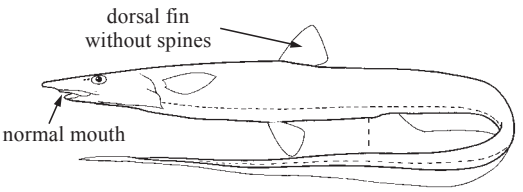
Diagnostic characters: Body moderately elongate; **tail slender and tapering to a point**. Head narrow, somewhat compressed, tapering anteriorly to a rounded point as seen from above, more broadly rounded as seen from side. Eye well developed. Snout projects beyond mouth. Anterior and posterior nostrils close together, about halfway between eye and tip of snout. **Mouth inferior, small and sucker-like; upper lip with thick, pleated folds; posterior end of maxilla bent sharply downward, forming a flap-like structure; fleshy papillae on snout bordering upper lip. Teeth absent. Dorsal fin short-based, located above anus, the first 4 to 6 rays hard and spinous, increasing in length from front to back, the remainder soft and segmented, membrane connecting all rays except first 1 to 3 spines. Anal fin long, extending from just behind anus to tip of tail, anterior rays spinous, posterior rays segmented, the transition gradual**. Pectoral fin slightly below midside, behind gill opening; pelvic fin abdominal; caudal fin absent. Scales small, covering most of head and body. Lateral line complete, on dorsal half of body anteriorly, becoming midlateral on tail; canals and scales not notably enlarged. **Colour:** light brown or grey, lining of gill chamber dark brown. No markings or patterns.

Size: To approximately 35 to 40 cm.

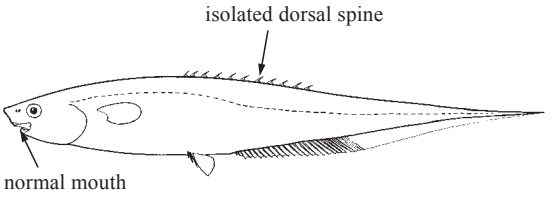
Similar families occurring in the area

Halosauridae: mouth normal, not sucker-like; dorsal fin without spines or with a single, short spine connected to remainder of fin by membrane.

Notacanthidae: mouth normal, not sucker-like; dorsal fin without segmented rays, rather a series of isolated spines unconnected by a membrane.



Halosauridae



Notacanthidae

Habitat, biology, and fisheries: This fish lives on the bottom in approximately 600 to 2 000 m and feeds mostly on organic material contained in bottom sediment drawn up by the sucker-like mouth. Little is known about its biology; there is no obvious sexual dimorphism. *Lipogenys gillii* is rarely seen and has no commercial value.

Distribution: Known from off the Atlantic coast of Canada and the USA, from Nova Scotia to New Jersey; may extend into the northern part of the area in deep water. The species has recently been reported from off Japan and New Zealand and may well be found worldwide in suitable habitat.

Remarks: Although *Lipogenys* is usually placed in its own family, primarily because of the peculiar and highly modified mouth, its anatomy is similar in most respects to that of the Notacanthidae. Indeed, one recent study placed *Lipogenys* as the sister group of *Polyacanthonotus* within the Notacanthidae. A single species is currently recognized, but critical comparisons have not been made between populations.

Reference

McDowell, S.B. 1963. Family Lipogenyidae. In Fishes of the Western North Atlantic, edited by D.M. Cohen. *Mem. Sears Found. Mar. Res*. 1(6):208-228.

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Order ANGUILLIFORMES

ANGUILLIDAE

Freshwater eels

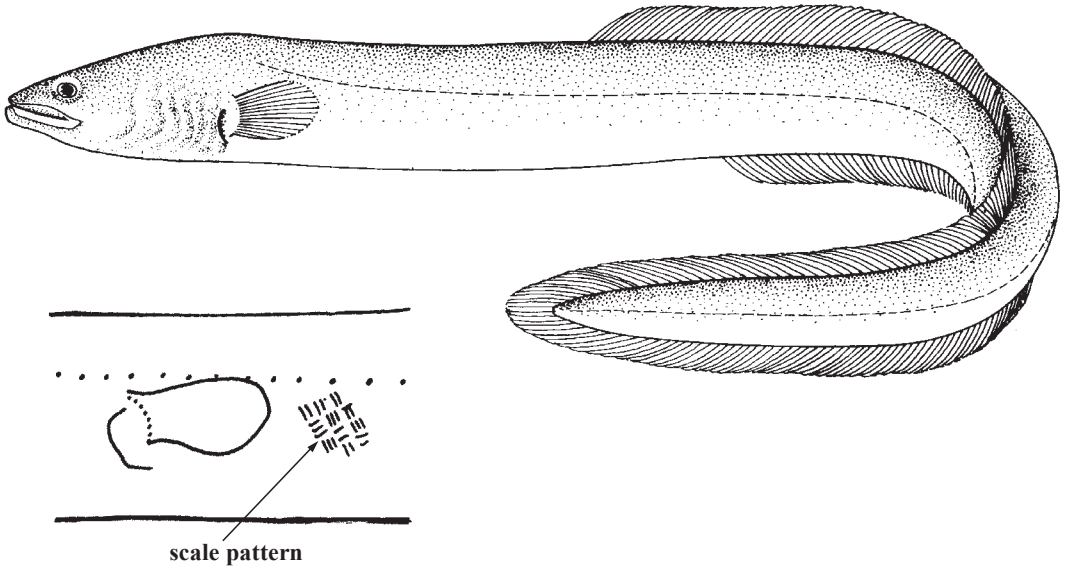
by D.G. Smith, National Museum of Natural History, Washington, D.C., USA

A single species occurring in the area.

Anguilla rostrata (Lesueur, 1817) ELA

Frequent synonyms / misidentifications: None / None.

FAO names: En - American eel; **Fr** - Anguille d'Amèrique; **Sp** - Anguila americana.



Diagnostic characters: Body moderately elongate, cylindrical in front and only moderately compressed along the tail. Eye well developed, moderately small in females and immatures, markedly enlarged in mature males. Snout rounded. Anterior nostril tubular, near tip of snout; posterior nostril a simple opening in front of eye at about mideye level. Mouth moderately large, gape ending near rear margin of eye; **lower jaw projects beyond upper; well developed fleshy flanges on upper and lower lips. Teeth small, granular, in narrow to broad bands on jaws and vomer**. Dorsal and anal fins continuous around tail; **dorsal fin begins well behind pectoral fin, closer to anus than to pectoral-fin base; pectoral fin well developed. Small oval scales present, embedded in skin and arranged in a basket-weave pattern**. Lateral line complete. **Colour:** immature individuals, called yellow eels, vary from yellowish green to brown above, paler ventrally; sexually mature individuals become bicoloured, black above and white below, with a bronze or silvery sheen, and are then referred to as silver eels or bronze eels.

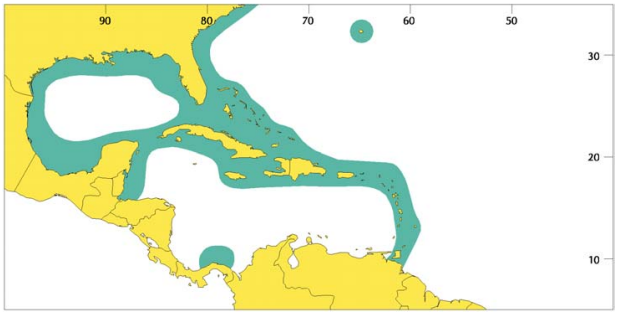
Size: Maximum about 150 cm, common to 50 cm; females grow much larger than males.

Similar species occurring in the area

The combination of the following characters will distinguish *Anguilla rostrata* from all other species of eels in the area: presence of scales and of pectoral fins; teeth in upper and lower jaws minute; lower jaw protruding beyond upper jaw; dorsal fin begins far behind pectoral fins, closer to anus than to pectoral-fin base.

Habitat, biology, and fisheries: Adults of *Anguilla rostrata* spend most of their lives in fresh water or estuarine habitats. They are nocturnal, hiding by day and coming out at night to forage. They take almost any available food, mainly small, benthic invertebrates and fishes. They are extremely hardy and live in a wide variety of aquatic habitats. Mature eels leave fresh water in the autumn and travel to the Sargasso Sea, where they spawn in late winter and early spring. Spawning is the terminal event in the eel's life, and it dies without returning to fresh water. The eggs hatch into larvae called leptocephali, which are carried on the currents back to the continent. When they reach the edge of the continental shelf, they metamorphose into juvenile eels called elvers and enter fresh water the following spring. Elvers are caught with fine-mesh fyke nets and dip nets in the spring during their inshore migration. Yellow eels are caught with baited eel pots and trot lines. Silver eels are taken in pound nets in estuarine areas during seaward migration. Most of the catch is exported to Europe and East Asia, where eels are considered a delicacy. They are less popular in North America, where they are marketed fresh, salted, or smoked. FAO statistics report landings ranging from 2 to 43 t from 1995 to 1999. Elvers have been exported to Japan and Taiwan Province of China for use in aquaculture.

Distribution: Widely distributed in lands bordering the western North Atlantic from Greenland to Trinidad, including the Gulf of Mexico; most common along the Atlantic coast of the USA and southern Canada.



Reference

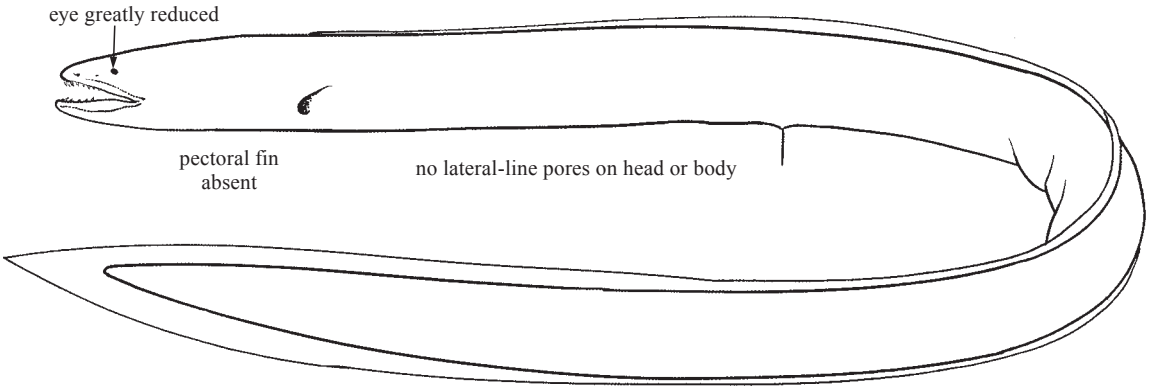
Smith, D. G. 1989. Family Anguillidae. In Fishes of the Western North Atlantic, edited by E. B. Böhlke. *Mem. Sears Found. Mar. Res.*, 1(9):25-47.

HETERENCHELYIDAE

Mud eels

by D.G. Smith, National Museum of Natural History, Washington, D.C., USA

Diagnostic characters: Medium-sized eels, maximum size about 1 m. Body moderately elongate to elongate, cylindrical anteriorly, compressed posteriorly, tail longer than head and trunk. Head moderate; **eye greatly reduced, covered by semi-transparent skin**; jaws nearly equal or lower jaw projects slightly beyond upper; mouth relatively large, gape ending well behind eye; teeth conical to molariform, bi- or triserial on jaws, in 1 to several rows on vomer. Dorsal and anal fins low and confluent with caudal fin; dorsal fin begins over or slightly behind gill opening; **pectoral fin absent**. Scales absent. **Lateral line absent, no pores on head or body. Colour:** grey or brown in preservative; freshly collected specimens largely unpigmented, with a reddish cast due to blood in superficial capillaries.



Habitat, biology, and fisheries: Heterenchelyids are burrowing eels that spend most or all of their time buried in the substrate. They are seldom seen, and virtually nothing is known about their biology. They are rare and of no importance to fisheries.

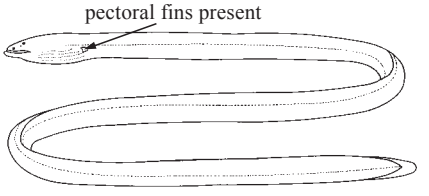
Remarks: The centre of distribution of the Heterenchelyidae is the eastern Atlantic, where 2 genera and several species occur. A single species occurs in the area; it has been recorded from scattered localities in the Caribbean and northern South America, in relatively shallow water.

Similar families occurring in the area

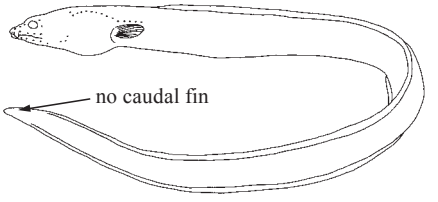
The only other eels with eyes as reduced as those of the heterenchelyids are the Moringuidae and certain members of the Ophichthidae. Both of these families have lateral lines with pores on the body, at least anteriorly.

Moringuidae: *Moringua* has a strongly projecting lower jaw, and both the anus and the dorsal-fin origin are well behind midlength. *Neoconger* has the upper jaw projecting beyond the lower, and its dorsal fin begins slightly before the anus. Both moringuid genera have pectoral fins, although that of *Moringua* is often reduced.

Ophichthidae: the small-eyed, burrowing ophichthids of the subfamily Ophichthinae have no caudal fin, and the tail ends in a hard, finless point. Ophichthids have a well-developed lateral line with pores on the head and body, and in nearly all of them the upper jaw projects beyond the lower.



Moringuidae



Ophichthidae

List of species occurring in the area

Pythonichthys sanguineus Poey, 1868. Maximum size about 80 cm. Caribbean and N South America.

Reference

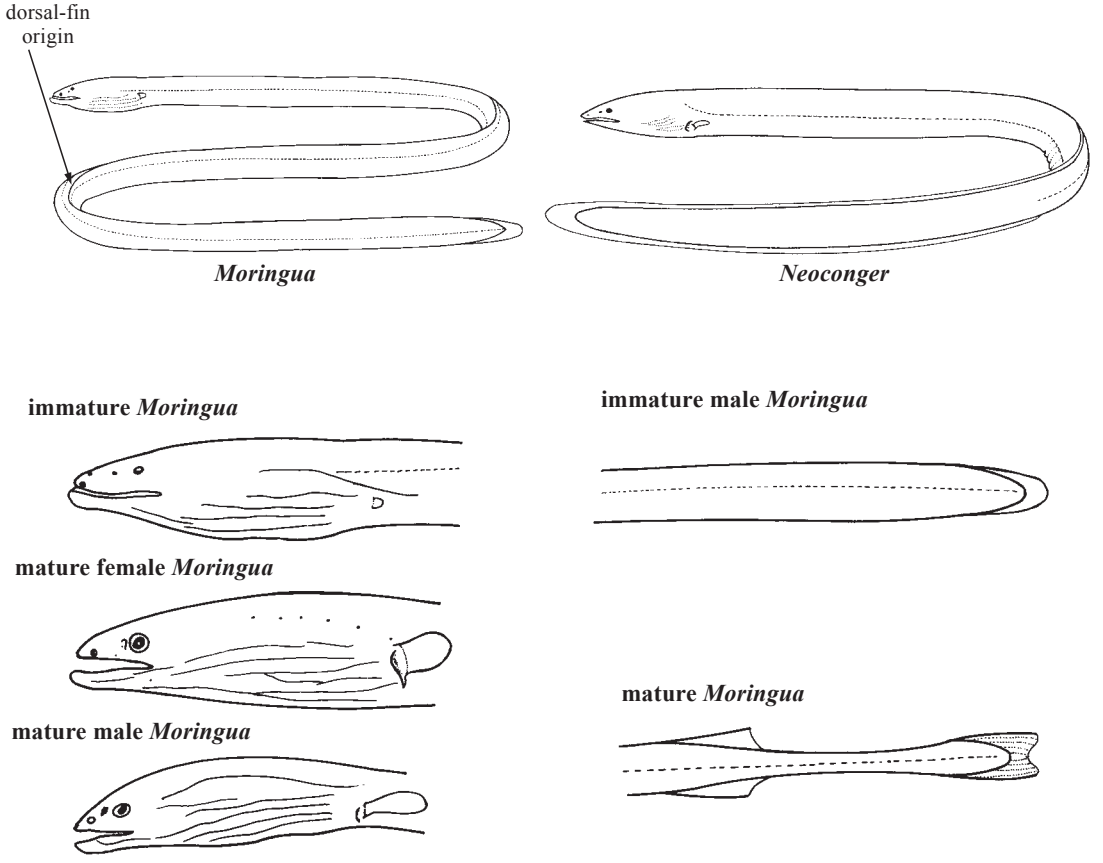
Smith, D.G. 1989. Family Heterenchelyidae. In Fishes of the Western North Atlantic, edited by E.B. Böhlke. *Mem. Sears Found. Mar. Res.*, 1(9):48-54.

MORINGUIDAE

Spaghetti eels

by D.G. Smith, National Museum of Natural History, Washington, D.C., USA

Diagnostic characters: Small eels, maximum size 50 cm. Body moderately elongate to very elongate, cylindrical except near tip of tail; anus near or behind midlength; tip of tail soft, blunt. **Eye reduced except in mature *Moringua***; snout not greatly prolonged; anterior nostril with a low tube or without a tube, posterior nostril in front of eye; mouth moderate, gape ending under or slightly behind eye; upper lip without an upturned flange; lower lip with or without a groove separating it from remainder of lower jaw; teeth conical, small to moderately enlarged, in 1 or 2 series on jaws and vomer; intermaxillary teeth generally the largest, arranged in 2 longitudinal rows or in a semicircle. All fins present though sometimes reduced; dorsal and anal fins confluent with caudal fin; **dorsal fin begins far behind head, slightly before or well behind midlength**; anal fin begins at or distinctly behind anus. Scales absent. Lateral line on body complete or present only on trunk; **on head, pores present only on lower jaw. Colour:** *Neoconger*: grey to brown in life, with some red on fins and head. *Moringua*: immatures yellow-orange above and yellow or white below with some reddish tinting, mature individuals countershaded with dark grey to black above and white below. In preservative, all moringuids featureless grey to tan.



Habitat, biology, and fisheries: Moringuids are burrowing eels that spend much of their time buried in the sediment. *Moringua* lives in clear water over sandy bottoms and is common around coral reefs. *Neoconger* is found over muddy bottoms along the continental shelf. They feed mainly on small invertebrates. Although seldom seen, moringuids can be quite common and probably play an important ecological role. *Neoconger* is occasionally taken in trawls, and mature *Moringua* sometimes appear at the surface around night lights. Moringuids are of no importance to fisheries.

Remarks: The Moringuidae contains 2 different-looking genera. *Moringua* is much more elongate and changes greatly in form and colour during its life. Immature individuals are worm-like, with reduced eyes and fins, and a projecting lower jaw; they are yellow or red in life (the red probably resulting from blood in superficial capillaries rather than a specific pigment). At maturity, the eyes and pectoral fins enlarge, and the dorsal and anal fins expand near the tail to form a paddle-like tail fin. Colour changes to brown or black above and white below. These features are more strongly expressed in males than females, and females grow much larger than males. Immatures spend most if not all of their time buried in the sand, but mature males and females may emerge and swim near the surface. *Neoconger* is only moderately elongate, uniformly grey in colour, with small eyes, and the snout projects beyond the lower jaw. Its lateral line is incomplete, ending at about the level of the anus.

Similar families occurring in the area

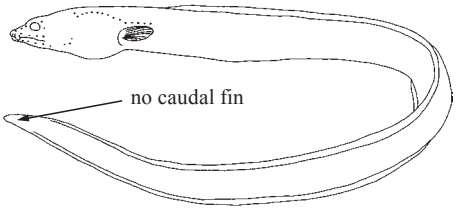
Anguillidae: *Moringua* is distinguished from all other families except the Anguillidae by the protruding lower jaw. Anguillids have small, embedded scales; well-developed fleshy flanges on the upper and lower lip; a large eye; and pectoral fin at all stages of their life. The anus is located at or slightly in front of midlength, and the dorsal fin begins in front of the anus. *Moringua* lacks scales, the lips are without flanges, the anus is located well behind the midpoint of the body, and the dorsal fin begins approximately above the anus.

Ophichthidae: *Neoconger* is likely to be confused only with certain ophichthids. Most ophichthids (Ophichthinae) lack a caudal fin, and the tip of the tail is hard and pointed. Those ophichthids with a caudal fin (Myrophinae) have the posterior nostril below the middle of the eye (sometimes concealed in the upper lip) and have pores on the upper jaw. *Neoconger* has the posterior nostril at about mideye level and lacks pores on the upper jaw. Ophichthids also have more numerous branchiostegal rays.

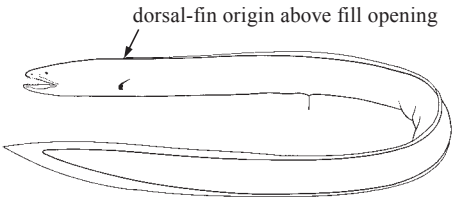
Heterenchelyidae: lack pectoral fins at all stages, and the dorsal fin begins over the gill opening. The lateral line is absent, with no pores on the head or body.



Anguillidae



Ophichthidae



Heterenchelyidae

Key to the species of Moringuidae occurring in the area

1a. Upper jaw projects beyond lower; anus near midlength; lateral line ends near level of anus . . . . . ***Neoconger mucronatus***

1b. Lower jaw projects beyond upper; anus distinctly behind midlength; lateral line complete . . . . . ***Moringua edwardsi***

List of species occurring in the area

Moringua edwardsi (Jordan and Bollman, 1889). To about 60 cm. Bermuda, Bahamas, and Caribbean.

Neoconger mucronatus Girard, 1858. To about 30 cm. Gulf of Mexico to Brazil.

Reference

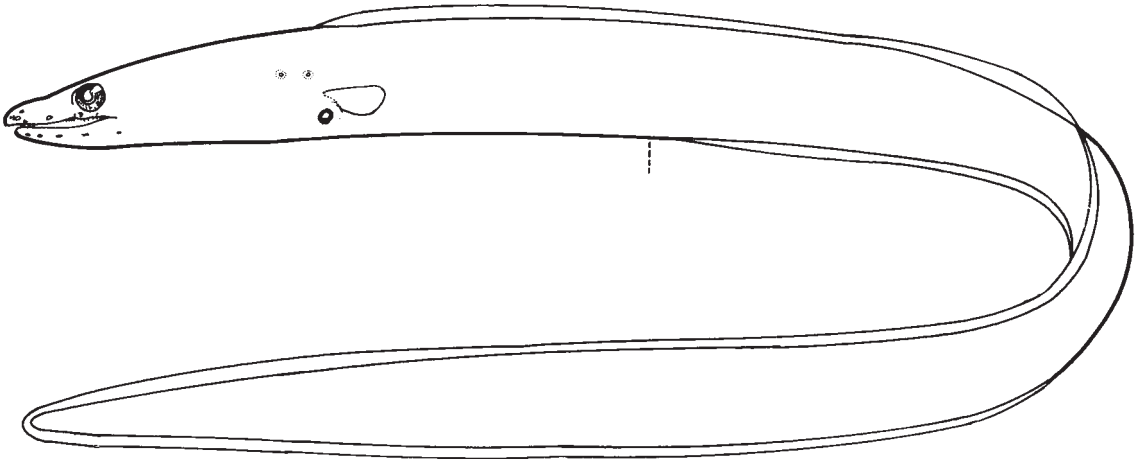
Smith, D. G. 1989. Family Moringuidae. In Fishes of the Western North Atlantic, edited by E. B. Böhlke. *Mem. Sears Found. Mar. Res.*, 1(9):55-71.

CHLOPSIDAE

False morays

by D.G. Smith, National Museum of Natural History, Washington, D.C., USA

Diagnostic characters: Small eels, no more than 30 cm, usually 15 to 20 cm. Body stout to moderately elongate, compressed, anus slightly before midbody. **Eye well developed**. Snout moderate to short, projecting slightly beyond tip of lower jaw. Anterior nostril in a short tube, near tip of snout; **posterior nostril located below mideye level, either on side of head above lip, on lip and covered with a flap, or opening inside mouth. Upper lip without an upturned fleshy flange; lower lip with or without a downturned fleshy flange**. Teeth small and conical or long and needle-like, in 2 to several series on jaws, and 1 or 2 long rows on vomer; large fangs never present. **Gill opening reduced to a small, round, pore-like opening**. Dorsal and anal fins well developed, confluent with caudal fin; **dorsal fin begins over or slightly behind gill opening. Pectoral fin present or absent**. Scales absent. **Lateral line incomplete, usually reduced to 1 or 2 pores at anterior end of canal in front of pectoral fin. Colour:** variable, most often brown, and frequently countershaded with white ventrally; 1 species with a pale nuchal band.



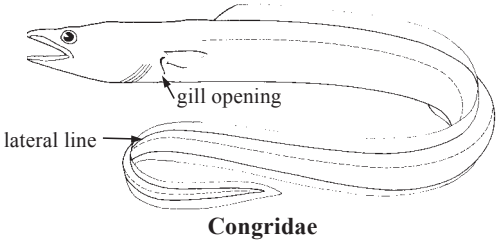
Habitat, biology, and fisheries: Chlopsids are small, cryptic eels inhabiting coral reefs, seagrass beds, and rubble. They are seldom seen except at rotenone stations. Some species occasionally turn up in trawls, but their retiring habits and preference for rough bottoms place them beyond the reach of most collecting methods. They are of no importance to fisheries.

Remarks: This family was formerly known as the Xenocongridae. A few species are common, but most are quite rare.

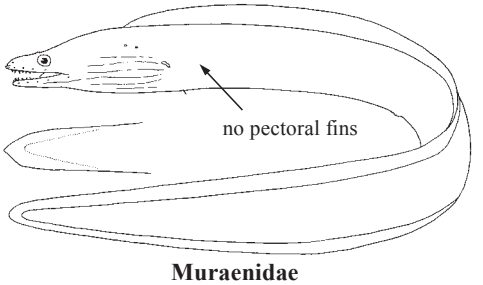
Similar families occurring in the area

Congridae: those chlopsids with pectoral fins are most likely to be confused with congrids; congrids have a complete lateral line, however, and a larger gill opening.

Muraenidae: muraenids always lack a pectoral fin, and the posterior nostril is at or above the upper margin of the eye; enlarged, fang-like teeth are usually present.



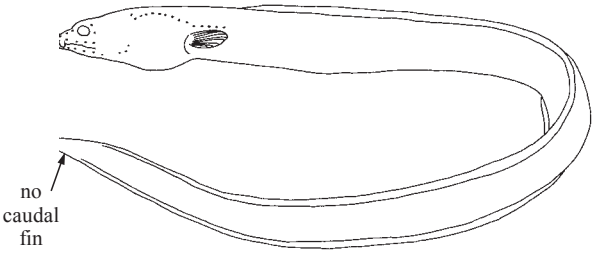
Congridae



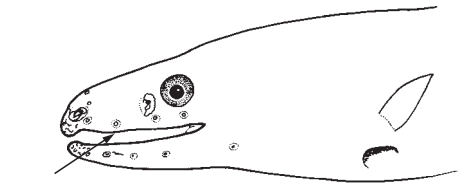
Muraenidae

Ophichthidae: also have the posterior nostril low on the side of the head or on the lip. Those of the subfamily Ophichthinae lack a caudal fin, and the tip of the tail is hard and pointed. Those of the subfamily Myrophinae have a caudal fin, but they have an expanded branchial basket with numerous branchiostegal rays, most of which are not attached to the hyoid bones.

Synaphobranchidae (Ilyophinae): some have a reduced lateral line and resemble chlopsids; they also have the posterior nostril low on the side of the snout, further enhancing the resemblance. Most ilyophines, however, have more than 2 lateral-line pores; the only exception is *Dysommina*, which has no open pores. Most ilyophines have a single row of vomerine teeth, each tooth composed of 2 fused teeth. Most chlopsids have 2 rows of vomerine teeth; in those that have 1 row, the teeth are simple, not compound.



Ophichthidae



Synaphobranchidae

Key to the species of Chlopsidae occurring in the area

1a. Vomerine teeth in a single series on midline of roof of mouth (Fig. 1) . . . . . ***Robinsia catherinae***

1b. Vomerine teeth in 2 or 4 series (Figs 2, 3) ***2***

2a. Pectoral fin present ***3***

2b. Pectoral fin absent ***5***

3a. Vomerine teeth in 4 series (Fig. 2) . . . . . ***Catesbya pseudomuraena***

3b. Vomerine teeth in 2 series (Fig. 3) ***4***

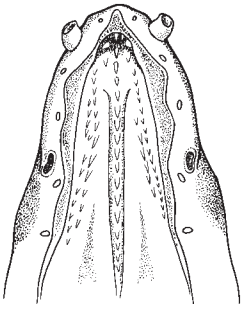


Fig. 1

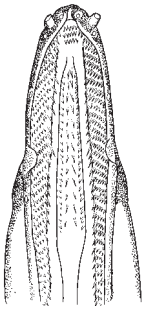


Fig. 2

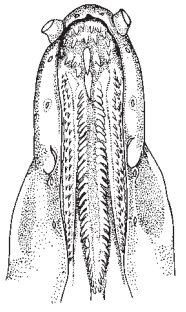


Fig. 3

4a. Posterior nostril on upper lip, concealed by a flap dorsally; head uniform in colour (Fig. 4) . . . . . ***Kaupichthys hyoproroides***

4b. Posterior nostril a simple opening on side of head opposite lower part of eye (Fig. 5); head with a pale transverse band behind eye . . . . . ***Kaupichthys nuchalis***

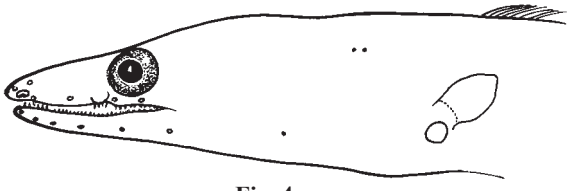


Fig. 4

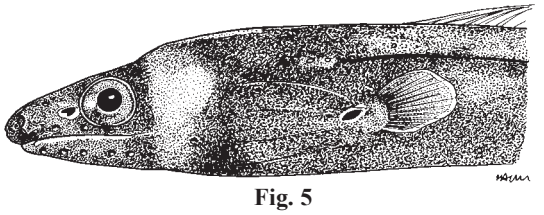


Fig. 5

5a. Lower lip with a downturned flange (Fig. 6) . . . . . ***Chilorhinus suensonii***

5b. Lower lip without a downturned flange . . . . . → ***6***

6a. Bicoloured, brown above and white below (Fig. 7) . . . . . ***Chlopsis bicolor***

6b. Banded or mottled in colour (Fig. 8) . . . . . ***Chlopsis dentatus***

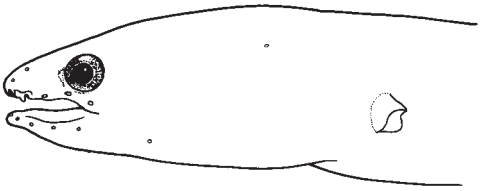


Fig. 6

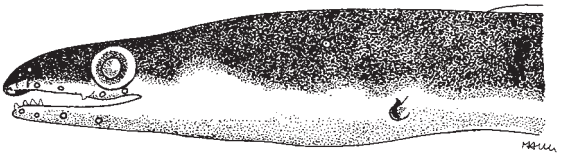


Fig. 7



Fig. 8

List of species occurring in the area

Catesbya pseudomuraena Böhlke and Smith, 1968. To 15 cm. Known from the Bahamas.

Chilorhinus suensonii Lütken, 1852. To 20 cm. Bermuda and Bahamas to Brazil.

Chlopsis bicolor Rafinesque, 1810. To about 24 cm. E and W Atlantic, including the Mediterranean.
Chlopsis dentatus (Seale, 1917). To 20 cm. Caribbean; also Indian Ocean, W Pacific.

Kaupichthys hyoproroides (Strömman, 1896). To 24 cm. Throughout the area on coral reefs.
Kaupichthys nuchalis Böhlke, 1967. To 14 cm. Throughout the area on coral reefs.

Robinsia catherinae Böhlke and Smith, 1967. To 20 cm. Caribbean; also Indian Ocean.

Reference

Smith, D.G. 1989. Family Chlopsidae. In Fishes of the Western North Atlantic , Part 9, edited by E. B. Böhlke. *Mem. Sears Found. Mar. Res.*, 1(9):72-97.

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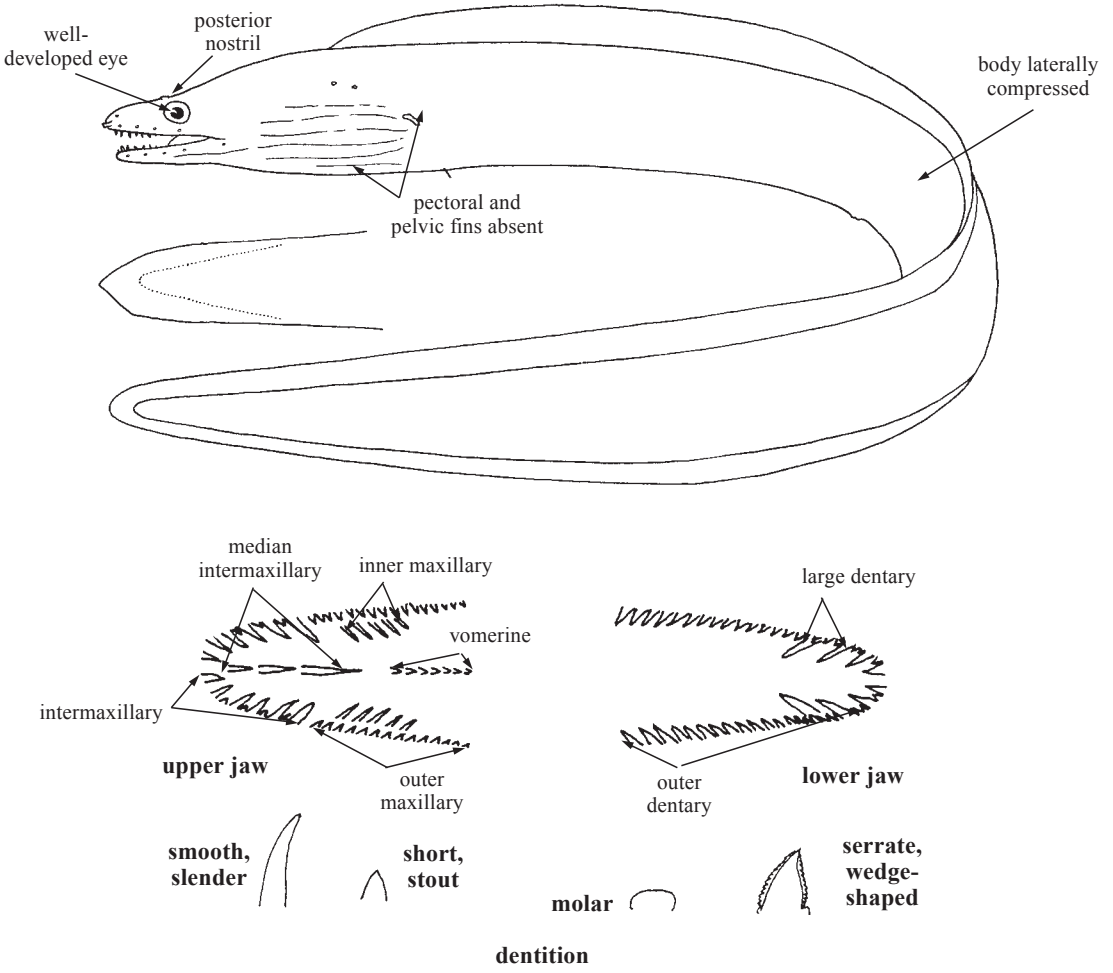
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MURAENIDAE

Moray eels

by E.B. Böhlke (deceased), Academy of Natural Sciences, Pennsylvania, USA
proofs checked by D.G. Smith, National Museum of Natural History, Washington, D.C., USA

Diagnostic characters: Body elongate, muscular, and laterally compressed. Dorsal profile of head above and behind eye often raised due to the development of strong head muscles. Eye well developed, above and near midgape. Snout short to elongate. Anterior nostril tubular, near tip of snout; **posterior nostril above or before eye, a simple pore or in a tube**. Mouth large, gape usually extending behind posterior margin of eye, lips without flanges. Teeth numerous and strong, with smooth or serrate margins, ranging from blunt rounded molars to long, slender, sharply pointed, and sometimes depressible canines; jaws short to elongate, usually about equal. On upper jaw, intermaxillary (anterior) teeth in 1 or 2 peripheral rows and usually a median row of 1 to 3 teeth which are the longest in the mouth (sometimes missing in large specimens); maxillary (lateral) teeth in 1 or 2 rows on side of jaws; vomerine teeth (on roof of mouth) usually short and small, in 1 or 2 rows or in a patch, or sometimes absent. Dentary (lower jaw) teeth in 1 or more rows; in many species in the subfamily Muraeninae the first 4 teeth are larger, sometimes forming a short inner row. **Gill opening a small round hole or slit at midside**. Dorsal and anal fins variously developed, from long fins with dorsal fin usually beginning on head and anal fin immediately behind anus (subfamily Muraeninae), to both fins restricted to tail tip (subfamily Uropterygiinae); dorsal and anal fins continuous with caudal fin around tail tip; **pectoral and pelvic fins absent. Scales absent. Lateral-line pores absent on body except for a few (usually 1 or 2) above and before gill opening**; head pores usually 3 near tip of snout, 4 along upper jaw, and 6 on lower jaw; no pores behind eye or in supratemporal commissure. **Colour:** variable, from nearly uniform to distinctive patterns of spots, blotches, bars, and/or reticulations.



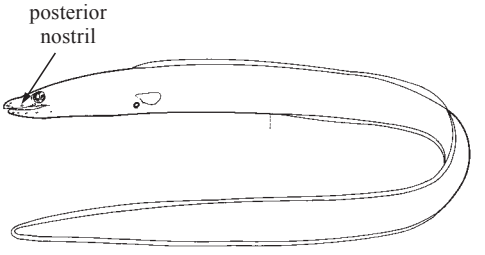
Habitat, biology, and fisheries: Morays are small to very large eels (to 375 cm total length) inhabiting tropical and subtropical waters. Many are found in shallow-water rock and coral reef habitats, where they find protection in holes and crevices; others live above sand or mud bottoms at depths to 500 m; a few species are found in brackish-water tidal creeks, mangrove areas, or in rivers. They are scavengers and predators, feeding on fish or crustaceans. If provoked or handled carelessly, their powerful jaws and strong teeth will cause deep lacerations, but usually they do not leave their hiding places to attack swimmers. Morays are caught by spear, hook-and-line or longlines, traps, trawls, and occasionally by dredge. They are not sought commercially, but may be incidentally caught and sold in fish markets. They are eaten in many parts of the world, some locally in the area; consumption of morays 4 kg or larger may result in ciguatera poisoning, which is sometimes fatal.

Remarks: The species of morays in the Atlantic are well known, but the generic nomenclature for the family is not established. The generic classification used by Böhlke et al. (1989) is followed for these accounts.

Similar families occurring in the area

Few eels are likely to be confused with morays. The combination of elevated head profile, high posterior nostril, lack of pectoral fins, and reduced lateral line is not found in any other family.

Chlopsidae (formerly Xenocongridae): superficially similar to morays, but posterior nostril below mideye level or on lip rather than above eye; pectoral fins sometimes present; vomerine tooth series widely divergent (except *Catesbya*) rather than along midline.



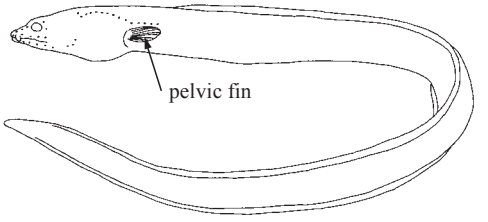
Chlopsidae

Myrocongridae: similar in appearance to morays but pectoral fins present.

Ophichthidae: somewhat similar in appearance, but posterior nostril always low on side of head, on lip, or opening inside mouth; pectoral fins usually present, caudal fin absent in most.



Myrocongridae



Ophichthidae

Identification note: Morays are notoriously difficult to identify because of great variability. Characters used include fin positions, tail length (position of anus), jaws and dentition, nostril condition, and colour pattern. Both colour pattern and dentition may change greatly with growth, and the presence of the fins is sometimes difficult to determine (the beginning of the dorsal fin is sometimes not discernible externally; the anal fin condition can best be determined by its presence or absence just behind the anus). Vertebral counts, while not useful for field identification, are consistent for a species and are important characters for defining species; the mean counts for predorsal-preanal-total vertebrae (**MVF**) are included in the key for reference.

Key to the species of Muraenidae occurring in the area

1a. Dorsal fin beginning above and near to well-before anus (usually on head), anal fin beginning just behind anus (subfamily Muraeninae) (Fig. 1) . . . . . → *2*

1b. Dorsal and anal fins restricted to and visible only near tail tip (subfamily Uropterygiinae) (Fig. 2) . . . . . → *20*

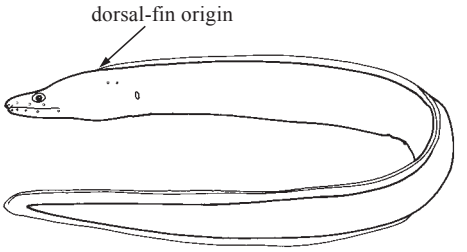


Fig. 1 Muraeninae

2a. Dorsal fin beginning above and shortly behind anus; uniform brown with pale head and tail tip (red-orange in life); MVF 73-53-130 . . . . . *Monopenchelys acuta*

2b. Dorsal fin beginning above and before anus; colour variable . . . . . → *3*

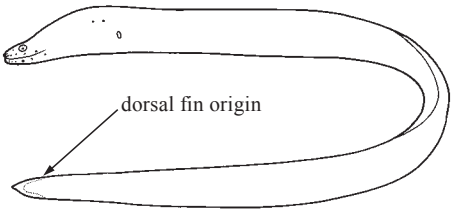


Fig. 2 Uropterygiinae

3a. Some teeth rounded or molariform (at least the vomerine teeth), no canine teeth; dark all over with pale chain-like pattern; MVF 6-58-117 . . . . . *Echidna catenata*

3b. No molariform teeth, some canine teeth present; colour variable . . . . . → *4*

4a. Jaws elongate and arched, meeting only at their tips; elongate fangs exposed when mouth is closed (Fig. 3) . . . . . → *5*

4b. Jaws not arched, closing completely or with slight gap; teeth not exposed when mouth is closed (Fig. 4) . . . . . → *7*

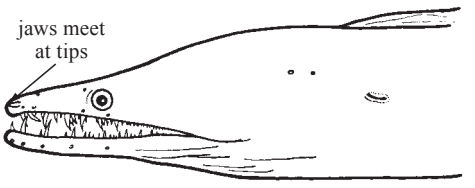


Fig. 3 lateral view of head

5a. Posterior nostril large and elongate, before eye; less than 6 inner dentary teeth; brown with pale mottling; MVF 8-60-144 . *Enchelycore nigricans*

5b. Posterior nostril a rounded pore above anterior margin of eye; more than 6 inner dentary teeth; colour variable . . . . . → *6*

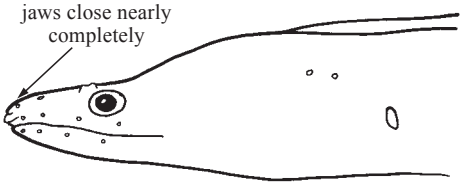


Fig. 4 lateral view of head

6a. Colour uniform brown, jaw pores set in white spots; 6 to 13 inner dentary teeth; MVF 9-48-135 . . . . . *Enchelycore carychroa*

6b. Colour pattern of pale blotches on brown body; jaw pores not noticeably white; 10 to 14 inner dentary teeth; MVF 7-56-154 . . . . . *Enchelycore anatina*

7a. Posterior nostril in tube; gill opening in black spot . . . . . → *8*

7b. Posterior nostril flush or nearly so with head profile; gill opening with body coloration . . . . . → *9*

8a. Head dark, body and fins with large dark spots; MVF 4-64-154 . . . . . *Muraena robusta*

8b. Head brown, body and fins with large pale rosettes overlain with small dark spots; MVF 4-56-131 . . . . . *Muraena retifera*

9a. Teeth numerous, no long canines; intermaxillary teeth 5 rows across, maxillary teeth in 2 rows; dark with small white spots (yellow in life) or pale with dark reticulations; MVF 5-49-120 . . . . . ***Gymnothorax miliaris***

9b. Teeth not numerous, some long canines; intermaxillary teeth 3 rows across, maxillary teeth in 1 row (few inner teeth in young); colour not as above . . . . . → ***10***

10a. Snout and jaws elongate; teeth slender and smooth, some as very long canines . . . . . → ***11***

10b. Snout blunt, jaws short; teeth wedge-shaped and serrate, no long canines . . . . . → ***14***

11a. Vomerine teeth in 2 rows; colour uniform dark brown (green in life); MVF 6-60-140 . . . . . ***Gymnothorax funebris***

11b. Vomerine teeth in 1 row; colour pattern of blotches, spots, or reticulations . . . . . → ***12***

12a. Colour pattern of large pale polygons overlain with small dark spots on pale reticulated background; MVF 5-53-138 . . . . . ***Gymnothorax polygonius***

12b. Colour pattern of small dark spots or blotches on pale background . . . . . → ***13***

13a. Contrasting pattern of overlapping small dark spots on pale background; MVF 6-54-138 . . . . . ***Gymnothorax moringa***

13b. Diffuse pattern of spots and blotches (purplish in life) on pale background; MVF 5-51-133 . . . . . ***Gymnothorax vicinus***

14a. Four pores along upper jaw . . . . . → ***15***

14b. Three pores along upper jaw . . . . . → ***16***

15a. Overall colour pattern on head, body, and tail of pale dendritic marks on brown background; MVF 7-58-135 . . . . . ***Gymnothorax hubbsi***

15b. Colour pattern of dark reticulations on pale body and tail, head dusky; MVF 6-68-153 . . . . . ***Gymnothorax maderensis***

16a. Head and body spotted dorsally and ventrally; tail dark, with few large white spots . . . . . → ***17***

16b. Head and body spotted dorsally, pale and unspotted ventrally; tail spotted or patterned, not noticeably dark . . . . . → ***18***

17a. Dorsal fin with dark margin, with body coloration basally; MVF 6-63-164 . . . . ***Gymnothorax kolpos***

17b. Dorsal fin with bold pattern of white saddle marks on black fin; MVF 6-66-168 . . . . . ***Gymnothorax conspersus***

18a. Dorsal and anal fins with body coloration and dark margins; MVF 6-49-142 . . . . . ***Gymnothorax nigromarginatus***

18b. Dorsal fin with black and white pattern, anal fin with or without pattern . . . . . → ***19***

19a. Anal fin without pattern but with dark edge; body with pale polygonal spots separated by narrow reticulations; MVF 6-53-140 . . . . . ***Gymnothorax saxicola***

19b. Anal fin with alternating dark and pale areas; body with distinct well-separated pale spots; MVF 6-50-145 . . . . . ***Gymnothorax ocellatus***

20a. Tail very short, anus at 2/3 total length; jaws elongate, the lower protruding; snout short, eye above anterior third of jaw; 13 to 16 broad dark bands on body and tail; MVF 122-123-150 . . . . . ***Channomuraena vittata***

20b. Tail about 1/2 total length, anus near midbody; jaws not elongate; snout moderate, eye above midjaw; body variably uniform or patterned . . . . . → ***21***

21a. An extra pore adjacent to posterior nostril; MVF 97-102-107 (Fig. 5a) . . . . . ***Anarchias similis***

21b. No pore adjacent to posterior nostril; MVF 106-110-121(Fig. 5b). . . . . ***Uropterygius macularius***

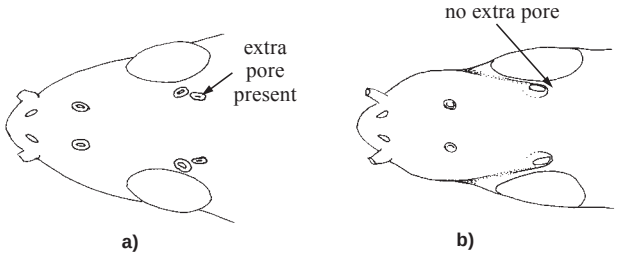


Fig. 5 dorsal view of head

List of species occurring in the area

The symbol is given when species accounts are included.

Anarchias similis (Lea, 1913).

Channomuraena vittata (Richardson, 1845).

Echidna catenata (Bloch, 1795).

Enchelycore anatina (Lowe, 1838).
Enchelycore carychroa Böhlke and Böhlke, 1976.
Enchelycore nigricans (Bonnaterre, 1788).

Gymnothorax conspersus Poey, 1867.
Gymnothorax funebris Ranzani, 1839.
Gymnothorax hubbsi Böhlke and Böhlke, 1977.
Gymnothorax kolpos Böhlke and Böhlke, 1980.
Gymnothorax maderensis (Johnson, 1862).
Gymnothorax miliaris (Kaup, 1856).
Gymnothorax moringa (Cuvier, 1829).
Gymnothorax nigromarginatus (Girard, 1858).
Gymnothorax ocellatus Agassiz, 1831.
Gymnothorax polygonius Poey, 1876.
Gymnothorax saxicola Jordan and Davis, 1891.
Gymnothorax vicinus (Castelnau, 1855).

Monopenchelys acuta (Parr, 1930).

Muraena retifera Goode and Bean, 1882.
Muraena robusta Osorio, 1909.

Uropterygius macularius (Lesueur, 1825).

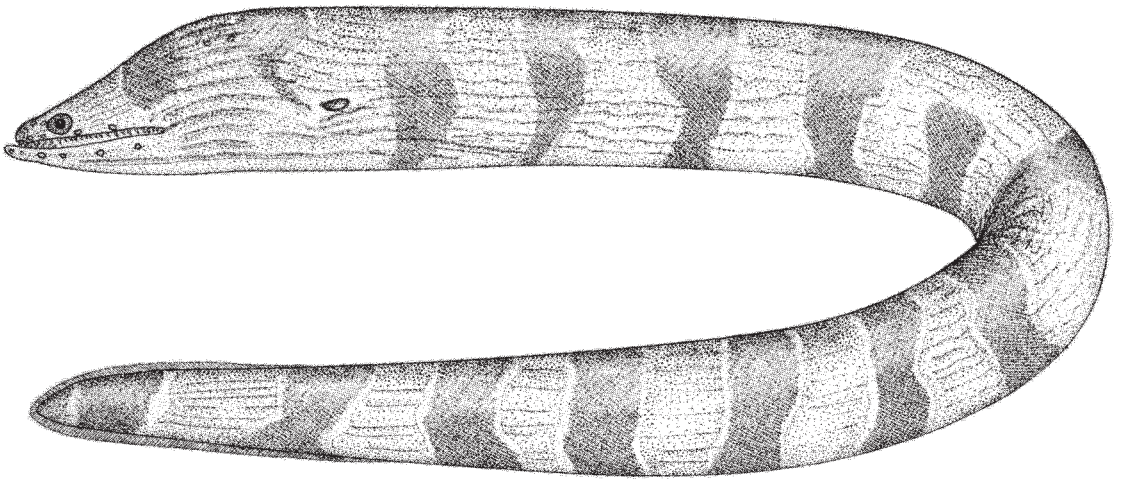
Reference

Böhlke, E.B., J.E. McCosker and J.E. Böhlke. 1989. Family Muraenidae. In Fishes of the western North Atlantic, edited by E.B. Böhlke. *Mem. Sears Found. Mar. Res.*, Memoir No. 1, 9(1): 655p.

Channomuraena vittata (Richardson, 1845) AMH

Frequent synonyms / misidentifications: None / None.

FAO names: En - Broadbanded moray; **Fr** - Murène anneau; **Sp** - Morena franjeada.

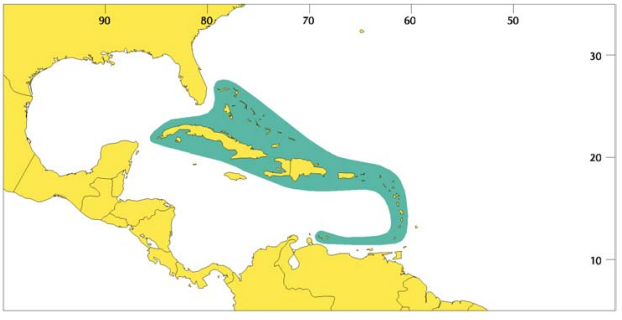


Diagnostic characters: A large, thick, muscular moray with tapering body and short tail; anus in posterior third of total length. Head large; **eye small and near tip of snout; posterior nostril in short tube** above anterior margin of eye. Snout short, **tip of lower jaw projecting beyond upper**; jaws very long and widely separated posteriorly. Teeth numerous, small, and pointed, all of similar size; **intermaxillary teeth in a patch** of 9 teeth across anteriorly, decreasing in number and continuous with vomerine row of triserial to biserial teeth; **maxillary and dentary teeth in bands 3 to 6 rows across** (6 in large specimens). **Fins confined to posterior part of tail**, low and inconspicuous. **Colour:** background uniform **pale brown, with 13 to 16 broad dark bars encircling head and body** behind eye, sometimes with pale borders; colour varying from tan or reddish brown with brown bars to dark greyish brown with dark olive bars.

Size: Maximum to 150 cm.

Habitat, biology, and fisheries: An uncommon bottom-dwelling species, found in rocky habitats at depths to 40 m. Uniquely snake-like in appearance and behaviour, described as expanding its head like a cobra when approached. Caught incidentally in insular trap and line fisheries; of no commercial importance.

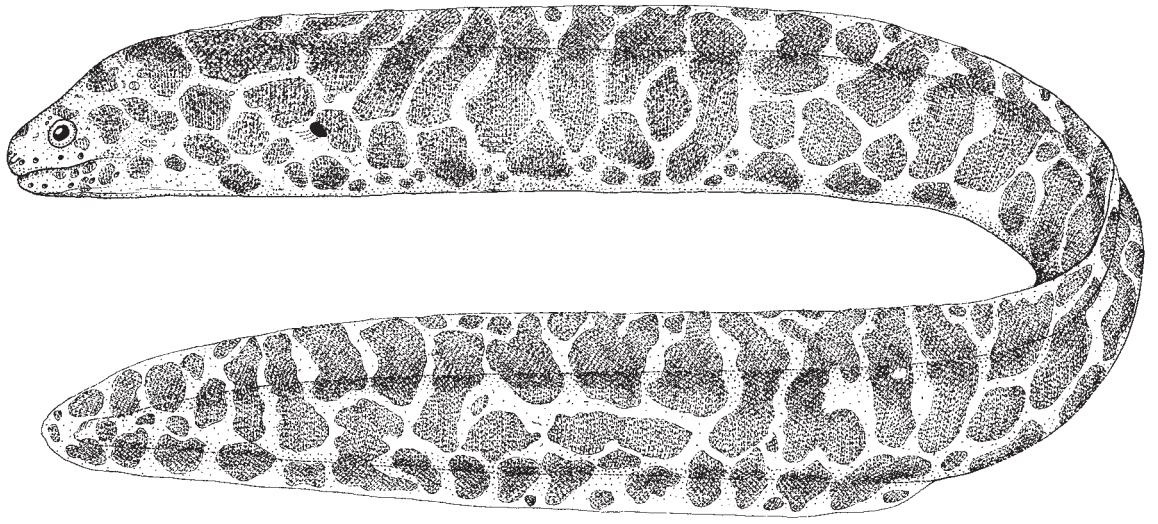
Distribution: A circumtropical species, taken off islands in the tropical Atlantic and central and western Pacific. In the study area, from Bermuda, the Bahamas and the Caribbean islands. In the eastern central Atlantic from the Cape Verde Archipelago and Annobon in the Gulf of Guinea (Area 34), and from Ascension Island in the southeastern Atlantic (Area 47). In the Pacific, a few individuals taken off scattered islands of the central Pacific and off Taiwan Province of China.



Echidna catenata (Bloch, 1795) AMD

Frequent synonyms / misidentifications: None / None.

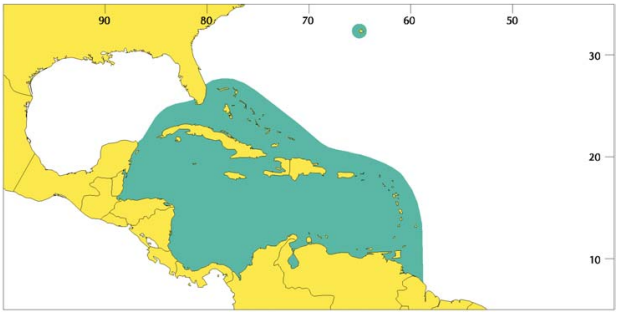
FAO names: En - Chain moray; **Fr** - Murène enchainée; **Sp** - Morena cadeneta.



Diagnostic characters: Body stout, tail rounded; **anus shortly behind midbody**. Head short, profile steep. Eye above or shortly behind midjaw; **posterior nostril with raised, crenulate margin**, above anterior margin of eye. **Snout short and rounded; jaws short**, closing completely. **Teeth short, some molariform**; intermaxillary teeth short and stout, 3 rows across, 1 to 3 short median teeth; maxillary teeth in 2 short rows, **vomerine teeth biserial and molariform**; dentary teeth in 1 or 2 rows. Dorsal fin beginning on head midway between corner of mouth and gill opening. **Colour:** most specimens **dark with overall chain-like pattern** of pale narrow reticulations (yellowish in life); very large specimens may have the colour reversed.

Size: Maximum to 70 cm.

Habitat, biology, and fisheries: One of the most common morays found on coral reefs, in rocks and sand; frequently seen in shallow waters where it feeds on crabs. Large specimens may be consumed locally. Occasionally taken by trawl or line; of no commercial importance, but a desired aquarium fish.

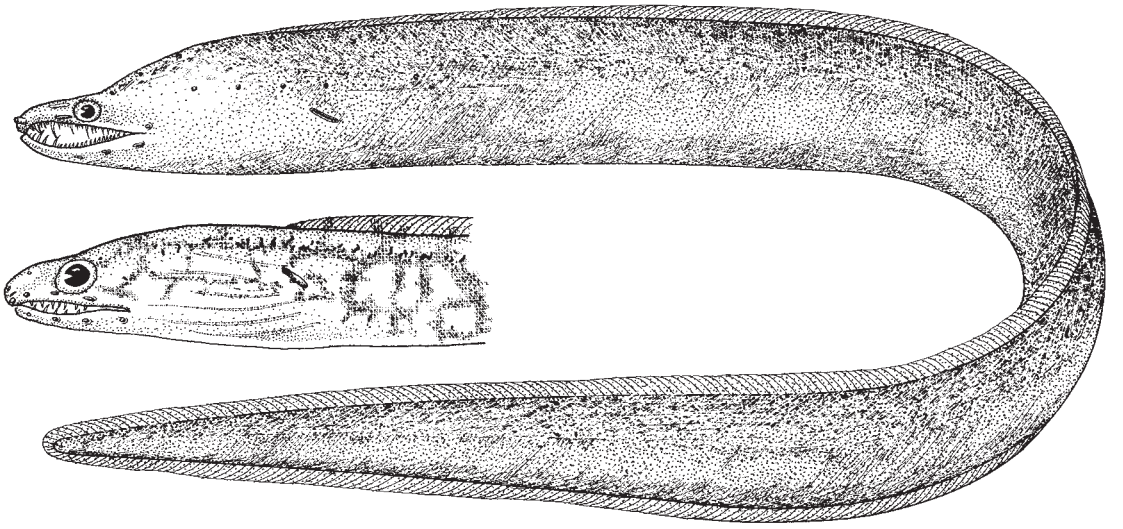


Distribution: An insular species, taken off Bermuda, the Bahamas, the Florida Keys, throughout the islands of the Caribbean, off coastal Mexico, and central and northern South America. Also taken off Brazil (Area 41) and off Ascension Island (Area 47), but not in the eastern central Atlantic.

Enchelycore nigricans (Bonnaterre, 1788)

Frequent synonyms / misidentifications: None / None.

FAO names: En - Viper moray; **Fr** - Murène noire; **Sp** - Morena negra.

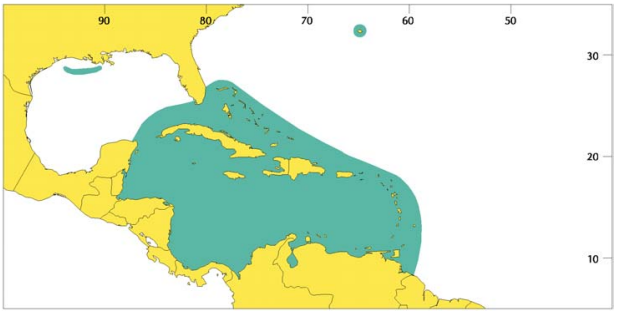


Diagnostic characters: Body elongate, strong, and muscular, moderately compressed; **anus at midbody or shortly before**. Head elongate, somewhat elevated. Eye above or just behind midjaw; **posterior nostril an elongate pore** before eye in adults. **Snout long, jaws long and arched**. Teeth numerous, some **long fang-like canines which are exposed when mouth is closed**; intermaxillary teeth in 5 irregular rows across, 1 to 3 long fang-like median teeth; maxillary teeth biserial; vomerine teeth short and uniserial; dentary teeth biserial anteriorly, uniserial posteriorly. Dorsal fin beginning above or above and slightly before gill opening. **Colour:** young pale with contrasting dark reticulated pattern (inset), adults **brown and faintly mottled with darker brown or sometimes uniformly brown**.

Size: Maximum to 100 cm.

Habitat, biology, and fisheries: A common inhabitant of coral reefs and rocky shorelines to depths of 24 m. Caught incidentally in trap and line fisheries. Reported to be consumed fresh or salted in some localities (ciguatera poisoning should be considered); not of commercial importance.

Distribution: A wide-ranging insular species found throughout the tropical and subtropical Atlantic, from Bermuda, the Bahamas, the Florida Keys, the northwestern Gulf of Mexico, throughout the Caribbean Islands, and off coastal central and northern South America. Also off islands of the eastern central and southeastern Atlantic (Areas 34, 47), and off Brazil (Area 41).

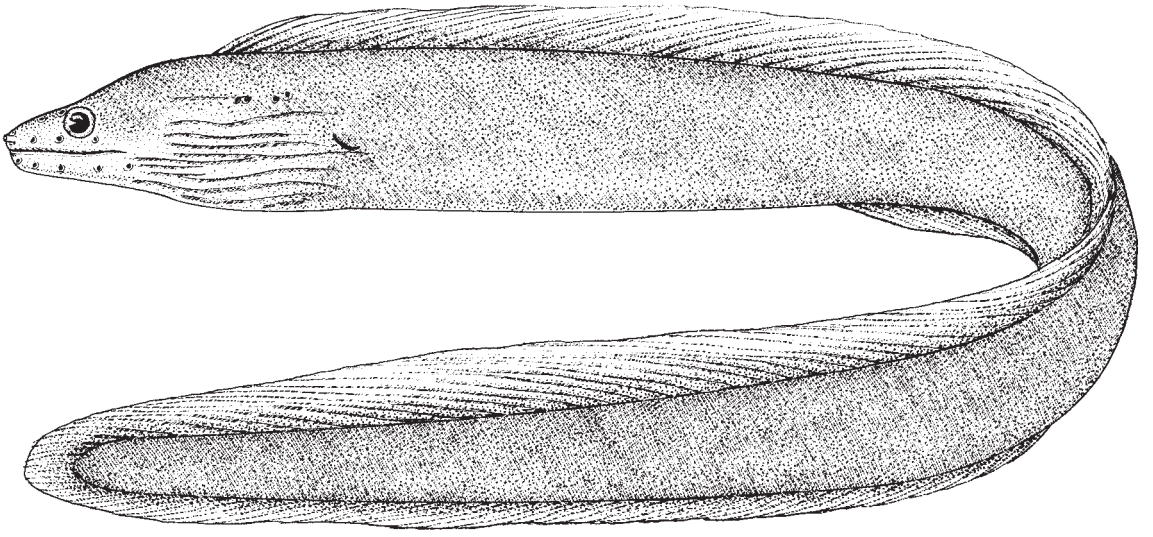


Gymnothorax funebris Ranzani, 1839

AMI

Frequent synonyms / misidentifications: *Lycodontis funebris* (Ranzani, 1839) / None.

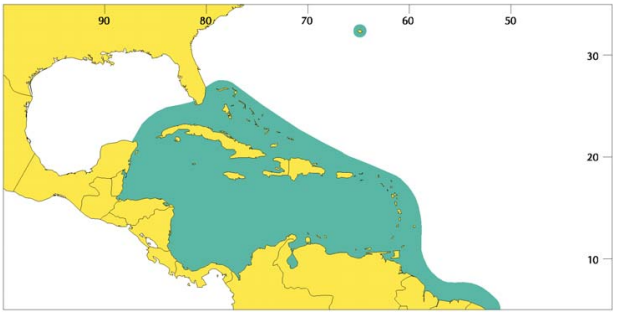
FAO names: En - Green moray; **Fr** - Murène verte; **Sp** - Morena congrio.



Diagnostic characters: Body strong and muscular; **anus shortly before midbody**. Head elongate, elevated posteriorly. Eye above midjaw; **posterior nostril a simple pore or with short rim**, above anterior margin of eye. Snout moderate; jaws moderate, closing completely. **Teeth smooth, large, and stout**; intermaxillary teeth 3 rows across, 1 to 3 long median fangs; maxillary teeth uniserial, few inner teeth in small specimens; **vomerine teeth biserial**; dentary teeth uniserial, few anterior inner teeth. Dorsal fin beginning on head, a little closer to gill opening than to mouth angle. **Colour:** uniformly dark brown or greenish brown; green in life.

Size: Maximum 190 cm.

Habitat, biology, and fisheries: Common in tidepools, rocks, and coral reefs to depths of 33 m; also found in brackish-water tidal creeks and mangrove areas. Large individuals reported to be aggressive without provocation. Used for food in some areas; large specimens have been reported to be ciguatoxic. Occasionally caught in trawls and by line; of no commercial importance.

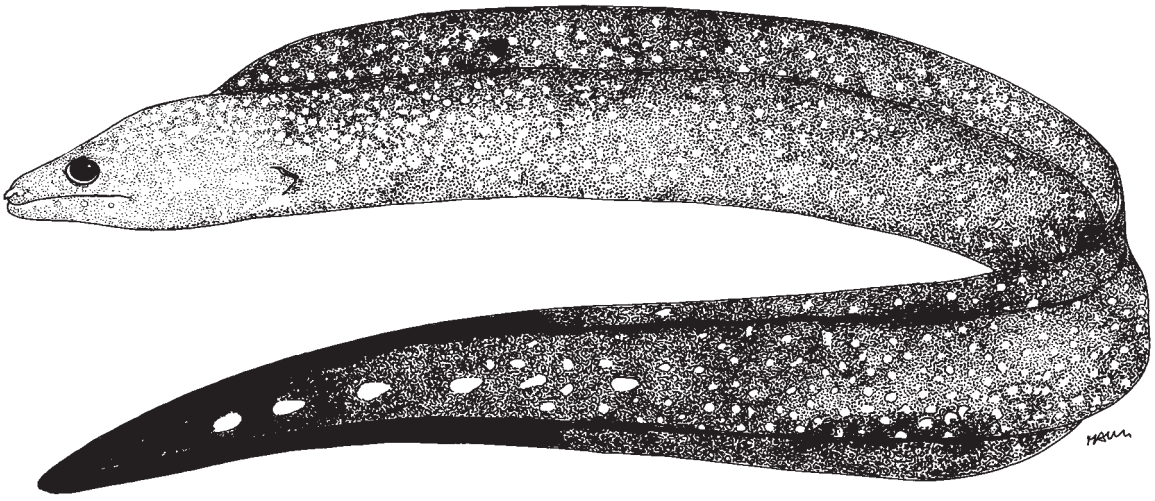


Distribution: Widespread throughout the Atlantic; from Bermuda, the Bahamas, the Florida Keys, throughout the Caribbean Islands, off coastal Mexico, and central and northern South America. In the eastern central Atlantic from Cape Verde Archipelago (Area 34); in southwestern Atlantic off Brazil (Area 41); and from the southeastern Atlantic islands of Ascension and St. Helena (Area 47).

Gymnothorax kolpos Böhlke and Böhlke, 1980

Frequent synonyms / misidentifications: None / *Gymnothorax ocellatus* Agassiz, 1831.

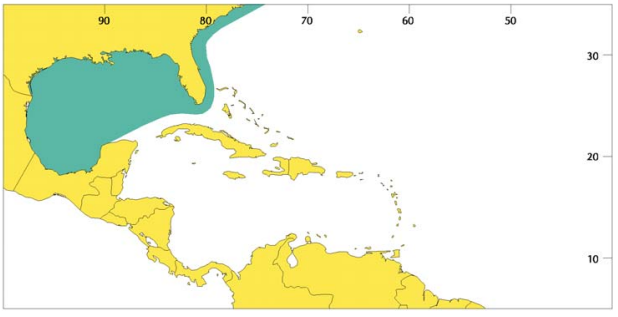
FAO names: En - Blacktail moray.



Diagnostic characters: Body strong and muscular with long tapering tail; anus shortly before midbody. Head large with sloping profile. Eye above midjaw; **posterior nostril with rim**, above anterior margin of eye. Snout and jaws moderate, lower jaw prominent; only **3 pores along upper jaw. Teeth few, strong, triangular, and shark-like, with serrate margins**; both upper and lower jaws with a single continuous row of teeth; no median intermaxillary teeth; vomerine teeth few and inconspicuous or hidden. Dorsal fin beginning on head between corner of mouth and gill opening. **Colour: head and body pale to medium greenish brown, tail progressively darker; numerous distinct small pale spots** on head and body, becoming larger and fewer to **only 3 or 4 large white spots on posterior third of tail. Dorsal fin with body pattern anteriorly, black posteriorly; anal fin dark, without spots.**

Size: Maximum to about 100 cm.

Habitat, biology, and fisheries: A deep-water inhabitant, infrequently taken, most often over mud or sand bottoms at 75 to 100 m. Most individuals are large, mature adults; the habitat of young is not known. Taken by trawl, trap, or hook-and-line. May be consumed locally but the possibility of ciguatera poisoning should be considered. Of no commercial importance.



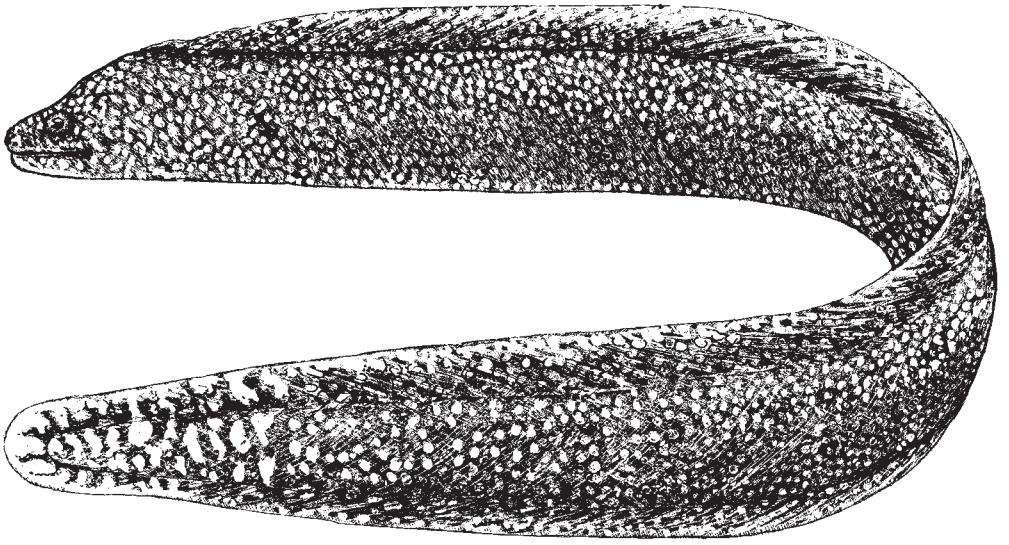
Distribution: Only known from deep waters of the Gulf of Mexico and off the coast of North Carolina and Georgia.

Note: There are 5 spotted species in Area 31 which are similar in appearance and may be confused: *Gymnothorax conspersus, G. kolpos, G. nigromarginatus, G. ocellatus*, and *G. saxicola*; they are separated by subtle colour differences and vertebral counts, and are separated geographically.

Gymnothorax miliaris (Kaup, 1856)

Frequent synonyms / misidentifications: *Lycodontis miliaris* (Kaup, 1856) / *Muraena flavopicta* (Kaup, 1856); *Muraena miliaris* (Kaup, 1856).

FAO names: En - Goldentail moray; **Fr** - Murène dorée; **Sp** - Morena dorada.

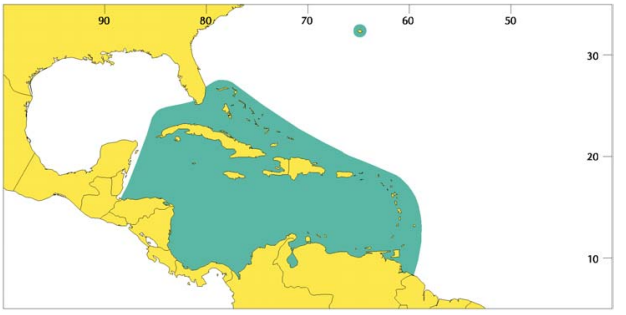


Diagnostic characters: Body stout, tail not tapering but rounded at tip; **anus shortly before midbody**. Head moderate. Eye above jaw, closer to rictus than to snout tip; **posterior nostril with raised rim**, above anterior margin of eye. Snout short; jaws short, closing completely. **Teeth smooth, short, and stout**, no very long canines; **intermaxillary teeth numerous, 5 rows across**, 2 to 5 median teeth; **maxillary teeth biserial**; vomerine teeth uniserial. Dorsal fin beginning on head between corner of mouth and gill opening. **Colour:** highly variable colour pattern; common pattern for young and most adults overall **dark background with scattered small pale spots or dots**; some large individuals with overall **pale background with dark reticulations**, or with **pale background with very few, highly irregular, dark spots** and blotches; the pattern similar on all parts of eel; **tail tip always pale**. Pale areas cream to golden yellow in life, dark areas brown to purplish.

Size: Maximum 55 cm.

Habitat, biology, and fisheries: A common inhabitant of coral reefs and rocky shorelines, but seldom seen; taken at depths to 50 m. Large specimens occasionally caught by trawl, trap, and hook-and-line. Possibly consumed locally; of no commercial importance.

Distribution: An insular species, widespread in the Atlantic; from Bermuda, the Bahamas, the Florida Keys, throughout the islands of the Caribbean, off coastal Mexico, and central and northern South America. Also, taken off islands of the eastern central and southeastern Atlantic (Areas 34, 47), and off Brazil (Area 41).



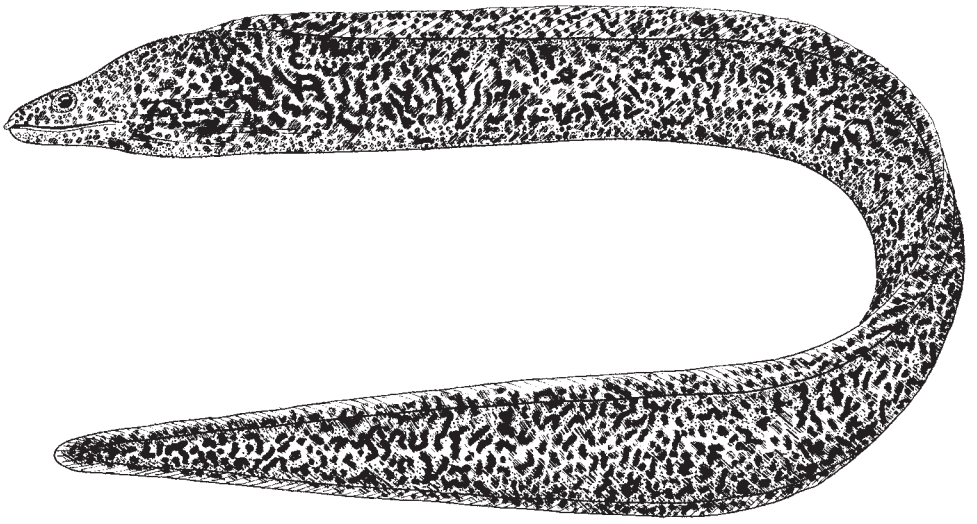
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Gymnothorax moringa (Cuvier, 1829) AGG

Frequent synonyms / misidentifications: *Lycodontis moringa* (Cuvier, 1829) / None.

FAO names: En - Spotted moray; **Fr** - Murène tachetée; **Sp** - Morena pintada.

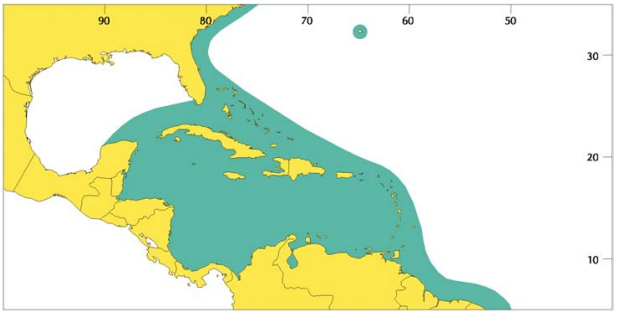


Diagnostic characters: Body elongate, strong, and muscular, moderately compressed; **anus shortly before midbody**. Head moderate, elevated posteriorly. Eye above midjaw; **posterior nostril a rimmed pore** above anterior margin of eye. Snout moderate; jaws moderate, closing completely. **Teeth smooth, some long canines**; teeth in both jaws uniserial in adults; 3 long fang-like median intermaxillary teeth; **vomerine teeth uniserial**. Dorsal fin beginning on head between corner of mouth and gill opening. **Colour:** head, body, and tail **patterned with small overlapping dark spots giving mottled appearance on pale background** (yellow with brown to purplish black spots in life); pattern variable in size of blotches and intensity of pigmentation. Dorsal fin often with black margin anteriorly, and white margin far posteriorly on combined dorsal-caudal-anal fins. Young without spotted pattern and with white lower jaw, closely resembling young of *G. vicinus*.

Size: Maximum 100 cm (questionably reported from 200 to 300 cm at Ascension Island).

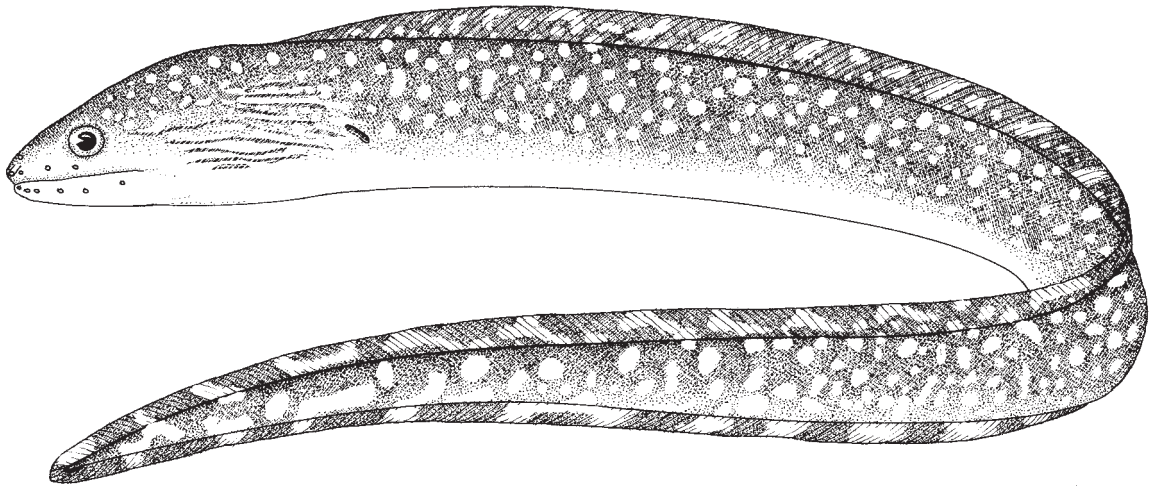
Habitat, biology, and fisheries: Very common on shallow coral reef, rock, and seagrass habitats, found at depths to 50 m. Reported to be aggressive without provocation; dangerous when handled alive. Used as food in some areas, large individuals reported to be ciguatoxic. Occasionally caught by trawl, seine, trap, and hook-and-line; of no commercial importance.

Distribution: Widespread in the western Atlantic, from Bermuda, the Bahamas, off the Carolinas, the Florida Keys, throughout the Caribbean Islands, off coastal Mexico, and central and northern South America. Also off Brazil (Area 41), and taken at the south eastern Atlantic islands of St. Helena and Ascension (Area 34). Not found in the eastern central Atlantic.



Gymnothorax ocellatus Agassiz, 1828 AMW

Frequent synonyms / misidentifications: None / *Gymnothorax saxicola* Jordan and Davis, 1891.
FAO names: En - Mottlemargin moray; **Fr** - Murène ocellée; **Sp** - Morena de charco.



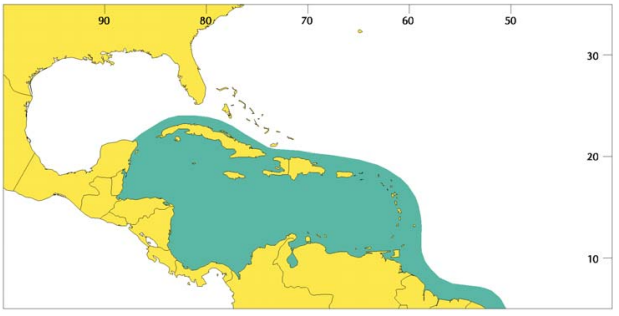
Diagnostic characters: Body strong and muscular with tapering tail; anus shortly before midbody. Head moderate. Eye above midjaw; **posterior nostril a rimmed pore** above anterior margin of eye. Snout short and rounded; jaws closing completely; **3 pores along upper jaw. Teeth strong, triangular, and shark-like, serrated** on anterior and posterior margins; jaw teeth uniserial; 0 to 3 median intermaxillary teeth (absent in large specimens); vomerine teeth uniserial or absent. Dorsal fin beginning on head between mouth angle and gill opening. **Colour: body grey-brown**, darker dorsally and paler ventrally, **with distinct, well-separated white spots** of varying sizes and shapes; tail patterned, not dark; head brown with smaller white spots. **Margin of dorsal fin with pattern of undulating black and white marks, anal fin with similar coloration.**

Size: Maximum about 60 cm.

Habitat, biology, and fisheries: Adults common on the continental shelf over sand and mud bottoms to depths of 90 m; habitat of young not known. Usually taken by trawl, occasionally by line. Possibly consumed locally but not of commercial importance.

Distribution: Found throughout the Antillean Chain, and off the central and northern South American coast from Nicaragua south to Venezuela. Present off the coast of Brazil (southwestern Atlantic, Area 41).

Note: Three very similar species, *G. ocellatus, G. nigromarginatus*, and *G. saxicola*, have sometimes been synonymized, but are now considered to be valid species; they might also be confused with 2 other spotted species, *G. conspersus* and *G. kolpos*, which inhabit deeper waters and which have more vertebrae; all 5 exhibit subtle colour differences and are separated geographically.

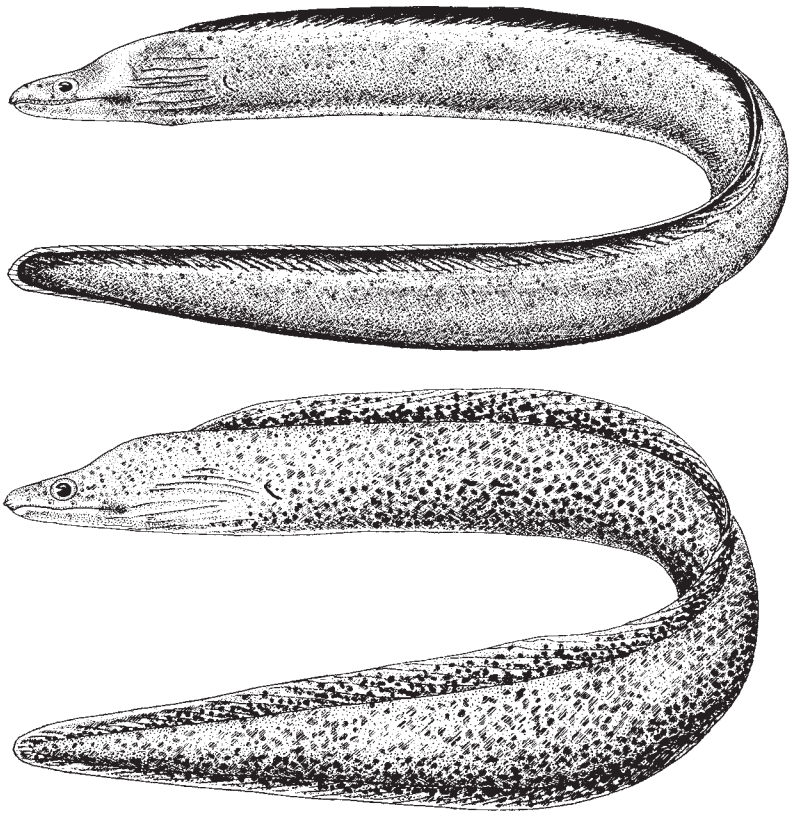


Gymnothorax vicinus (Castelnau, 1855) AMT

Frequent synonyms / misidentifications: *Lycodontis vicinus* (Castelnau, 1855) / None.

FAO names: En - Purplemouth moray; **Fr** - Murène jaune; **Sp** - Morena amarilla.

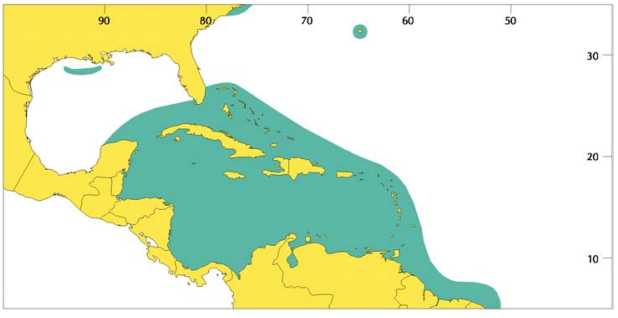
Diagnostic characters: Body elongate, strong and muscular, laterally compressed; **anus shortly before midbody**. Head elongate. Eye above midjaw; **posterior nostril a rimmed pore** above anterior margin of eye. Snout moderate; jaws elongate, closing completely. **Teeth smooth, some long canines**; teeth in both jaws uniserial in adults; 3 fang-like median intermaxillary teeth; **vomerine teeth uniserial**. Dorsal fin beginning on head between corner of mouth and gill opening. **Colour:** variably patterned, 2 extreme patterns of adults shown below. May be highly patterned with **overlapping dark spots**, the pattern extending onto fins; **or almost uniformly brown colour with faint freckles** of darker colour, fins dark basally and with pale margins. **Corner of mouth with a characteristic small dark spot**. In life, dark colour purplish brown, pale areas white, not yellow. Young uniformly brown with pale lower jaw, closely resembling young of *G. moringa*.



Size: Maximum 122 cm.

Habitat, biology, and fisheries: Inhabits shallow rock and coral reef areas and seagrass beds; found at depths to 40 m. Can be aggressive, dangerous when handled alive. May be consumed locally; large specimens possibly ciguatoxic. Occasionally caught by trawl, trap, and hook-and-line; of no commercial importance.

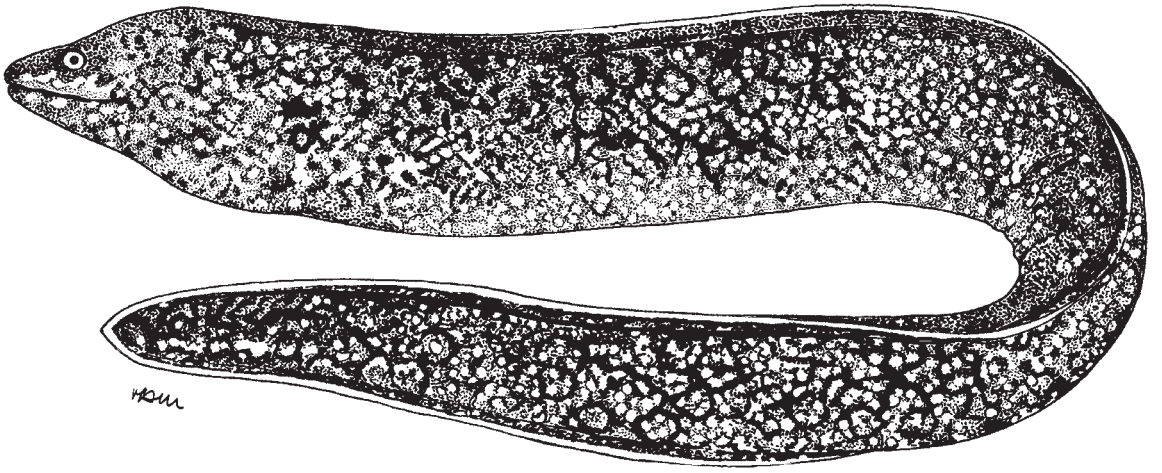
Distribution: Widespread in the western Atlantic, from Bermuda, the Bahamas, off North Carolina, the Florida Keys, and the northern Gulf of Mexico, throughout the Caribbean Islands, and off the central and northern South American coast. In the eastern central Atlantic off Madeira, the Cape Verde Archipelago, and the Bight of Biafra (Area 34). Taken off Brazil (Area 41) and in the southeastern Atlantic off Ascension Island (Area 47).



Muraena retifera Goode and Bean, 1882 MMR

Frequent synonyms / misidentifications: None / None.

FAO names: En - Reticulate moray.

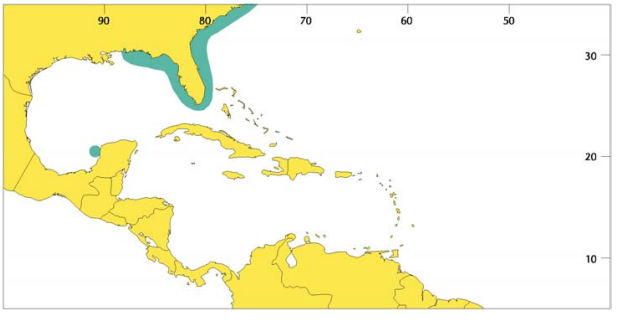


Diagnostic characters: Body strong, elongate, and tapering; anus at or before midbody. Head moderate, elevated posteriorly. Eye above midjaw; **posterior nostril in a tube** above anterior margin of eye. Snout moderate, jaws moderate, closing completely. **Teeth smooth, large, and strong**; teeth of adults uniserial; 2 or 3 long median intermaxillary teeth; vomerine teeth uniserial. Dorsal fin beginning on head between corner of mouth and gill opening. **Colour:** brown to **dark brown background with close-set, pale rosettes which are peppered with bright white dots**; head brown with small white spots, the rosette pattern beginning near gill opening. **Gill opening in prominent black blotch**. Margins of fins pale. Small eels appear dark with large pale spots; rosette pattern sometimes inconspicuous in adults, which then appear dark brown overall with small white dots.

Size: Maximum to 90 cm.

Habitat, biology, and fisheries: Lives in continental coastal waters over mud or sand bottoms at depths from 20 to 90 m; not common. Taken by trawl, occasionally by trap or hook-and-line. Possibly consumed locally; could be ciguatoxic; of no commercial importance.

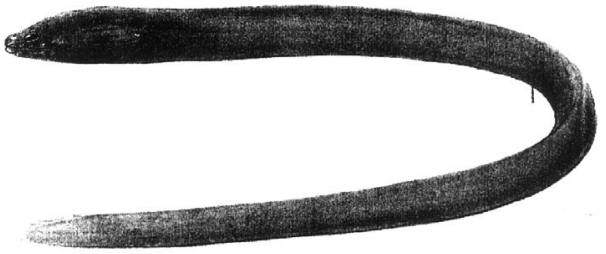
Distribution: A coastal species, found off the Atlantic coast of the United States from North Carolina to Florida and in the eastern Gulf of Mexico off the west coast of Florida; also taken in the Bay of Campeche, Mexico, and off northern Venezuela. Also present off Brazil (southwestern Atlantic, Area 41).

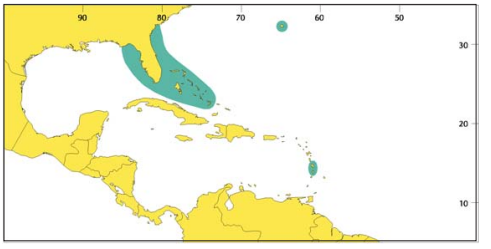


Anarchias similis (Lea, 1913)

En - Pygmy moray.

Maximum size to 20 cm. Inhabits moderately deep waters, living on or near the bottom from 30 to 100 m. Uncommon, taken by dredge. Too small to be consumed or of commercial importance. Bermuda, coastal United States (Georgia to Florida), the Bahamas, southern Antilles, and Nicaragua coast. Also off Brazil (southwestern Atlantic, Area 41).

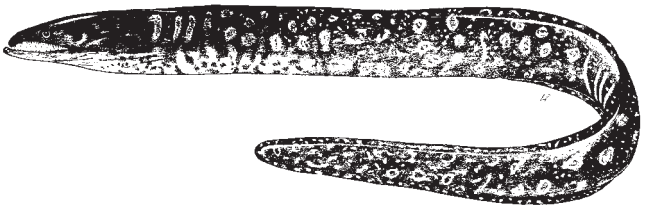


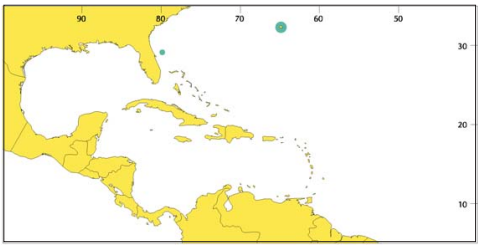


Enchelycore anatina (Lowe, 1838)

En - Fangtooth moray; **Fr** - Murène de Iles; **Sp** - Morena isleña.

Maximum size to over 110 cm. Inhabits deep waters, below 50 m. Uncommon, taken by trap and hook-and-line. Possibly consumed locally; of no commercial importance. From scattered localities of Bermuda and Florida in the western central Atlantic; Brazil (south western Atlantic, Area 41); St. Helena (southeastern Atlantic, Area 47); Madeira, Azores, Canaries, and Cape Verde (eastern central Atlantic, Area 34); and in the eastern Mediterranean (Area 37).

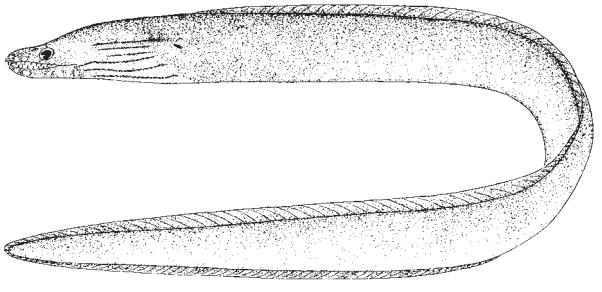


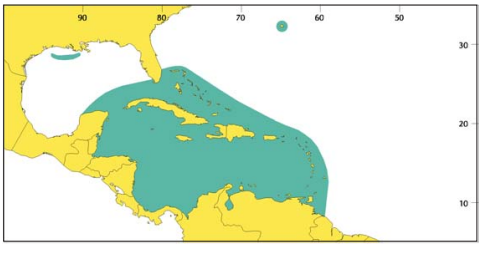


Enchelycore carychroa Böhlke and Böhlke, 1976

En - Chestnut moray.

Maximum size 34 cm. Common inhabitant of shallow coral reefs and rocks to depths of 15 m, occasional to 60 m. Infrequently taken by dredge; too small to be consumed or of commercial importance. Widespread in the western Atlantic, from Bermuda, the Bahamas, Florida Keys, northwestern Gulf of Mexico, and coastal central and northern South America. Also off northern Brazil (southwestern Atlantic, Area 41); and Ascension Island and St. Helena (southeastern Atlantic, Area 47).

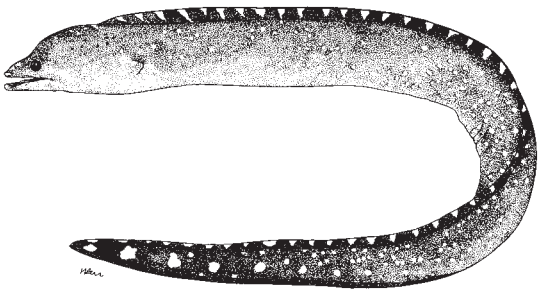


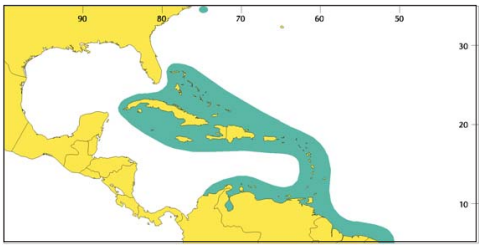


Gymnothorax conspersus Poey, 1867

En - Saddled moray.

Maximum size to 110 cm. Inhabits deep waters, usually below 200 m. Taken by trawl, occasionally in deep traps. Might be consumed locally; of no commercial importance. Tropical western Atlantic from Florida Straits south to Rio Grande do Sul, Brazil (Area 41).

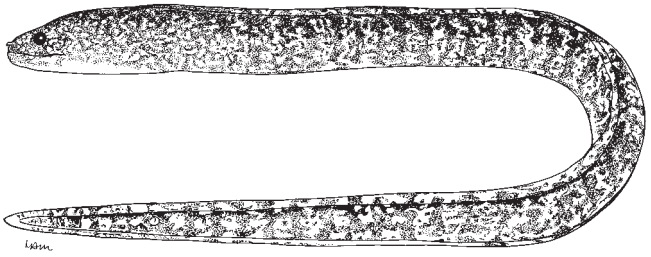


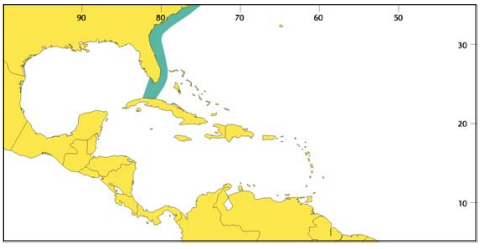


Gymnothorax hubbsi Böhlke and Böhlke, 1977

En - Lichen moray.

Maximum size 35 cm. Inhabits coastal waters at depths from 60 to 90 m. Rare, taken by trawl, occasionally by dredge. Too small to be consumed; of no commercial importance. Atlantic coast of USA from North Carolina to Florida, the western Bahamas, and north coast of Cuba.



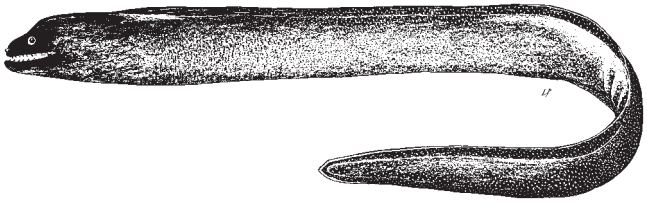


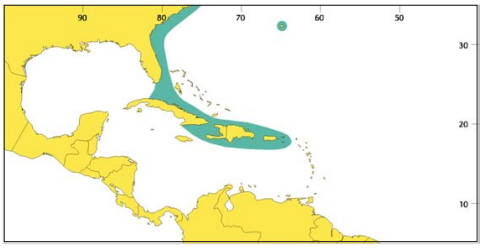
Gymnothorax maderensis (Johnson, 1862)

AGD

En - Sharktooth moray; **Fr** - Murène de Madère; **Sp** - Morena de Madeira.

Maximum size to 105 cm. Inhabits deep waters from 150 to 280 m. Rare, taken by hook-and-line or trap. Might be consumed locally; of no commercial importance. Western Atlantic from Bermuda, North Carolina, Cuba, Puerto Rico, and the Virgin Islands; eastern central Atlantic from Madeira, Canary Islands, and Dahomey (Area 34).

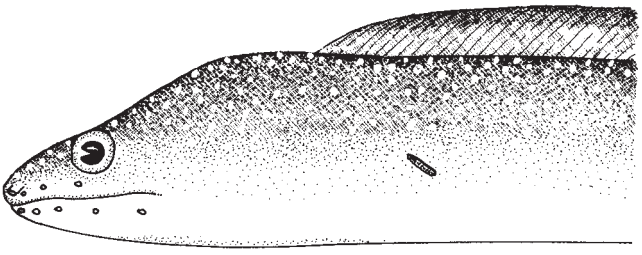


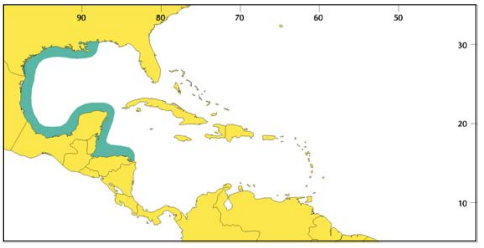


Gymnothorax nigromarginatus (Girard, 1858)

En - Blackedge moray.

Maximum size to 53 cm. A common continental coast species inhabiting waters of 10 to 91 m. Taken by trawl, a frequent byproduct of Gulf coast shrimp fisheries. May be consumed locally, but not of commercial importance. Northern Gulf of Mexico from Mobile Bay area west to Texas, and off Yucatán and Honduras.



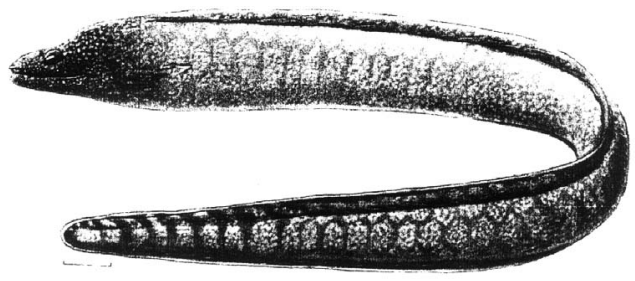


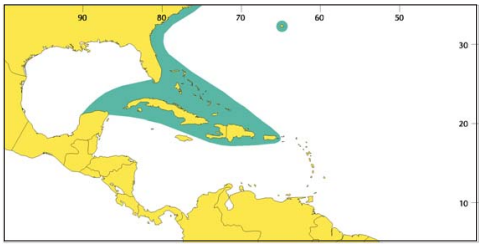
Gymnothorax polygonius Poey, 1876

AGI

En - Polygon moray.

Maximum size to 84 cm. Lives in moderately deep waters of 90 to 256 m. Uncommon, taken by trawl, trap, and hook-and-line. Might be consumed locally; of no commercial importance. Western Atlantic from scattered localities from North Carolina to Brazil (Area 41). Also eastern central Atlantic from Cape Verde Archipelago and Madeira (Area 34) and south eastern Atlantic island of St. Helena (Area 47).

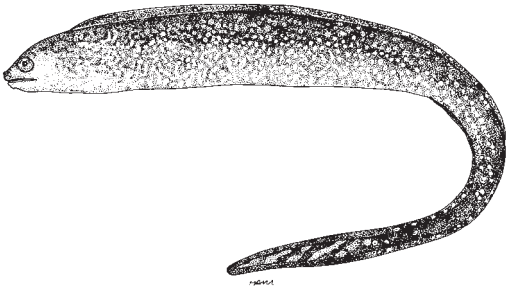


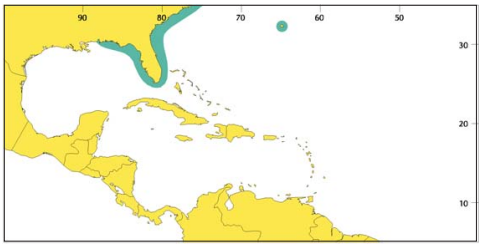


Gymnothorax saxicola Jordan and Davis, 1891

En - Honeycomb moray.

Maximum size to 62 cm. Lives along the continental coast at depths of 2 to 86 m. Common, usually taken by trawl, a frequent byproduct of shrimp fisheries. Possibly consumed locally; of no commercial importance. Atlantic coast of the USA from North Carolina to Florida, and eastern Gulf of Mexico off Florida west to Mobile Bay drainage.

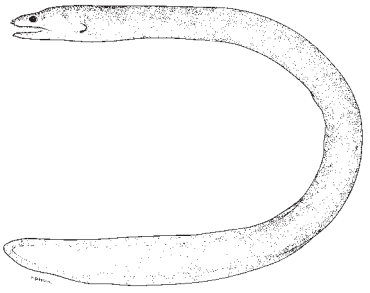


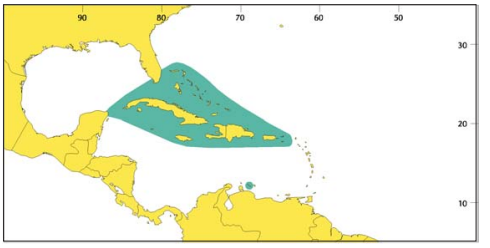


Monopenchelys acuta (Parr, 1930) MMA

En - Redface eel.

Maximum size to 21 cm. Lives on coral heads and rocky ledges at moderate depths of 13 to 45 m. Rare; taken once by dredge. Too small to be consumed; of no commercial importance. Circumtropical distribution; western Atlantic islands of the Bahamas, Lesser Antilles, Grand Cayman, and off Mexico; also from Ascension Island (south eastern Atlantic, Area 47); in the Indo-Pacific from Hawaii, Fiji, Seychelles, Comoros, and Agalega Islands.

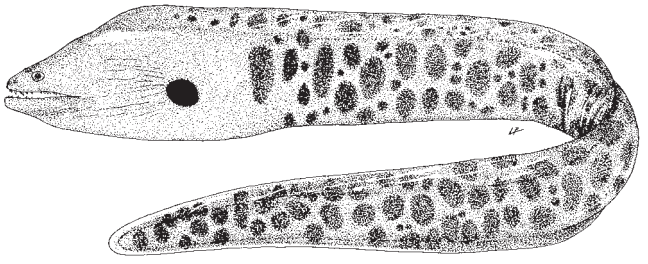


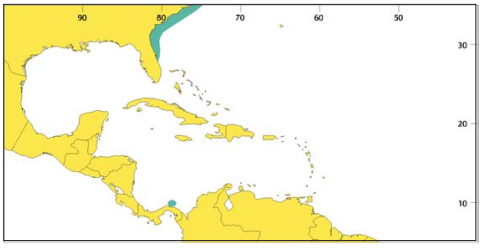


Muraena robusta Osório, 1909 MMO

En - Stout moray; **Fr** - Murène robuste; **Sp** - Morena robusta.

Maximum size to 186 cm. Young inhabit shallow rock and coral areas; adults inhabit moderately deep waters of 30 to 68 m. Adults caught by hook-and-line. Possibly consumed locally, but ciguatera poisoning should be considered; not commercially important. Uncommon off North Carolina, Florida, and Panama; common in the eastern central Atlantic off the west coast of Africa and islands of Cape Verde and Bay of Biafra (Area 34).

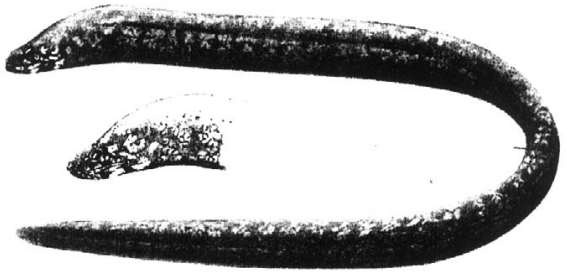


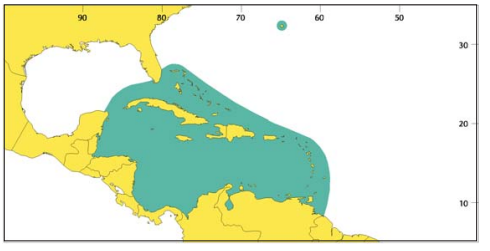


Uropterygius macularius (Lesueur, 1825) MUH

En - Marbled moray.

Maximum size to 29 cm. Inhabits coral and rocky areas at depths to 137 m. Rarely taken by dredge. Too small to be consumed; not of commercial importance. An insular species, found in Bermuda, the Bahamas, Florida Keys, throughout the islands of the Caribbean, and off northern South America.





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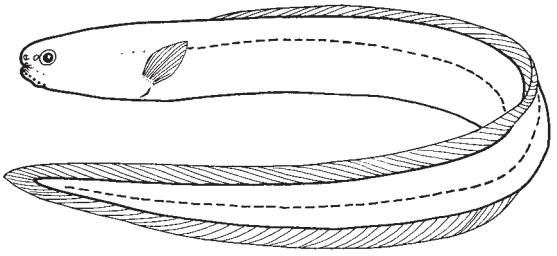
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SYNAPHOBRANCHIDAE

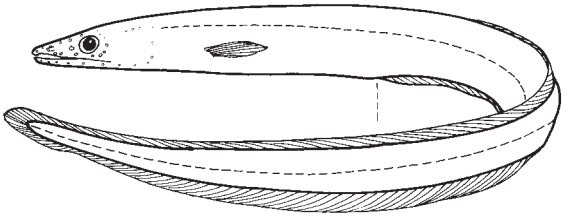
Cutthroat eels

by D.G. Smith, National Museum of Natural History, Washington, D.C., USA

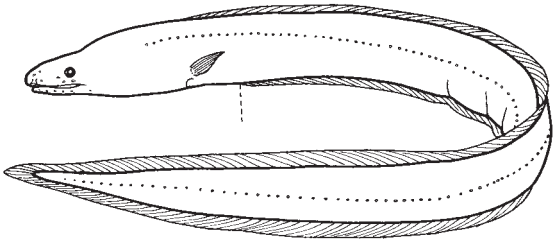
Diagnostic characters: Small to medium-sized eels, the largest species reaching 1.8 m, but most less than 1 m. Body stout to elongate, anus usually well in front of midbody. Head variable. Eye well developed to reduced. Snout may be short and blunt or moderately elongate. Mouth usually large, gape extending behind rear margin of eye; lips without a fleshy flange; jaws nearly equal, sometimes snout projects slightly beyond lower jaw and sometimes vice versa. Anterior nostril tubular, near tip of snout; posterior nostril on side of snout, at or below mideye level. **Teeth usually small and conical, in 1 to several rows on jaws and vomer; some species have enlarged, compound teeth on vomer, but large fangs never present. Gill openings low on body, below pectoral fins (when present); sometimes the gill openings of the 2 sides united in a ventral slit**. Dorsal and anal fins well developed, confluent with caudal fin. Pectoral fins present or absent. **Scales present or absent**. Lateral line variable, often complete, sometimes reduced to a few pores at anterior end and sometimes no pores at all. **Colour:** plain brown or grey, sometimes countershaded. No distinctive markings.



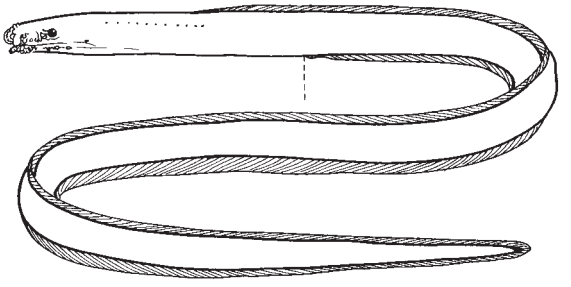
Simenchelys parastica (Simenchelyinae)



Synaphobranchus kaupi (Synaphobranchinae)



Dysomma anguillare (Ilyophinae)



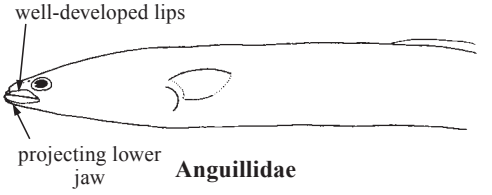
Dysomma brevirostre (Ilyophinae)

Habitat, biology, and fisheries: Synaphobranchids are benthic eels, some living in very deep water. *Simenchelys* is a scavenger, feeding on dead fish and sometimes burrowing into the carcass; this habit led to the mistaken idea that it is a parasite. Synaphobranchines are more generalized predators, living on small fishes and invertebrates. Most synaphobranchines live in fairly deep water, and some species are quite common in their depth range. Ilyophines, with a few exceptions, are rare and seldom seen. Many of them seem to live in specialized habitats that are difficult to sample. The Ilyophinae is the most speciose subfamily, judging from the great variety of leptocephali that have been collected; most of these larvae cannot be identified with a known adult, indicating that many species still await discovery. Synaphobranchids are of little or no importance to fisheries, although they are sometimes taken in deep trawls.

Remarks: The Synaphobranchidae is divided into 3 subfamilies. The Simenchelyinae contains a single genus and species, *Simenchelys parasitica*. It is distinguished by its peculiar snub-nosed appearance, caused by the extreme shortening of the jaws. Aside from this feature, it is relatively generalized, with a moderately elongate body, well-developed fins, and the anus slightly ahead of midbody. It is covered with small, embedded scales. The Synaphobranchinae contains those species most typical of the family. They are relatively generalized eels, except for the tendency of the gill openings on each side to converge toward the ventral midline. Most species have embedded scales, the eye and fins are well developed, and the jaws are moderately elongate.The Ilyophinae is the most speciose and morphologically diverse of the synaphobranchid subfamilies. Ilyophines show great variety in body shape, dentition, presence or absence of pectoral fins, eye size, and ornamentation of the snout. Most lack scales. In some species, the anus is located far forward, nearly under the pectoral fins.

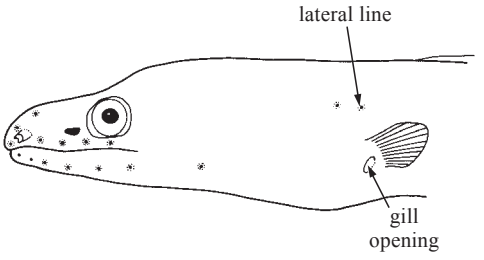
Similar families occurring in the area

Anguillidae: are the only other eels that have scales. Anguillids have prominent fleshy flanges on the lips, and the lower jaw projects beyond the upper.

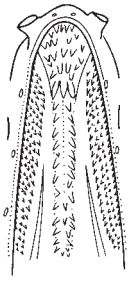


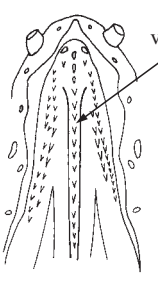
Anguillidae

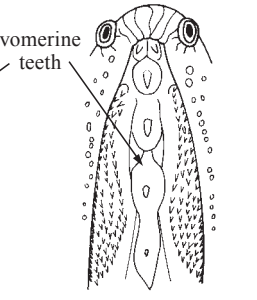
Chlopsidae: some ilyophines have a reduced lateral line and resemble chlopsids. Chlopsids also have the posterior nostril low on the side of the snout, further enhancing the resemblance. Most chlopsids have more than 1 row of teeth on the vomer; 1 genus (*Robinsia*) has a single row, but they are simple, not compound. Chlopsids almost always have 1 or 2 pores in the lateral line, at the anterior end of the canal. Of the known ilyophines, *Linkenchelys* has 4 or 5 pores, and *Dysommina* has none, but no species has 1 or 2.



Chlopsidae


Chlopsidae
Kaupichthys


Chlopsidae
Robinsia

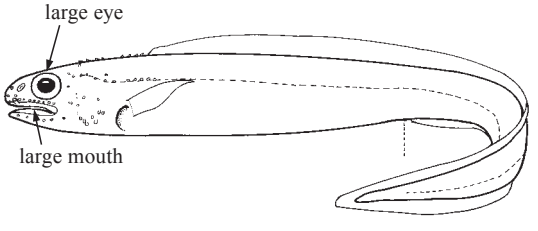


Synaphobranchidae

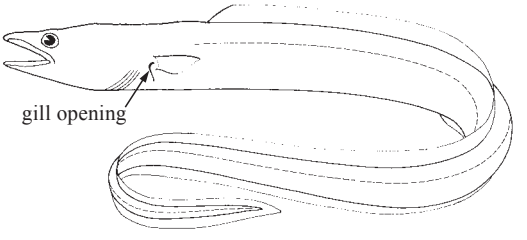
roof of mouth

Colocongridae: have a short, blunt snout somewhat like *Simenchelys*, but they have a larger eye and mouth, lack scales, and the anus is far behind midlength.

Congridae: some of the more generalized synaphobranchids may be mistaken for congrids. Congrids lack scales and have the gill opening more lateral in position and closer to the pectoral fins. Many, though not all, congrids have fleshy flanges on the lips. Most have the posterior nostril at or above mideye, and the gill openings are lateral rather than ventral.



Colocongridae

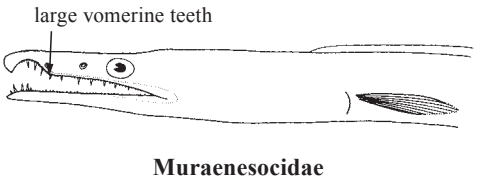


Congridae

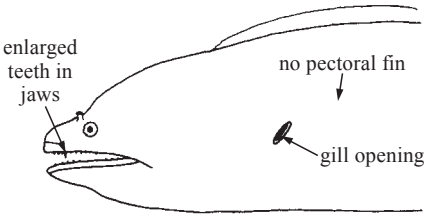
Muraenesocidae: have a large mouth and enlarged teeth on the vomer, as do some ilyophines. In muraenesocids, however, the enlarged teeth are single and not compound as in ilyophines.

Muraenidae: lack pectoral fins, as do some ilyophines, but the gill opening is very small and pore-like. Muraenids usually have enlarged teeth, but these are on the jaws and intermaxillary plate; the vomerine teeth are small. Muraenids have 1 or 2 pores in the lateral line, at the anterior end of the canal.

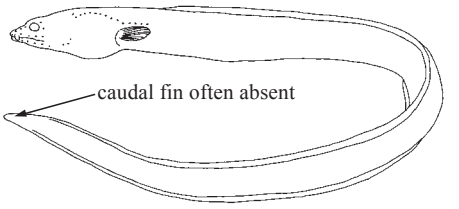
Ophichthidae: in many ophichthids the caudal fin is absent, and the tip of the tail is hard and pointed. Ophichthids have the posterior nostril low on the snout, but in most species it is actually on the lip or within the mouth; in synaphobranchids, the nostril is always above the lip. Those ophichthids with the nostril above the lip have a swollen throat with many overlapping branchiostegal rays, detached from the hyal bones and forming a basket-like structure. In synaphobranchids, the throat is not swollen; the branchiostegals are less numerous and are attached to the hyal bones. Ophichthids usually have a median supraorbital pore, which synaphobranchids lack.



Muraenesocidae



Muraenidae



Ophichthidae

Key to the species of Synaphobranchidae occurring in the area

Note: The species of *Synaphobranchus* can be difficult to identify. The distinguishing characters are not always clear. The scale shape can be ambiguous, and the dorsal origin is variable because some of the anterior pterygiophores do not bear rays. Sometimes the vertebral count is the only way to identify a specimen with certainty.

1a. Head anterior to eyes extremely short, mouth a sphincter-like slit with gape not extending posterior to anterior nostril (Fig. 1) . . . . . ***Simenchelys parasitica***

1b. Head more elongate, mouth extends to level of posterior edge of eye or beyond . . . . . → *2*

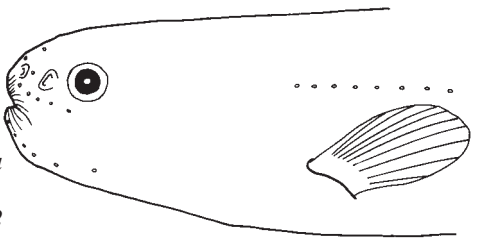


Fig. 1 lateral view of head (*Simenchelys*)

2a. Gill openings on the 2 sides united as a longitudinal slit on ventral midline (Fig. 2); scales present . . . . . → *3*

2b. Gill openings separate, although they may be closely approximated; scales present or absent . . . . . → *6*

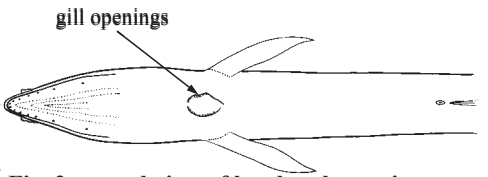


Fig. 2 ventral view of head and anterior part of body

3a. Scales elongate to oval (Fig. 3a, b) . . . . . → *4*

3b. Scales rounded (Fig. 3c, d) . . . . . → *5*

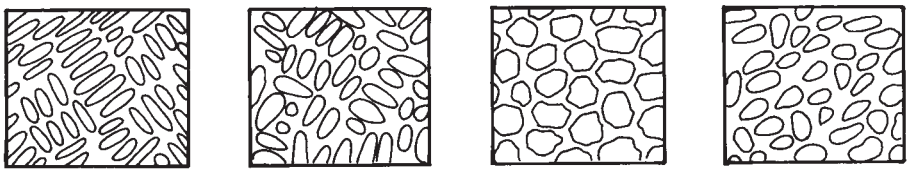


Fig. 3 patterns and shapes of body scales

4a. Scales very elongate (3 to 4 times as long as wide), small, regularly arranged in aligned clusters of 4 or 5 set at right angles to other such groups (Fig. 3a); vertebrae 143 to 153; dorsal-fin origin well behind level of anus (Fig. 4a); vomerine teeth uniserial but zig-zag anteriorly . . . . . ***Synaphobranchus kaupi***

4b. Scales oval, not so regularly arranged (Fig. 3b); vertebrae 128 to 140; dorsal-fin origin at or just posterior to level of anus (Fig. 4b); vomerine teeth uniserial . . . . . ***Synaphobranchus affinis***



a) ***Synaphobranchus kaupi*** **b)** ***Synaphobranchus affinis***

Fig. 4 lateral view of head and body

5a. Scales large, polygonal or rounded (Fig. 3c); vertebrae 140 to 150; predorsal length 2.9 to 3.2 in total length; vomerine teeth uniserial except for short anterior patch or a few teeth in a roughly biserial arrangement . . . . . ***Synaphobranchus oregoni***

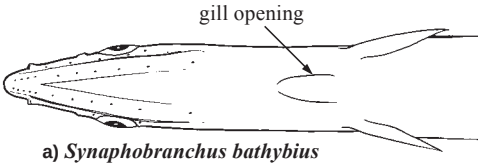
5b. Scales small, rounded or oval, irregularly arranged (Fig. 3d); vertebrae 130 to 140; predorsal length 1.9 to 2.2 in total length; vomerine teeth irregularly biserial anteriorly, forming small expanded portion at tip . . . . . ***Synaphobranchus brevidorsalis***

6a. Scales present . . . . . → ***7***

6b. Scales absent . . . . . → ***9***

7a. Gill openings nearly parallel, separated by much less than their length (Fig. 5a); vertebrae 125 to 135 . . . . . ***Synaphobranchus bathybius***

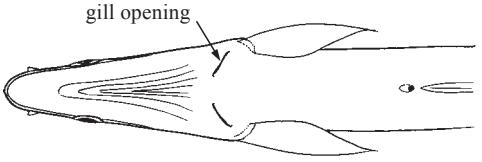
7b. Gill openings divergent or parallel, but separated by more than their length; vertebrae 145 or more . . . . . → ***8***



a) ***Synaphobranchus bathybius***

8a. Gill openings strongly divergent, anterior ends separated by a distance about equal to their length, posterior ends separated by about 1.5 to 2 times their length (Fig. 5b); jaws approximately equal; vertebrae 164 to 173 . . . . . ***Synaphobranchus capensis***

8b. Gill openings parallel or nearly so, separated by a distance about equal to their own length (Fig. 5c); snout projecting slightly beyond tip of lower jaw; vertebrae 145 to 151 . . . . . ***Ilyophis brunneus***



b) ***Synaphobranchus capensis***

9a. Head distinctly shorter than trunk . . ***Haptenchelys texis***

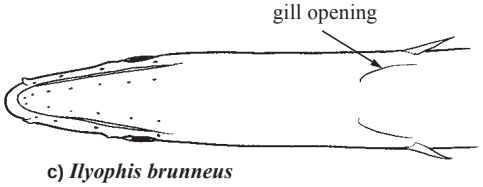
9b. Head equal to or longer than trunk . . . . . → ***10***

10a. Pectoral fin present . . . . . → ***11***

10b. Pectoral fin absent . . . . . → ***14***

11a. Trunk very short, anus under or shortly behind tip of appressed pectoral fin . ***Dysomma anguillare***

11b. Trunk longer, anus well behind tip of appressed pectoral fin . . . . . → ***12***



c) ***Ilyophis brunneus***

Fig. 5 ventral view of head

12a. Intermaxillary teeth present in a well developed, rounded patch (Fig. 6); body distinctly bicoloured for most of its length, dark above and pale below . . . . . ***Atractodenchelys phrix***

12b. Intermaxillary teeth absent (Fig. 7); body not bicoloured . . . . . ***→ 13***

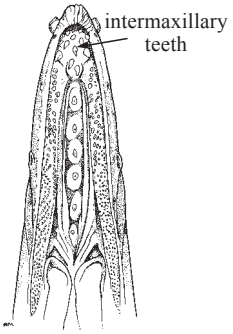


Fig. 6 roof of mouth ***(Atractodenchelys phrix)***

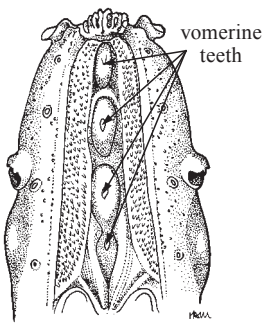


Fig. 7 roof of mouth ***(Dysommina rugosa)***

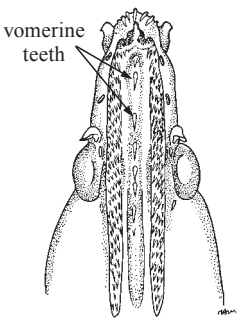


Fig. 8 roof of mouth ***(Linkenchelys multipora)***

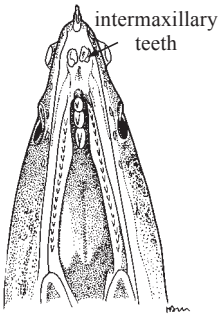


Fig. 9 roof of mouth ***(Dysomma tridens)***

13a. Four large, compound vomerine teeth in a single row, each tooth enclosed in a pad of papillose tissue (Fig. 7); no lateral-line pores on body . . . . . ***Dysommina rugosa***

13b. Approximately 8 slender, simple vomerine teeth, not enclosed in a pad of papillose tissue (Fig. 8); 4 or 5 pores at anterior end of lateral line, in front of level of pectoral fin . . . . . ***Linkenchelys multipora***

14a. Three large, compressed intermaxillary teeth projecting downward from tip of snout in front of lower jaw (Fig. 9); snout rugose with some papillae . . . . . ***Dysomma tridens***

14b. Two intermaxillary teeth, side by side, not projecting outside mouth; snout and tip of lower jaw bulbous, heavily ornamented with papillae and ridges . . . . . ***Dysomma brevirostre***

List of species occurring in the area

Note: There is some uncertainty over the generic allocations of many of the species in this family. Some authors place the species *capensis* in the genus *Diastobranchus* and *bathybius* in *Histiobranchus*, rather than placing both in *Synaphobranchus*. The species *anguillare* has at times been placed in the genus *Sinomyrus* and *brevirostre* in *Nettodarus*; they are both placed in *Dysomma* here. These arrangements are to some extent arbitrary, but the system followed here is that of the most recent revision of the family (Robins and Robins, 1989).

Atractodenchelys phrix Robins and Robins, 1970. To 70 cm. Caribbean and E coast of Florida.

Dysomma anguillare Barnard, 1923. To 45 cm. Worldwide.

Dysomma brevirostre (Facciolà, 1887). To 25 cm. E and W Atlantic (incl. Mediterranean), central Pacific.

Dysomma tridens Robins, Böhlke, and Robins, 1989. Known from 1 specimen, 21.7 cm, from Belize.

Dysommina rugosa Ginsburg, 1951. To 35 cm. Worldwide.

Haptenchelys texis Robins and Martin, 1976. To 55 cm. E and W Atlantic.

Ilyophis brunneus Gilbert, 1891. To 60 cm. Worldwide.

Synaphobranchus affinis Günther, 1877. To 46 cm. Worldwide.

Synaphobranchus bathybius Günther, 1877. To 75 cm. Worldwide.

Synaphobranchus brevidorsalis Günther, 1887. To 120 cm. Worldwide.

Synaphobranchus capensis (Barnard, 1923). To 180 cm. Previously known from S Africa, Australia, and New Zealand, but recently reported from off New England and may extend into the area.

Synaphobranchus kaupi Johnson, 1862. To 85 cm. Worldwide.

Synaphobranchus oregonii Castle, 1960. To 70 cm. Gulf of Mexico, Caribbean, Straits of Florida.

Reference

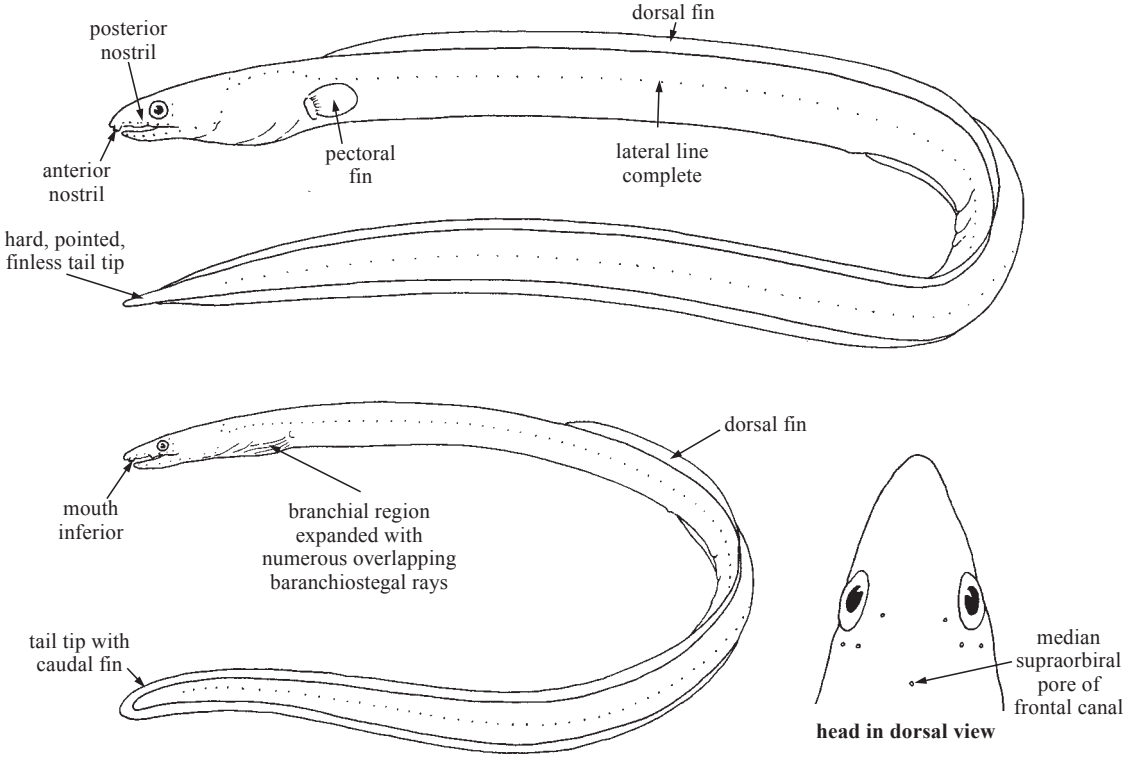
Robins, C.H. and C.R. Robins. 1989. Family Synaphobranchidae. In Fishes of the Western North Atlantic, edited by E.B. Böhlke. *Mem. Sears Found. Mar. Res.*, 1(9):207-253.

OPHICHTHIDAE

Snake eels (shrimp eels, worm eels, and sand eels)

by J.E. McCosker, California Academy of Sciences, USA

Diagnostic characters: Elongate eels, snake-like or worm-like, cylindrical anteriorly, cylindrical or compressed posteriorly, most about 50 cm or less, some reaching 250 cm. Eye size variable, from well developed to rudimentary. Snout pointed or rounded; **nostrils** widely separated, the anterior usually in a short tube, **the posterior of most species along edge of upper lip or opening within mouth**. Mouth moderate to large, terminal or inferior. Gill openings midlateral to entirely ventral, ranging from constricted (subfamily Myrophinae) to an elongate slit (subfamily Ophichthinae). **Branchial region expanded and reinforced by numerous overlapping branchiostegal rays**. Dorsal and anal fins present or absent, rarely elevated; pectoral fins present or absent; pelvic fins absent; **caudal fin present or absent, when absent tip of tail is often hard and pointed**. Scales absent. **Lateral line** complete; often with well-developed pores on head and body, **right and left sides connected by a frontal and a temporal canal on head; median pore usually present in frontal canal**. Gas bladder present, often reduced. **Colour:** highly variable, from uniform light or dark to patterns of spots, stripes, bands, bars, or saddles; usually darker on dorsal surface.



Habitat, biology, and fisheries: The Ophichthidae is the most diverse and speciose family of true eels, occupying tropical and subtropical habitats including nearshore sand and mud bottoms, estuaries, and coral reefs, ranging from the sandy intertidal to midwater depths of 800 m; however, most live shallower than 200 m. They are often extremely abundant and probably are important forage items for many species. Ophichthids are more characteristic of continental waters than of islands. Their sharp snouts and tails and their often muscular and cylindrical bodies are well adapted for burrowing, and many species spend most of their adult lives buried in the shallow sediment. Some come out at night to forage over the bottom and juveniles and adults are sometimes collected at the surface around a light. Like all eels, ophichthids have a pelagic leptocephalus larva. Various species of larger ophichthids, subfamily Ophichthinae, are caught throughout the area, however no directed fishery exists for them. They are taken by trawl or by hook-and-line but are undesirable due to the numerous intramuscular bones, and are rarely consumed. Although not particularly aggressive, some of the larger snake eels will bite if handled carelessly.

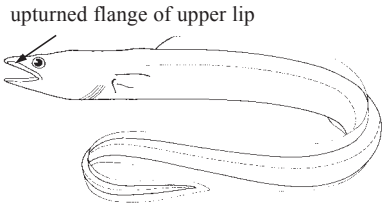
Similar families occurring in the area

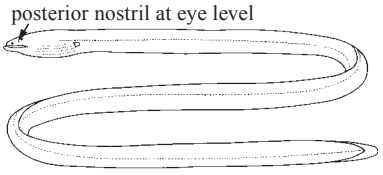
All ophichthids differ from other eels in having numerous overlapping branchiostegal rays. Most ophichthids differ from most other eels in having the posterior nostril within the lip or opening inside the mouth. The subfamily Ophichthinae is further distinguished from all other eels by its hard, pointed, finless tail tip.

Congridae: some congrids, particularly the garden eels (subfamily Heterocongrinae), have a reduced caudal fin, but some caudal-fin rays are nearly always present, and the tail tip is not hard and pointed. The heterocongrines are further distinguished by their short snout and the prominent upturned flange on the upper lip. Members of the ophichthid subfamily Myrophinae have a caudal fin, however they are distinguished from other eels by their posterior nostril condition and the presence of a median pore in the transverse frontal canal on the head.

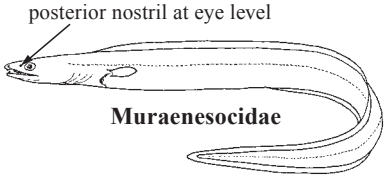
Moringuidae: moringuids are also burrowing eels and may superficially resemble some of the small-eyed ophichthids. Moringuids have a caudal fin, the posterior nostril at the level of the eye, and lack the numerous and overlapping branchiostegal rays.

Muraenesocidae: they differ in having the posterior nostrils at the level of the eye and a median series of very large teeth, flanked by a row of small teeth, along the vomer.





Moringuidae



Muraenesocidae

Key to the species of Ophichthidae occurring in the area

1a. Tail tip flexible, caudal-fin rays not conspicuous, confluent with dorsal and anal fins (Fig. 1a); gill opening midlateral, a opening constricted (Fig. 2) . . . . . **(Myrophinae)** → *2*

1b. Tail tip a hard or fleshy finless point (Fig. 1b); gill opening midlateral to entirely ventral, unconstricted (Fig. 3)

. . . . . **(Ophichthinae)** → *11*

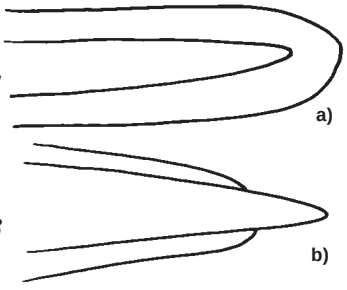


Fig. 1 lateral view of tail

2a. Posterior nostril before eye, above upper lip and not covered by a flap (Fig. 4a); pectoral fins present, but may be reduced to small, barely noticeable flaps in posterodorsal corner of gill opening . . . . . ***(Pseudomyrophis)*** → *3*

2b. Posterior nostril labial, either within lip and opening into mouth, or along lip and covered by a flap (Fig. 4b); pectoral fins well developed or minute . . . . . → *5*

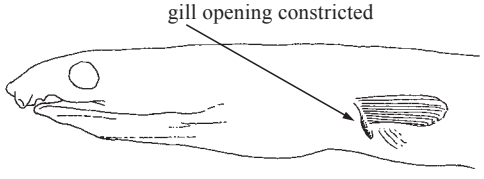


Fig. 2 lateral view of head (Myrophinae)

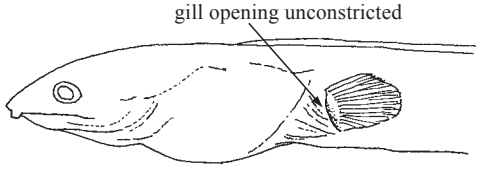


Fig. 3 lateral veiw of head (Ophichthinae)

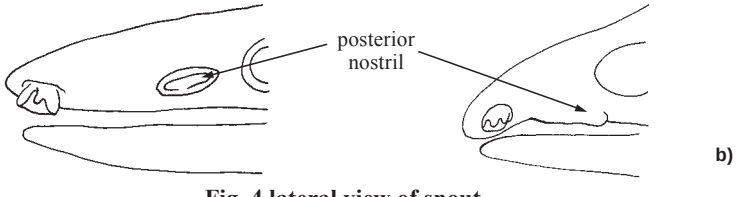


Fig. 4 lateral view of snout

3a. Body extremely elongate, its depth 1 to 1.5% of total length; head 5.2 to 6.1% of total length; dorsal-fin origin behind midtrunk; total vertebrae 213 to 217 . . . . . ***Pseudomyrophis nimius***

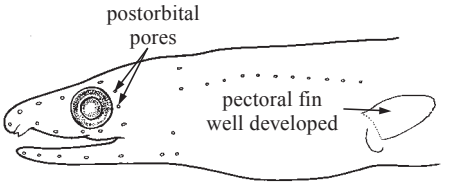
3b. Body elongate, its depth at or greater than 1.5% total length; head length greater than 6.9% total length; dorsal-fin origin about at midtrunk; total vertebrae less than 200 . . . . . → ***4***

4a. Head length 6.9 to 7.8% total length; body depth 1.5 to 2.2% total length; total vertebrae 184 to 191 . . . . . ***Pseudomyrophis frio***

4b. Head length 9.5 to 9.7% total length; body depth 2.1 to 2.4% total length; total vertebrae 155 to 159 . . . . . ***Pseudomyrophis fugesae***

5a. Pectoral fins well developed (Fig. 5a); dorsal-fin origin from anterior trunk region to behind anus; pleural ribs absent behind fifteenth to twentieth vertebrae . . . . . → ***6***

5b. Pectoral fins minute (Fig. 5b); dorsal-fin origin in midtrunk region; pleural ribs present on all trunk vertebrae . . . . . ***Mixomyrophis pusilipinna***



a) ***Myrophis platyrhynchus***



b) ***Mixomyrophis pusilipinna***

Fig. 5

6a. Dorsal-fin origin above or behind anus; vomerine teeth absent . . . . . ***Ahlia egmontis***

6b. Dorsal-fin origin anterior to midtrunk region; vomerine teeth present . . . . . → ***7***

7a. Body elongate, its depth more than 70 times in total length; teeth slender, slightly depressible; posterior nostril on lip and covered by flap . . . . . ***Asarcenchelys longimanus***

7b. Body stouter, its depth less than 50 times in total length; teeth stouter, not depressible; posterior nostril opens into mouth . . . . . ***(Myrophis)*** → ***8***

8a. Two postorbital pores (Fig. 5a), 1 behind upper half of eye and 1 behind mideye (dorsal-fin origin about midway between snout tip and anus; 19 to 22 predorsal vertebrae) . . . . . ***Myrophis platyrhynchus***

8b. One postorbital pore behind upper half of eye . . . . . → ***9***

9a. Dorsal-fin origin greater than twice head length behind snout tip, about midway between gill opening and anus; 30 to 34 predorsal vertebrae . . . . . ***Myrophis punctatus***

9b. Dorsal-fin origin less than twice head length behind snout tip; 30 or fewer predorsal vertebrae . . . . . → ***10***

10a. Dorsal-fin origin behind gill opening by 1 or 2 times the pectoral-fin length; 14 to 17 predorsal vertebrae, 45 to 49 preanal vertebrae . . . . . ***Myrophis anterodorsalis***

10b. Dorsal-fin origin behind gill opening by more than 3 times the pectoral-fin length, before midpoint between gill opening and anus; 26 to 30 predorsal vertebrae, 51 to 57 preanal vertebrae . . . . . ***Myrophis plumbeus***

11a. Dorsal fin present, generally elevated, its origin on nape above supraoccipital; pectoral fins absent; gill openings inferior, parallel or converging forward, isthmus narrower than gill opening length . . . . . → ***12***

11b. Dorsal fin, if present, arises behind nape; pectoral fins present or absent; gill openings inferior or lateral . . . . . → ***17***

12a. Anal fin absent; anterior nostril a hole, without a raised rim; head brown or black, body not spotted, with white markings, dorsal fin white . . . . . ***Letharchus velifer***

12b. Anal fin present . . . . . ***→ 13***

13a. Median groove on underside of snout extends to and beyond anterior nostril bases (Fig. 6); vomerine and intermaxillary teeth present . . . . . ***(Callechelys) → 14***

13b. Underside of snout not incised anteriorly (Fig. 7); vomerine teeth absent . ***Aprognathodon platyventris***

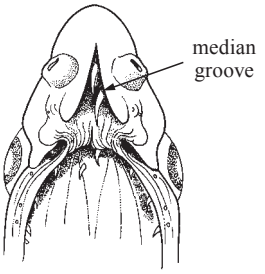


Fig. 6 underside of snout (*Callechelys*)

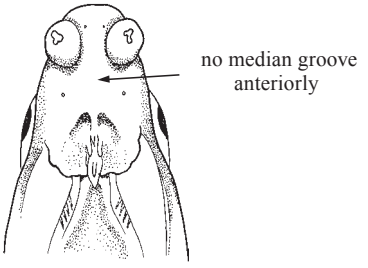


Fig. 7 underside of snout (*Aprognathodon platyventris*)

14a. Body coloration strongly delineated with alternating black and white stripes running the length of the body . . . . . ***Callechelys bilinearis***

14b. Body covered with numerous brown to black spots. . . . . ***→ 15***

15a. Body moderately elongate, its depth 2.6 to 3.7% total length; head 7.0 to 8.8% total length; jaw teeth numerous, 7 to 11 on each maxilla, 11 to 17 on each mandible; total vertebrae 169 to 186 . . . . . ***Callechelys muraena***

15b. Body elongate, its depth 1.7 to 2.2% total length; head 5.6 to 7.1% total length; jaw teeth fewer, 4 to 5 on each maxilla, 9 to 11 on each mandible; total vertebrae 169 to 186 . . . . . ***→ 16***

16a. Dorsal spots of large individuals coalesced into dark saddles; preanal vertebrae 107 or 108, total vertebrae 169 to 171 . . . . . ***Callechelys springeri***

16b. Dorsal spots of large individuals not coalesced into saddles; preanal vertebrae 111 to 121, total vertebrae 171 to 186 . . . . . ***Callechelys guineensis***

17a. Pectoral fins present, generally as large as or larger than eye (smaller in 1 species); coloration various, including plain and spotted species . . . . . ***→ 31***

17b. Pectoral fins absent or vestigial; median fins reduced or absent; coloration without large spots . . . . . ***→ 18***

18a. Gill openings entirely ventral or nearly so; head pores developed, 3 or 4 preopercular pores present (Fig. 8); all fins may be absent . . . . . ***→ 19***

18b. Gill openings low lateral, crescentic; head pores reduced, 2 preopercular pores (Fig. 9); at least a dorsal fin present . . . . . ***→ 22***

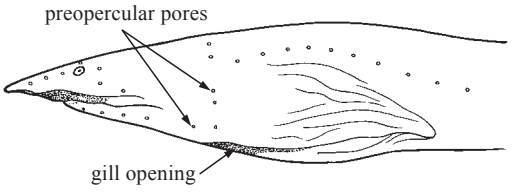


Fig. 8 lateral view of head

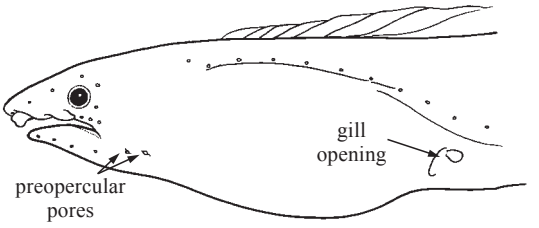


Fig. 9 lateral view of head

19a. All fins absent; anterior nostril either a hole or within a tube . . . . . → ***20***

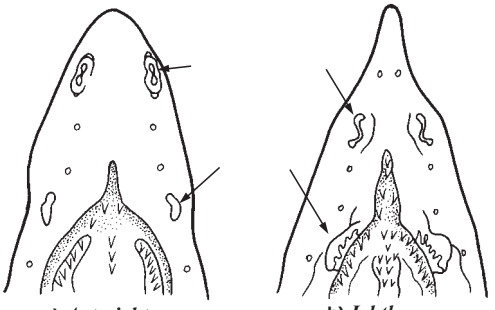
19b. Median fins present, although sometimes low and difficult to observe; anterior nostril a hole, not within a tube . . . . . ***Stictorhinus potamius***

20a. Posterior nostril opening outside mouth, with a flap; anterior nostril tubular (Fig. 10a); eye moderately developed . . . . . ***(Apterichtus)*** → ***21***

20b. Posterior nostril opening inside mouth, with or without a flap; anterior nostril not tubular (Fig. 10b); eye minute . . . . . ***Ichthyapus ophioneus***

21a. Supratemporal pores 5, preopercular pores usually 4 (occasionally 3); total vertebrae 123 to 132; preanal lateral-line pores 53 to 58 . . . . . ***Apterichtus ansp***

21b. Supratemporal pores 3, preopercular pores 3; total vertebrae 137 to 144; preanal lateral-line pores 61 to 65 . . . . . ***Apterichtus kendalli***



a) *Apterichtus* b) *Ichthyapus ophioneus*

Fig. 10 ventral view of snout and teeth on roof of mouth

22a. The only fin a short dorsal fin, originating midhead and ending 3 head lengths behind it; trunk extremely elongate; tail very short, about 30% of total length; pectoral fins absent . . . . . ***Phaenomonas longissima***

22b. Median fins continuous to near end of tail; trunk moderately to extremely elongate; tail 35% or more of total length; pectoral fins, if present, small and in upper gill opening corner . . . . . → ***23***

23a. Small, lappet-like pectoral fins present in upper gill opening corner (Fig. 9) . . . ***(Bascanichthys)*** → ***24***

23b. Pectoral fins absent . . . . . → ***26***

24a. A series of small, pale spots above each lateral-line pore along body, tail, and in branchial region (may be diffuse along body and tail of larger specimens); total vertebrae 159 to 167 . . . . . ***Bascanichthys scuticaris***

24b. No obvious pale spotting along lateral line or in branchial region; total vertebrae more than 177 . . . . . → ***25***

25a. Pectoral fins small, broad-based, their width 44 to 77% the length of gill opening; total vertebrae 177 to 190 . . . . . ***Bascanichthys bascanium***

25b. Pectoral fins minute, narrow-based, their width 36 to 37% the length of gill opening; total vertebrae 198 to 205 . . . . . ***Bascanichthys inopinatus***

26a. Anterior nostril a pore-like opening, without a raised rim (Fig. 11) . . . . . ***Caralophia loxochila***

26b. Anterior nostril tubular, either set off from underside of snout by a groove or notably within a tube . . . . . → ***27***

27a. Underside of snout not grooved; intermaxillary teeth inconspicuous . . . . . ***Ethadophis akkistikos***

27b. Underside of snout grooved nearly to base of anterior nostrils (Fig. 12); intermaxillary teeth protruding. . . . . ***(Gordiichthys)*** → ***28***

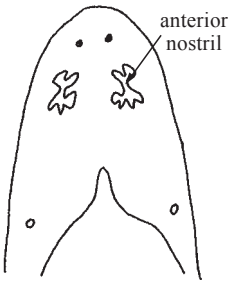


Fig. 11 underside of snout

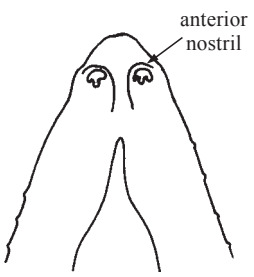


Fig. 12 underside of snout

28a. Anterior nostrils within a short tube that extends noticeably beneath underside of snout . . . . . ***Gordiichthys ergodes***

28b. Anterior nostrils not tubular, partly set off from underside of snout by a groove . . . . . → ***29***

29a. Body moderately elongate, its depth 62 to 79 times in total length; bicoloured in life and in preservative, dark dorsally and pale ventrally; vomerine teeth biserial anteriorly . . . . . ***Gordiichthys randalli***

29b. Body extremely elongate, worm-like, its depth 80 to 128 times in total length; coloration in preservative uniform, not darker dorsally; vomerine teeth uniserial throughout. . . . . → ***30***

30a. Body depth 80 to 91 times in total length; preanal vertebrae 92 to 98 and total vertebrae 168 to 176; lateral-line pores 161 to 166 . . . . . ***Gordiichthys leibyi***

30b. Body depth 100 to 128 times in total length; preanal vertebrae 105 to 111 and total vertebrae 193 to 206; lateral-line pores 186 to 189 . . . . . ***Gordiichthys irretitus***

31a. Anterior teeth of both jaws long, fang-like canines, extending far outside mouth when closed; lower jaw extends beyond snout (Fig. 13) . . . . . ***Aplatophis chauliodus***

31b. Anterior teeth in jaws not fangs extending beyond snout tip; snout extends beyond lower jaw, or jaws subequal. . . . . → ***32***



Fig. 13 lateral view of head (*Aplatophis chauliodus*)

32a. Teeth molariform or granular; pectoral fins broad-based (Fig. 14); dorsal-fin origin on head . . . . . ***(Myrichthys)*** → ***33***

32b. Teeth pointed; pectoral-fin base restricted, opposite upper half of gill openings (Fig. 15); dorsal-fin origin on or behind head . . . . . → ***34***

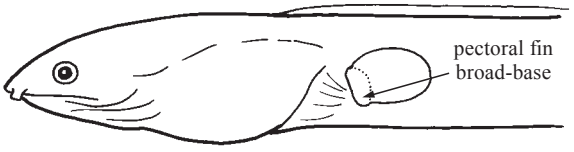


Fig. 14 lateral view of head (*Myrichthys*)

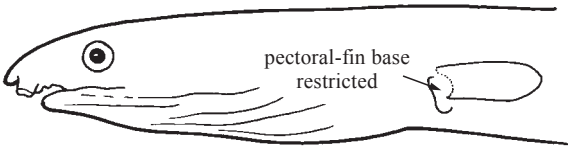


Fig. 15 lateral view of head

33a. Body coloration with round pale spots on dark background of brown or green . . . . . ***Myrichthys breviceps***

33b. Body coloration with diffuse dark spots with bright centres (gold in life) on a pale background . . . . . ***Myrichthys ocellatus***

34a. Pectoral fins rudimentary, much smaller than eye (Fig. 16); head and trunk slightly longer than tail . . . . . ***Quassiremus ascensionis***

34b. Pectoral fins developed, larger than eye; head and trunk as long as or shorter than tail . . . . . → ***35***

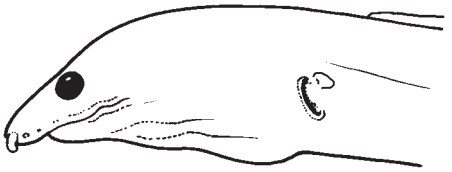


Fig. 16 lateral view of head (*Quassiremus ascensionis*)

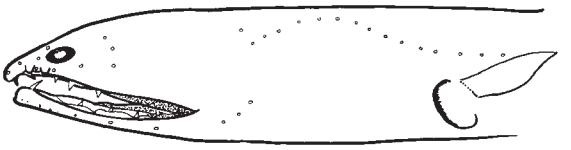


Fig. 17 lateral view of head (*Kertomichthys blastorhinus*)

35a. Eye before middle of upper jaw (Fig. 17); some teeth long and fang-like . . . . . → ***36***

35b. Eye over middle of upper jaw; teeth not long and fang-like . . . . . → ***39***

36a. Snout short, its profile depressed, narrow posteriorly and clavate anteriorly; vomerine teeth numerous and small, mostly uniserial . . . . . ***Kertomichthys blastorhinus***

36b. Snout longer and linear; vomerine teeth larger, either biserial or uniserial . . . . . → ***37***

37a. Maxillary teeth in 3 rows; vomerine teeth large and uniserial (Fig. 18a); preopercular pores absent; body coloration with fine brown speckling, lacking large spots . . . . ***Lethogoleos andersoni***

37b. Maxillary teeth in 1 or 2 rows; vomerine teeth small and biserial (Fig. 18b); at least 2 preopercular pores present, although may be difficult to observe; body coloration of dark spots as large or larger than eye . . . . . ***(Echiophis)*** → ***38***

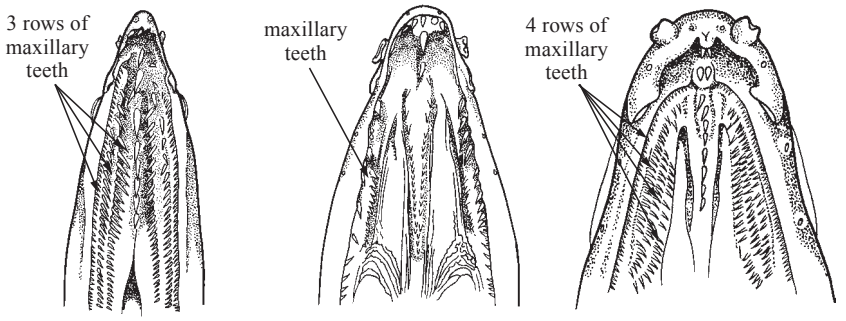


Fig. 18 teeth in upper jaw

38a. Body coloration with large brown spots on pale background; 2 inconspicuous preopercular pores; dorsal-fin origin behind pectoral-fin tips by length less than that of pectoral fins . . . . . ***Echiophis intertinctus***

38b. Body coloration with small brown spots on tan background; 3 preopercular pores set in dark spots; dorsal-fin origin behind pectoral-fin tips by greater than their length . . ***Echiophis punctifer***

39a. Teeth minute, conical, in 4 rows on maxillary (Fig. 18c); lateral line abruptly arched and abutting its partner in head region; body coloration uniform . . . . . ***Hyphalophis devius***

39b. Teeth generally not minute, in 3 rows or less on maxilla; lateral line not abruptly arched in head region; coloration various, either plain, spotted, banded or saddled . . . . . → ***40***

40a. Jaws subequal; snout tip blunt; labial barbels pendant, conspicuous (Fig. 19); coloration boldly spotted. . . ***Herpetoichthys regius***

40b. Snout overhanging lower jaw; snout tip rounded to pointed; barbels on upper lip present or absent, not pendant and conspicuous; coloration various, either plain, spotted, saddled or banded . . . . . ***(Ophichthus)*** → ***41***



Fig. 19 lateral view of head (*Herpetoichthys regius*)

41a. Anterior nostril with a tentacle from its inner rim (Fig. 20), longer than length of nostril tube (a small barbel along lip between anterior and posterior nostrils); coloration uniform, fins black-edged; teeth on jaws and vomer biserial . . . . . ***Ophichthus cylindroideus***

41b. Anterior nostril tubular, lacking an obvious tentacle from its inner rim. . . . . → ***42***

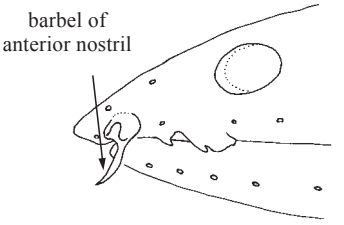


Fig. 20 lateral view of snout (*Ophichthus cylindroideus*)

42a. Tail 69% or more of total length; body elongate, not robust; pores of head and lateral line dark and conspicuous, in striking contrast to head and body . . . . . ***Ophichthus melanoporus***

42b. Tail 65% or less of total length; body moderately elongate to stout; pore coloration not as above. . . . . → ***43***

43a. Dorsal-fin origin well behind tips of pectoral fins. . . . . → ***44***

43b. Dorsal-fin origin above, slightly behind, or in advance of pectoral-fin tips . . . . . → ***47***

44a. Body dark (although median fins may be lighter), lacking bands or spots; teeth small, biserial to multiserial in jaws; vomerine teeth uniserial posteriorly. . . . . ***Ophichthus cruentifer***

44b. Body banded or spotted; teeth stout, upper jaw teeth biserial or multiserial; vomerine teeth uniserial or biserial . . . . . → ***45***

45a. Body with dark blotches along flank equal to or larger than eye; tail longer than 60% of total length. . . . . ***Ophichthus menezesi***

45b. Body without spots, but with 13 to 15 dark saddles; tail less than 60% of total length . . . . . → ***46***

46a. Dorsal-fin origin behind pectoral-fin tip by a distance greater than length of pectoral fin; vomerine teeth of adults uniserial; total vertebrae 144 to 147 . . . . . ***Ophichthus spinicauda***

46b. Dorsal-fin origin behind pectoral-fin tip by a distance less than length of pectoral fin; vomerine teeth of adults biserial to triserial; total vertebrae 115 to 119 . . . . . ***Ophichthus rex***

47a. Vomerine teeth biserial to triserial; tail longer than 60% of total length; body without dark bars, saddles, or light or dark spots . . . . . ***Ophichthus gomesii***

47b. Vomerine teeth uniserial (although sometimes a pair anteriorly); tail shorter than 60% of total length; body with dark bands or light or dark spots . . . . . → ***48***

48a. Body with brown saddles (although sometimes faint or lost in preservative); dorsal fin edged with brown . . . . . ***Ophichthus hyposagmatus***

48b. Body with dark or pale spots, lacking brown bands, bars or saddles; dorsal fin not notably edged with brown . . . . . → ***49***

49a. Body grey or bicoloured, dark dorsally, with pale eye-sized spots along midline; head pores within dark spots . . . . . ***Ophichthus puncticeps***

49b. Body pale, with irregular large dark blotches or with small dark spots outlining lateral-line and head pores . . . . . → ***50***

50a. Large dark spots and blotches along pale body, often meeting along the back; head, chin, and throat freckled with numerous small dark spots . . . . . ***Ophichthus ophis***

50b. Lateral-line pores and head pores set in small dark spots, sharply contrasting with pale body colour; dorsal fin with black edge . . . . . ***Ophichthus omorgmus***

List of species occurring in the area

Note: The following list probably represents the status of most of the shallow-water ophichthids known from the area. Because their cryptic and fossorial habits make them difficult to collect, it is likely that several undescribed species, particularly from deep water, exist. Included in the key, but not in this list, are 2 species (*Herpetoichthys regius* (Shaw, 1848) and *Phaenomonas longissima* (Cadenat and Marchal, 1963)) that are likely to be found in the area. The distributional abbreviation "C" indicates "central."

Ahlia egmontis (Jordan, 1884). To 43 cm. At 1 to 37 m depth WC 31.

Aplatophis chauliodus Böhlke, 1956. To 80 cm. At 33 to 91 m depth, NW31, SC31.

Aprognathodon platyventris Böhlke, 1967. To 45 cm. At 0 to 17 m depth, C31.

Apterichtus ansp (Böhlke, 1968). To 41 cm. At 0 to 15 m depth, C31, E31, WC41.
Apterichtus kendalli (Gilbert, 1891). To 54 cm. From 6 to 401 m depth, C31, E34.

Asarcenchelys longimanus McCosker, 1985. To 28 cm. S31.

Bascanichthys bascanium (Jordan, 1884). To 70 cm. At 0 to 24 m depth, W31.
Bascanichthys inopinatus McCosker, Böhlke and Böhlke, 1989. To 81 cm. At 40 m depth, C31.
Bascanichthys scuticaris (Goode and Bean, 1880). To ~1 m. at 0 to 27 m depth, W31.

Callechelys bilinearis Kanazawa, 1952. To 172 cm. At 0 to 22 m depth, N31, S31, N41, NC47.
Callechelys guineensis (Osorio, 1894). To 107 cm. At 0 to 36 m depth, C31, E34.
Callechelys muraena Jordan and Evermann, 1887. To 59 cm. At 27 to 115 m depth, W31, N31.
Callechelys springeri (Ginsburg, 1951). To 80 cm. At 22 to 36 m depth, NW31.

Caralophia loxochila Böhlke, 1955. To 46 cm. At 0 to 3 m depth, C31, SW31, WC41.

Echiophis intertinctus (Richardson, 1848). To 103 cm. At 20 to 64 m depth, NW31, SC31, WC 41.
Echiophis punctifer (Kaup, 1860). To 120 cm. To 100 m depth, NW31, SC31, WC 41.

Ethadophis akkistikos McCosker and Böhlke, 1984. To 32 cm. At 30 to 60 m depth, W31.

Gordiichthys ergodes McCosker, Böhlke and Böhlke, 1989. To 34 cm. At 30 to 60 m depth, W31.
Gordiichthys irretitus Jordan and Davis, 1891. To 79 cm. At 90 to 200 m depth, W31.
Gordiichthys leibyi McCosker and Böhlke, 1984. To 42 cm. At 37 to 72 m depth, NW31.
Gordiichthys randalli McCosker and Böhlke, 1984. To 67 cm. At 7 to 12 m depth, SC31.

Hyphalophis devius McCosker and Böhlke, 1982. To 29 cm. At 293 to 366 m depth, C31.

Ichthyapus ophioneus (Evermann and Marsh, 1900). To 48 cm. To 15 m depth, W31, WC41, W47.

Kertomichthys blastorhinus (Kanazawa, 1963). To 42 cm. At 183 m, SC31.

Letharchus velifer Goode and Bean, 1882. To 58 cm. At 5 to 90 m depth, NW31.

Lethogoleos andersoni McCosker and Böhlke, 1982. To 32 cm. At 141 to 192 m depth, C31, NC31.

Mixomyrophis pusillipinna McCosker, 1985. To 41 cm. At 393 to 451 m depth, NC31.

Myrichthys breviceps (Richardson, 1848). To 78 cm. At 0 to 9 m depth, C31, NC31, NW.
Myrichthys ocellatus (Lesueur, 1825). To 108 cm. At 0 to 7 m depth, C31, NC31, NW 41.

Myrophis anterodorsalis McCosker, Böhlke and Böhlke, 1989. To 16 cm. At 0 to 1.3 m depth, SC31.
Myrophis platyrhynchus Breder, 1927. To 21 cm. At 0 to 10 m depth, C31, C41.
Myrophis plumbeus (Cope, 1871). To 47 cm. S31, N41, E34.
Myrophis punctatus Lütken, 1851. To 35 cm. At 0 to 7 m depth, SC31, C41.

Ophichthus cruentifer (Goode and Bean, 1896). To 47 cm. At 36 to 1350 m depth, SC31, NW31, SW21.
Ophichthus cylindroideus (Ranzani, 1840). To 93 cm. At 24 to 46 m depth, SW31, NW41.
Ophichthus gomesii (Castelnau, 1855). To 66 cm. To 90 m depth, NC31, SW31, NW41.
Ophichthus hyposagmatus McCosker and Böhlke, 1984. To 39 cm. At 88 to 293 m depth, SW31, SC31.
Ophichthus melanoporus Kanazawa, 1963. To 69 cm. At 51 to 460 m depth, NW31.
Ophichthus menezesi McCosker and Böhlke, 1984. To 28 cm. At 169 to 1 400 m depth, NW31, W41.
Ophichthus omorgmus McCosker and Böhlke, 1984. To 45 cm. At 183 to 271 m depth, W31.
Ophichthus ophis (Linnaeus, 1758). To ~2 m. At 10 to 50 m depth, C31, SE34, NW41.
Ophichthus puncticeps (Kaup, 1860). To 93 cm. At 20 to 200 m depth, NW31, SC31.
Ophichthus rex Böhlke and Caruso, 1980. To 180 cm. At 22 to 366 m depth, NW31, W31.
Ophichthus spinicauda (Norman, 1922). To 108 cm. At 110 to 310 m depth, C31, SC31.

Pseudomyrophis frio (Jordan and Davis, 1891). To 31 cm. At 100 to 420 m depth, S31, W41.
Pseudomyrophis fugesae McCosker, Böhlke and Böhlke, 1989. To 95 mm. From 56 to 119 m depth, W31, N41.
Pseudomyrophis nimius Böhlke, 1960. To 37 cm. At 320 to 755 m depth, NW31.

Quassiremus ascensionis (Studer, 1889). To 70 cm. At 0 to 12 m depth, NC31, C31, NW41.

Stictorhinus potamius Böhlke and McCosker, 1975. To 35 cm. At 0 to 20 m depth, SC31, WC31, NW47.

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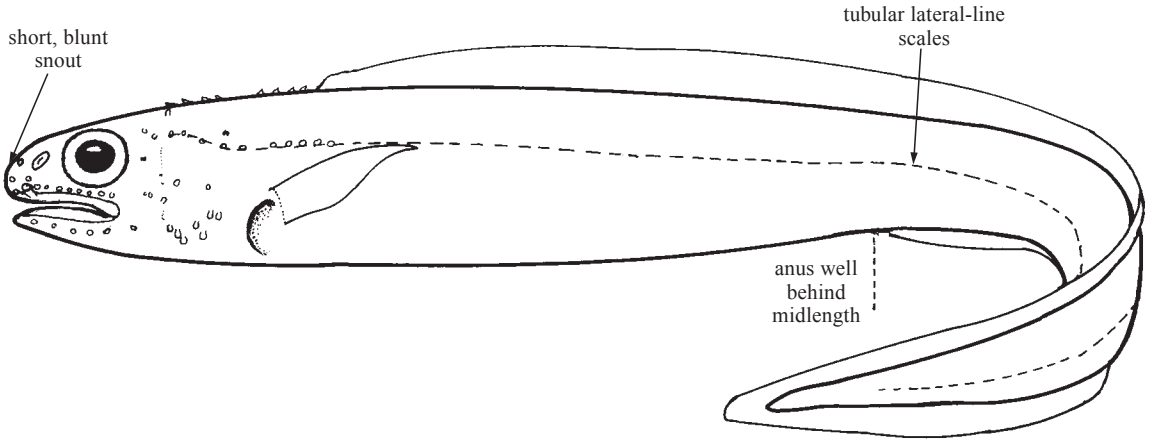
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COLOCONGRIDAE

Short-tailed eels

by D.G. Smith, National Museum of Natural History, Washington, D.C., USA

Diagnostic characters: Small to medium-sized eels, maximum size 50 to 60 cm. **Body short and stubby, deepest shortly behind head, tapering toward tail, strongly compressed posteriorly; tail much shorter than body, anus well behind midlength**. Head wide and deep. Eye large, its diameter equal to or greater than snout length. **Snout short and bluntly rounded**, projecting slightly beyond lower jaw; anterior nostril a short tube near tip of snout; posterior nostril large, round, with a low, raised rim, at mideye level. Mouth moderate, gape ending under rear of eye; no fleshy flanges on lips. Teeth small, conical, in 1 to 3 rows on jaws; intermaxillary teeth in 2 transverse series, posterior series continuous with maxillary teeth, anterior series separated and often incomplete; no teeth on vomer. **Dorsal and anal fins well developed, confluent with caudal fin; dorsal fin beginning slightly behind base of pectoral fin; pectoral fin well developed**. Scales absent. Lateral line complete, **pores in low tubes; head pores numerous, and except for anteriormost few are tubular**. Small dermal papillae on head. **Colour:** brown or grey, without markings. Sensory pores and papillae often black.



Habitat, biology, and fisheries: Colocongrids live on the mid- to upper continental slope in all tropical and subtropical oceans, except the eastern and central Pacific. They favour open terrain over muddy bottoms in depths of approximately 300 to 1 000 m. Little or nothing is known about their biology. Although they can be fairly common in their depth range and are sometimes taken in trawls, they are of no commercial importance.

Remarks: The Colocongridae contains a single genus, *Coloconger*, with 5 nominal species worldwide. One species occurs in the western Atlantic, another in the eastern Atlantic, and 3 in the Indo-West Pacific.

Similar families occurring in the area

These stubby, short-tailed eels are difficult to confuse with anything else. *Simenchelys parasitica* (Synaphobranchidae) also has a short, blunt snout, but it has embedded scales and its anus is near midlength; its mouth is much smaller, and it lacks tubular lateral-line pores. Some congrids, especially *Parabathymyrus*, have short snouts, but they have well developed flanges on the lips, and the anus is slightly before midlength.

List of species occurring in the area:

Coloconger meadi Kanazawa, 1957. To 50 to 60 cm. Florida to the Guianas, including the Gulf of Mexico.

Reference

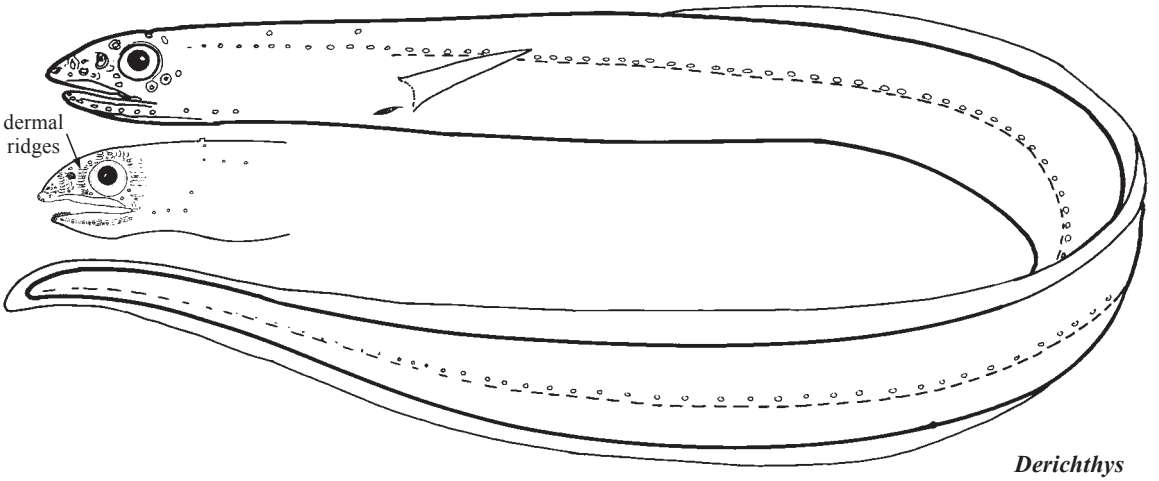
Smith, D.G. 1989. Family Colocongridae. In Fishes of the Western North Atlantic, edited by E. B. Böhlke. *Mem. Sears Found. Mar. Res.*, 1(9):413-419.

DERICHTHYIDAE

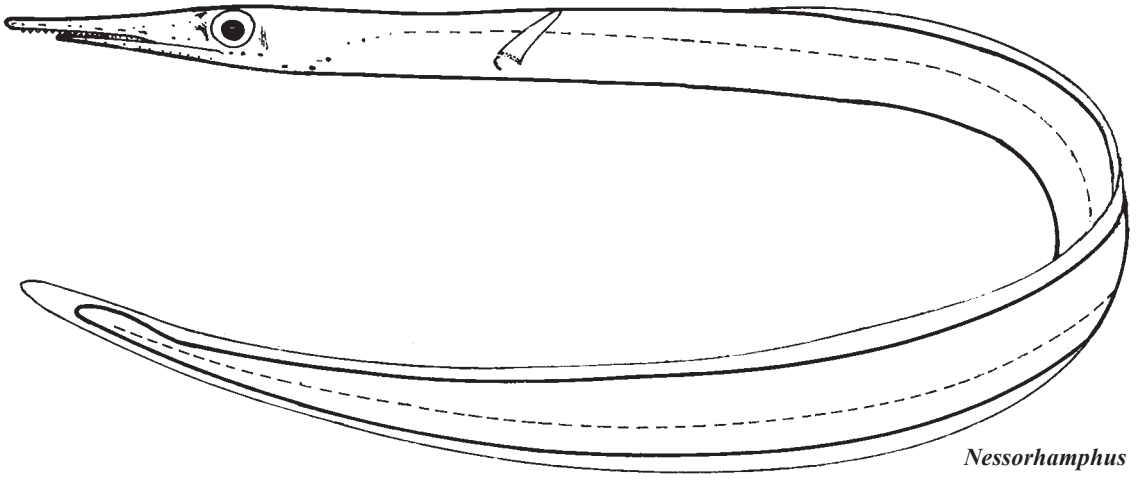
Longneck eels

by D.G. Smith, National Museum of Natural History, Washington, D.C., USA

Diagnostic characters: Small to medium-sized eels, maximum size approximately 60 cm, usually smaller. Body moderately elongate, tail not filamentous, ending in a small caudal fin; anus at or slightly behind midlength. Head variable in form, snout either short or markedly elongate. Eye well developed. Upper jaw extends beyond lower, cleft of mouth ends under or slightly behind eye; lips without upturned or downturned flanges. Teeth small, conical, multiserial. Gill opening small, slit-like, located just in front of and below pectoral fin. Dorsal and anal fins confluent with caudal fin; dorsal fin begins in anterior third of body, slightly behind tip of appressed pectoral fin; anal fin begins immediately behind anus, at or slightly behind midbody; **dorsal and anal fins both become distinctly reduced near end of tail**; pectoral fins present. Scales absent. Lateral line complete, pore system on head well developed. **Colour:** brown, with paler fins; 1 species with a dark midventral streak; no spots, lines, or other distinct markings.



Derichthys



Nessorhamphus

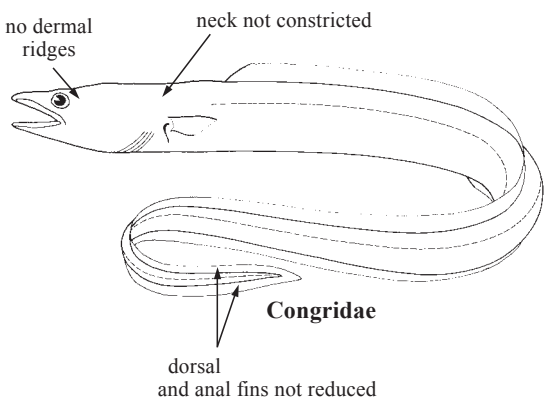
Habitat, biology, and fisheries: Derichthyids are midwater eels inhabiting depths of several hundred metres in all tropical and subtropical oceans. Little is known of their biology. They are seldom seen and are of no importance to fisheries.

Remarks: The Derichthyidae includes 2 genera and 3 species of small, seldom-seen, midwater eels. ***Derichthys*** **has a short snout, a constricted neck, and a series of short, longitudinal dermal ridges on the head** (presumably sensory in nature). ***Nessorhamphus*** **has a long, somewhat flattened snout, with the posterior nostril located far forward**; it lacks dermal ridges, and its neck is not constricted. Derichthyids are without the strong morphological specializations of the other midwater eels (the Nemichthyidae, Serrivomeridae, and Saccopharyngiformes).

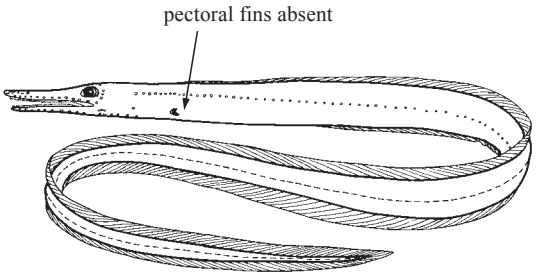
Similar families occurring in the area

Congridae: *Derichthys* is most likely to be confused with members of the Congridae, although the latter are not midwater eels and and are unlikely to be collected with it. *Derichthys* may be readily distinguished by the constricted neck, the short, longitudinal dermal ridges on the head, and the dorsal and and anal fins reduced near the end of the tail. Congrids do not have a constricted neck, lack ridges on the head, and the dorsal and anal fins are not reduced near the end of the tail.

Nettastomatidae: *Nessorhamphus* is most likely to be confused with certain members of the Nettastomatidae. All nettastomatids lack pectoral fins, however, except *Hoplunnis*, which is distinguished by the enlarged, fang-like teeth on the vomer. The posterior nostril in nettastomatids is highly variable in position, but it is never located nearer to the anterior nostril than to the eye.



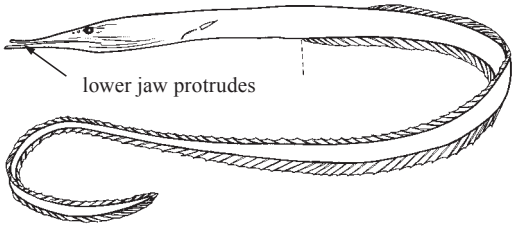
Congridae



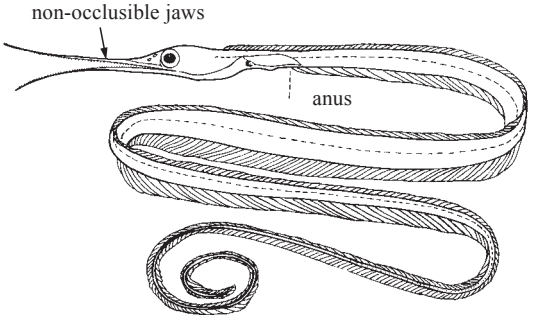
Nettastomatidae

Serrivomeridae: jaws equal or lower jaw protrudes; snout not spatulate; both nostrils near eye.

Nemichthyidae: jaws elongate and non-occlusible except in mature males; anus under or shortly behind pectoral fin.



Serrivomeridae



Nemichthyidae

Key to the genera and species of Derichthyidae occurring in the area

1a. Snout and lower jaw short, snout approximately equal to eye diameter; tip of snout not produced and spatulate, extends beyond lower jaw by a distance less than eye diameter (Fig. 1) . . . . . ***Derichthys serpentinus***

1b. Snout and lower jaw long, 3 to 6 times eye diameter; tip of snout produced and spatulate, extends beyond lower jaw by a distance equal to or greater than eye diameter (Fig. 2) . . . . . → ***2***

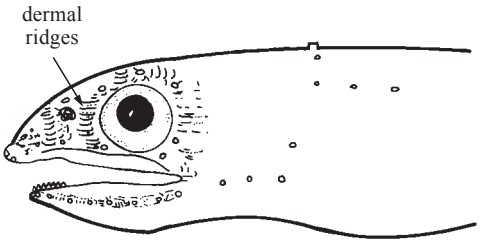


Fig. 1 ***Derichthys serpentinus***

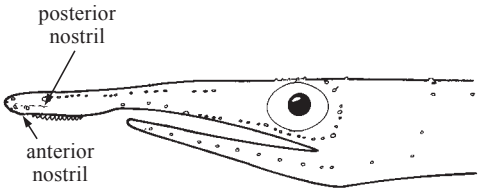


Fig 2 ***Nessorhamphus***

2a. Snout shorter, 3 to 4 times pigmented eye diameter; a dark streak running along midventral line (Fig. 3) . . . . . ***Nessorhamphus danae***

2b. Snout longer, about 6 times pigmented eye diameter; midventral line without a dark streak (Fig. 4) . . . . . ***Nessorhamphus ingolfianus***

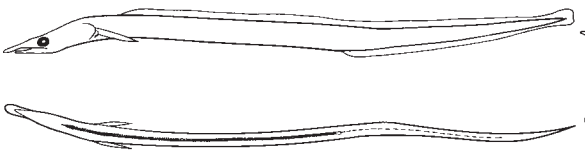


Fig. 3

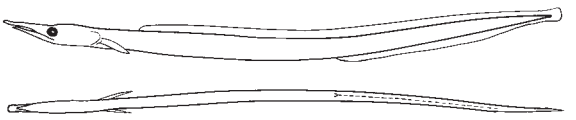


Fig. 4

List of species occurring in the area

Derichthys serpentinus Gill, 1864. To 35 cm. Worldwide.

Nessorhamphus danae Schmidt, 1931. To at least 29 cm. Equatorial Atlantic and Indo-Pacific.

Nessorhamphus ingolfianus (Schmidt, 1912). To 60 cm. Worldwide but antitropical; not known from Gulf of Mexico or Caribbean.

Reference

Robins, C.H. 1989. Family Derichthyidae. In Fishes of the Western North Atlantic. *Mem. Sears Found. Mar. Res.*, 1(9):420-431.

MURAENESOCIDAE

Pike congers

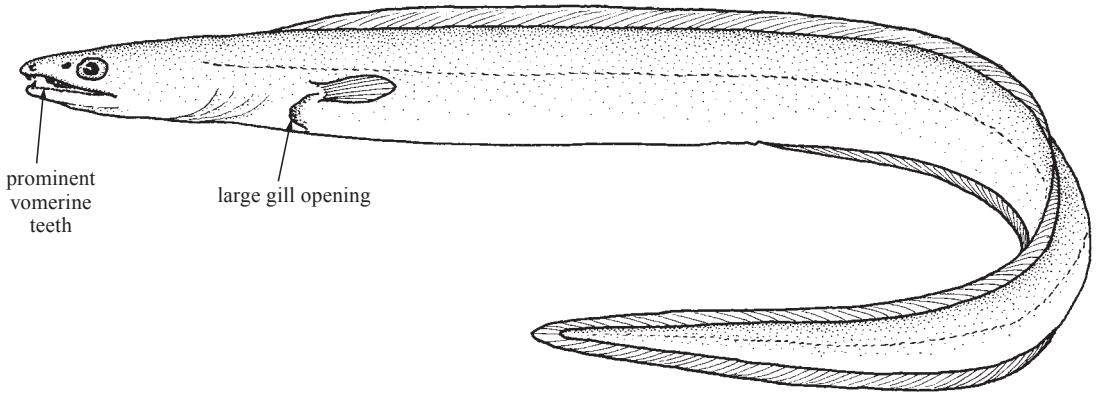
by D.G. Smith, National Museum of Natural History, Washington, D.C., USA

A single species occurring in the area.

Cynoponticus savanna (Bancroft, 1831) GPC

Frequent synonyms / misidentifications: *Muraenesox savanna* (Bancroft, 1831) / None.

FAO common names: En - Guayana pike-conger; **Fr** - Morénésoce coungré; **Sp** - Morenocio guayanés.



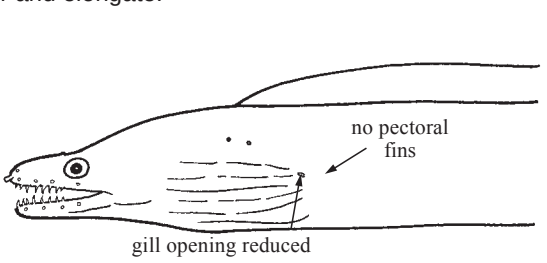
Diagnostic characters: Body moderately elongate, more or less cylindrical in front, compressed along tail. Head moderate. **Eye well developed**. Snout moderate, projects somewhat beyond tip of lower jaw. Anterior nostril tubular, on side of snout just behind tip; posterior nostril a simple opening in front of eye at approximately mideye level. Mouth large, gape ends just behind posterior margin of eye; lips without fleshy flanges. **Teeth large, prominent, sharp; multiserial on jaws; typically in 3 rows on vomer, with a median row of enlarged, compressed canines flanked on each side by a row of much smaller teeth; tip of lower jaw with its enlarged teeth fits into a notch in underside of snout when mouth closed; teeth concealed when mouth closed**. Gill opening a large, oblique slit in front of and below pectoral fin; **gill openings of the 2 sides nearly meet on ventral midline, interspace much smaller than length of gill opening**. Dorsal and anal fins well developed, confluent around tail; dorsal fin begins over or slightly ahead of pectoral-fin base. Pectoral fins well developed. Scales absent. **Lateral line complete, but opening through a complex or branching system of multiple pores rather than a single pore per segment; pores on head not apparent**. **Colour:** dark grey-black above, lighter below; pectoral fin black; dorsal and anal fins with a narrow, black edge.

Similar families occurring in the area

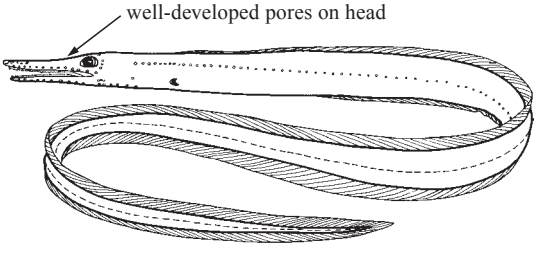
Few other eels have such greatly enlarged fangs on the roof of the mouth. Those that do are distinguished as follows:

Muraenidae: pectoral fins absent; gill opening reduced to a small pore; discrete pores on head.

Nettastomatidae (*Hoplunnis*): well-developed pores on head; vomerine fangs conical rather than compressed; lips reduced, maxillary and mandibular teeth exposed when mouth closed; body and head more slender and elongate.



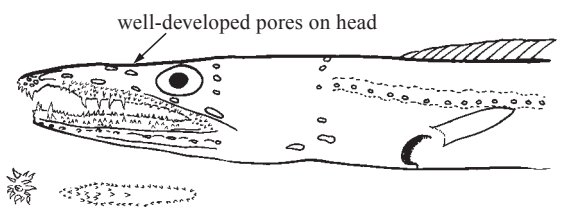
Muraenidae



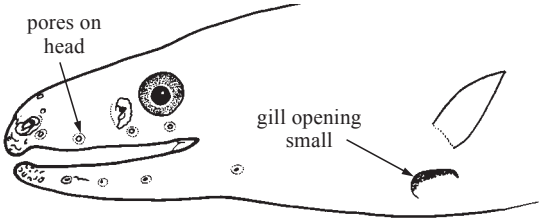
Nettastomatidae

Congridae: *Xenomystax* has some enlarged vomerine teeth, but none as massive and compressed as those of *Cynoponticus*; in addition, *Xenomystax* has well-developed pores on head, and teeth exposed when mouth closed. Other congrid species may resemble *Cynoponticus* superficially, but none has such enlarged vomerine fangs.

Synaphobranchidae (Ilyophinae): gill opening small, less than interbranchial space; pectoral fin small, less than snout length (greater than snout length in *Cynoponticus savanna*); pores on head.



Congridae

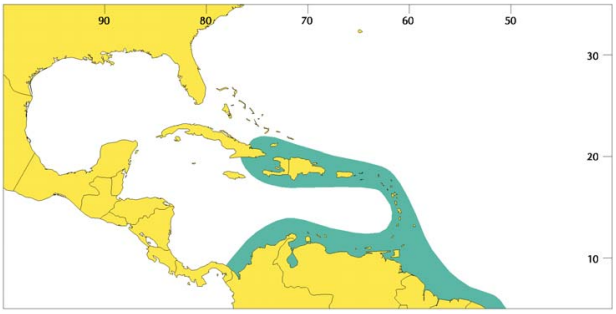


Synaphobranchidae

Size: Maximum size 200 cm, common to 50 cm.

Habitat, biology, and fisheries: Little information is available on the biology of this species. It lives on soft bottoms on continental and insular shelf, generally in less than 100 m depth, feeding on benthic invertebrates and fishes. Taken on bottom longlines and handlines at night, also in trawls, marketed mostly fresh. Separate statistics are not reported.

Distribution: Caribbean islands and coast of Central and South America to southern Brazil.



Reference

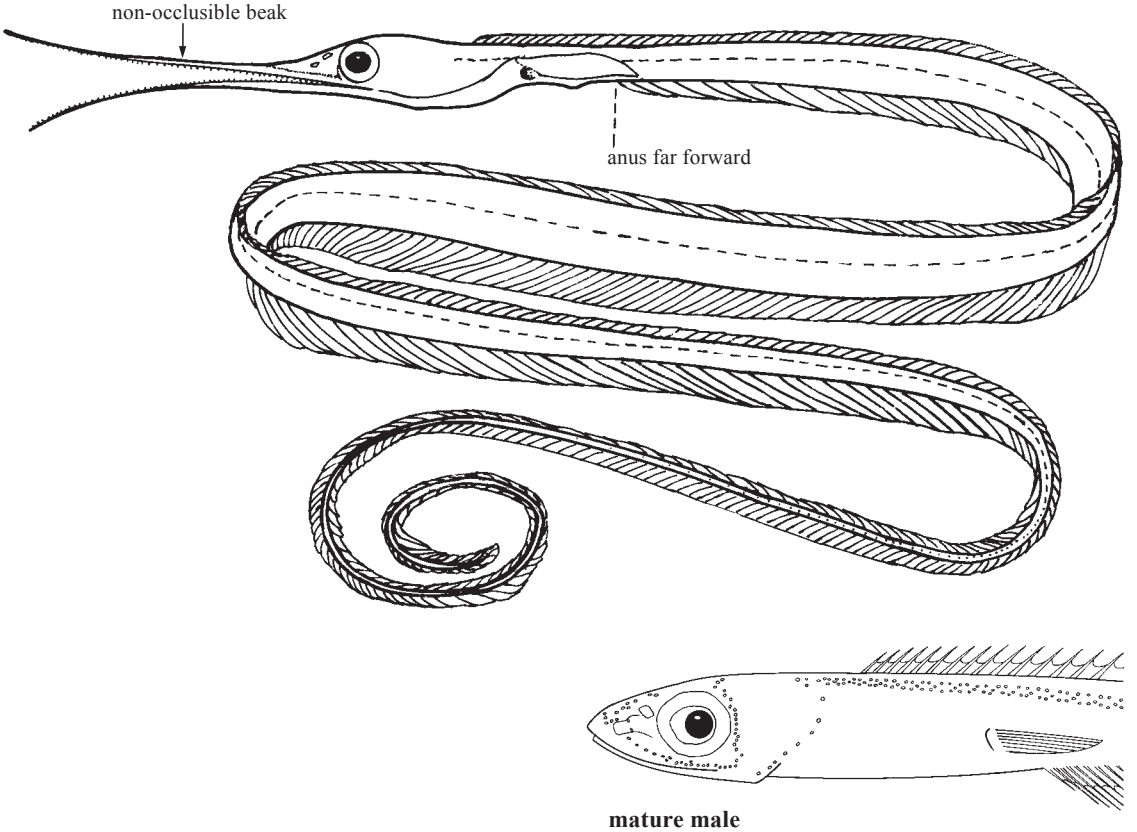
Smith, D.G. 1989. Family Muraenesocidae. In Fishes of the Western North Atlantic, edited by E. B. Böhlke. *Mem. Sears Found. Mar. Res.*, 1(9):432-440.

NEMICHTHYIDAE

Snipe eels

by D.G. Smith, National Museum of Natural History, Washington, D.C., USA

Diagnostic characters: Maximum size approximately 1 m, but much of this consists of the attenuated caudal region. **Body elongate to very elongate**, moderately to strongly compressed; tail moderately attenuate with a small caudal fin, or greatly attenuate and filiform; **anus far forward, either under pectoral fin or less than 1 head length behind it**. Eye well developed. **Jaws and snout produced into a long, non-occlusible beak in females and immatures**, short in mature males; cleft of mouth ends under or slightly behind eye. Teeth small with recurved tips, close-set in diagonal rows. Anterior and posterior nostrils located on side of head, just in front of eye; anterior nostril without a tube in females and immatures, strongly tubular and forwardly directed in mature males. Gill opening crescentic, located in front of and below pectoral fin. Dorsal and anal fins long and confluent with caudal fin when latter is present, **anal fin higher than dorsal fin; dorsal fin begins over or slightly in front of pectoral fin; anal fin begins just behind anus; pectoral fin present**. Scales absent. Lateral line complete, either as a single row of pores or 3 parallel rows of pores; pores on head well developed. **Colour:** variable, may be uniform dark or light brown, reverse countershaded (dark below and light above), completely pale, with or without internal dark bars, and with or without a patch of dark pigment spots below stomach.



mature male

Habitat, biology, and fisheries: Nemichthyids live in the midwaters of the world's oceans; adults are found at depths of several hundred to more than 2 000 m. They appear to feed mainly on shrimps and are capable of eating relatively large prey. Mature males lose the characteristic elongated beak along with most of the teeth; the olfactory organs enlarge, and the anterior nostrils become tubular. These degenerative changes suggest that the eels die after spawning. Snipe eels are seldom seen and are of no importance to fisheries.

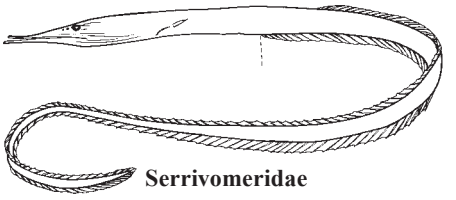
Similar families occurring in the area

Cyematidae: have jaws produced into a similar non-occlusible beak, but they have a short, stubby body and small eyes.

Serrivomeridae: have prolonged jaws that are fully occlusible; dorsal fin begins over or behind the anus; in nemichthyids, dorsal fin always begins in front of anus; anus located well behind the head, at about the first third or first quarter of total length.



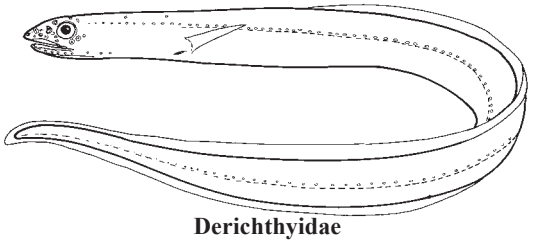
Cyematidae



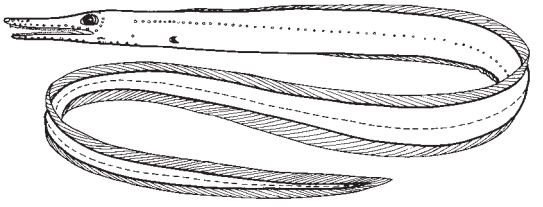
Serrivomeridae

Derichthyidae: jaws are occlusible, dorsal fin begins behind the pectoral fin, and anus is located far behind pectoral fin, near midbody.

Nettastomatidae: have long jaws that are fully occlusible; anus is located well behind pectoral fin.



Derichthyidae



Nettastomatidae

Key to the species of Nemichthyidae occurring in the area

1a. Caudal region extremely elongated and thread-like (Fig. 1), a distinct caudal fin absent; 3 rows of pores in lateral line (Fig. 2); no dermal ridges on head . . . . . → *2*

1b. Caudal region not thread-like (Fig. 3), a small caudal fin present; 1 row of pores in lateral line (Fig. 4); small, longitudinal dermal ridges on head (Fig. 5) . . . . . → *3*



Fig. 1 caudal region

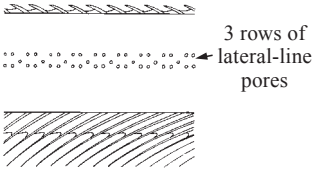


Fig. 2 lateral view of body



Fig. 3 caudal region

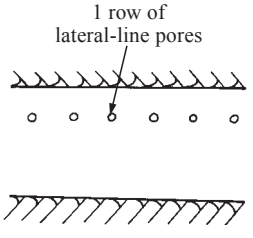


Fig. 4 lateral view of body

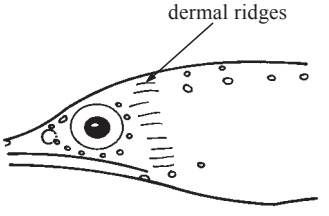


Fig. 5 lateral view of head

2a. Body dark brown or countershaded (Fig. 6); postorbital pores 6 to 17, usually more than 10, arranged in a staggered row; preopercular pores 6 to 13 . . . . . ***Nemichthys scolopaceus***

2b. Body pale with a cluster of black spots below stomach and dark subcutaneous vertical bars between vertebrae (Fig. 7); postorbital pores 5 to 14, usually fewer than 10, arranged in an even row; preopercular pores 2 to 6 . . . . . ***Nemichthys curvirostris***



Fig. 6 ***Nemichthys scolopaceus***

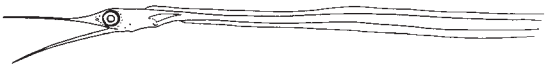


Fig. 7 ***Nemichthys curvirostris***

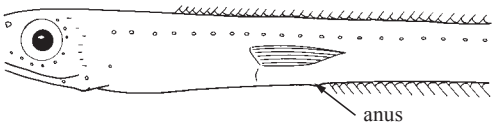


Fig. 8 lateral view of anterior body (*L. carinatus*)

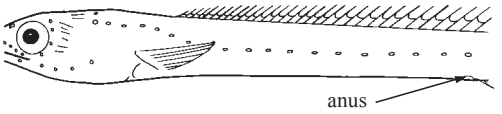


Fig. 9 lateral view of anterior body (*A. infans*)

3a. Anus located under pectoral fin (Fig. 8) . . . . . ***Labichthys carinatus***

3b. Anus located behind pectoral fin (Fig. 9) . . . . . ***Avocettina infans***

List of species occurring in the area

Avocettina infans (Günther, 1878). To about 80 cm. Worldwide, mostly N hemisphere.

Labichthys carinatus Gill and Ryder, 1883. To about 80 cm. E and W Atlantic, Indian Ocean, and central Pacific.

Nemichthys curvirostris (Strömman, 1896). To 1 m or more. E and W Atlantic, including Gulf of Mexico but not Caribbean; also Indian Ocean and S Pacific.

Nemichthys scolopaceus Richardson, 1848. To 1 m or more. Worldwide from about 55° N to 45° S.

Reference

Smith, D.G. and J.G. Nielsen. 1989. Family Nemichthyidae. In Fishes of the Western North Atlantic, edited by E.B.Böhlke. *Mem. Sears Found. Mar. Res.*, 1(9):441-459.

CONGRIDAE

Conger eels

by D.G. Smith, National Museum of Natural History, Washington, D.C., USA

Diagnostic characters: Medium-sized to large eels, most growing to 0.5 m, a few species to 2 m total length. Body moderately elongate to extremely elongate, round in cross-section anteriorly, compressed posteriorly; anus usually located at anterior 1/2 to 1/3 of total length; tail variable, from blunt and stiffened to long and slender. **Eye well developed, sometimes very large**. Snout variable, from long and pointed to short and pug-nosed; tip of snout usually extends at least slightly beyond tip of lower jaw, except in Heterocongrinae, where lower jaw protrudes. Anterior nostril tubular, near tip of snout; **posterior nostril usually located on side of head in front of eye**. Mouth variable, gape usually ending at some point beneath eye; in most species tip of lower jaw fits into space behind intermaxillary tooth patch; flanges on upper and lower lip present or absent. Teeth variable, from small and granular to long and fang-like; in many species, intermaxillary teeth exposed when mouth closed. Branchiostegal rays long but not overlapping ventrally, moderate in number, usually about 8 to 12. Gill opening a crescentic slit, just in front of pectoral fin. **Dorsal and anal fins always present, confluent around tail**; dorsal fin begins over or slightly behind pectoral fin, always closer to pectoral fin than to anus; caudal fin sometimes reduced, but some rays almost always present; pectoral fin usually present, well developed in most species, but reduced or absent in heterocongrines. Scales absent. Lateral line complete. **Colour:** most species plain brown or grey, pale ventrally, vertical fins often edged in black.



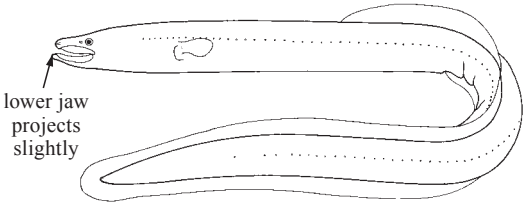
Habitat, biology, and fisheries: Congers are medium-sized to large eels found in tropical to temperate seas worldwide; a few species can reach 2 to 3 m in total length, but most are much smaller. They occur primarily on sand or mud bottoms from the coastline to depths of 2 000 m or more; most species live on the shelf or slope. Many burrow during the day and actively forage at night. The Heterocongrinae are the most distinct of the congrids, and among the few that show conspicuous morphological specializations. These are the so-called garden eels, which live in burrows in coral sand and project the front portion of the body from the burrow to feed on zooplankton. The remainder of the family are bottom dwellers that feed on a variety of fishes and invertebrates. Some species of *Conger* and a few *Ariosoma* are found in the commercial fishery, but on the whole they are of little importance and separate statistics are not available. They are caught by trawls, traps, and by hook-and-line, and are marketed mostly fresh. Because of their diversity and abundance, congrids probably play a more important role in the ecology of the area than their relatively minor position in the fishery would indicate.

Remarks: The genus *Coloconger* has in the past been included in the Congridae. It is here considered to represent a distinct family and is treated under the Colocongridae. The genus *Xenomystax* has been placed in the Muraenesocidae but is here considered to be a congrid.

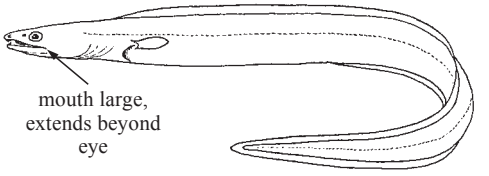
Similar families occurring in the area

Anguillidae: body covered with tiny embedded scales (scaleless in Congridae); lower jaw projecting slightly; dorsal fin begins about midway between pectoral fins and anus or over anus (always above or before pectoral tips in Congridae).

Muraenesocidae: mouth very large, extending to beyond eye (mouth in Congridae barely reaches rear margin of eye); vomerine teeth prominant, fang-like (relatively small in Congridae); gill openings nearly meet each other across ventral midline.



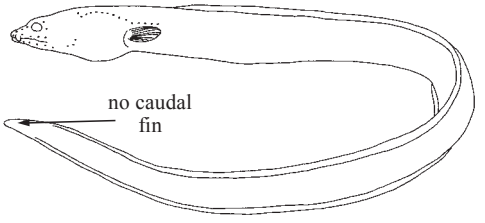
Anguillidae



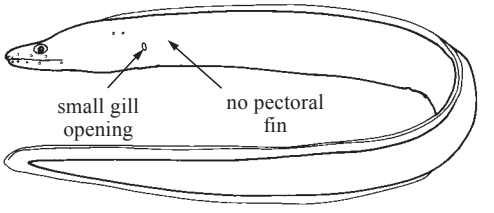
Muraenesocidae

Ophichthidae: in most genera no caudal fin but tip a hard, burrowing point (caudal fin present in most Congridae); posterior nostril usually inside mouth or in some way penetrating upper lip (a simple aperture in Congridae); throat swollen, supported by many branchiostegal rays overlapping in midline; a median frontal pore on head (no such pore in Congridae, although there is a median supratemporal pore).

Muraenidae: no pectoral fins (always present in Congridae); gill opening a small hole (a vertical slit in Congridae); teeth fang-like or molar-like (small and conical in Congridae); typically brightly banded, spotted or mottled.

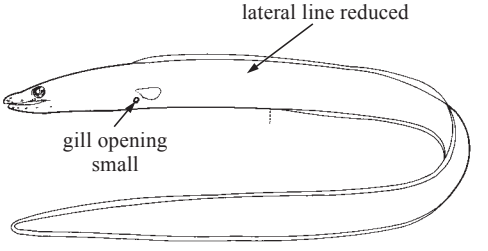


Ophichthidae



Muraenidae

Chlopsidae: gill opening a small hole; vomerine teeth in 2 divergent rows (a single or several parallel rows in Congridae); lateral line system reduced (prominent in Congridae); posterior nostril low on snout or flap-like; pectoral fins present or absent.



Chlopsidae

Key to the species of Congridae occurring in the area

Note: In some congrids the tip of the tail is frequently lost through injury. This can affect proportional measurements and give unnaturally high values for any proportion based on total length. The key below assumes that the specimen is intact.

1a. Body extremely elongate; mouth very oblique; snout length very short, much less than diameter of eye, anterior nostril enclosed in flange of upper lip (Fig. 1); pectoral fin reduced; caudal fin reduced or absent externally . . . . . **(Heterocongrinae)** → *2*

1b. Body moderately elongate; mouth horizontal or slightly oblique; snout length only slightly less than, to somewhat greater than diameter of eye; anterior nostrils free; pectoral fin well developed; caudal fin present though sometimes reduced . . . . . → *3*

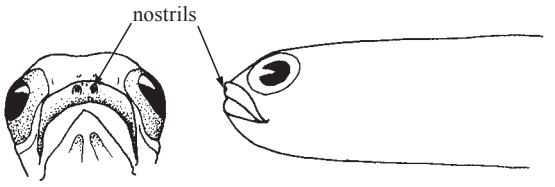


Fig. 1 anterior and lateral view of head

2a. Brown anteriorly, grading into pale yellow posteriorly; vertebrae 158 to 168; Caribbean and Bahamas . . . . . ***Heteroconger longissimus***

2b. Yellow anteriorly; vertebrae 139 to 148; Gulf of Mexico and east coast of Florida . . . . . ***Heteroconger luteolus***

3a. Preanal length usually greater than 40% total length; caudal fin short and tip of tail stiff; posterior nostril below mideye level; dorsal- and anal-fin rays unsegmented; flange present on upper lip . . . . . **(Bathymyrinae)** → *4*

3b. Preanal length usually less than 40% total length; posterior nostril at or above mideye level; dorsal- and anal-fin rays segmented; flange on upper lip present or absent . . . . **(Congrinae)** → *10*

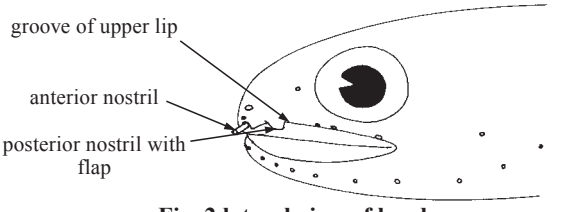


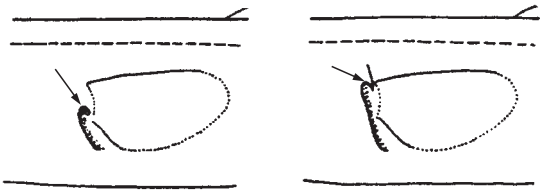
Fig. 2 lateral view of head

4a. Posterior nostril covered by a flap (Fig. 2) . . . . ***Parabathymyrus oregoni***

4b. Posterior nostril exposed . . . . . → *5*

5a. Upper end of gill opening at middle of pectoral-fin base (Fig. 3a); jaw teeth in bands . . . . . → *6*

5b. Upper end of gill opening at or above upper end of pectoral-fin base (Fig. 3b); jaw teeth in 1 or 2 series, forming a cutting edge . . . . . → *9*



a) ***Ariosoma*** **b)** ***Paraconger***

Fig. 3 gill opening

6a. Three supratemporal pores; interorbital pores present (Fig. 4); 3 postorbital pores . . . . . ***Ariosoma balearicum***

6b. Supratemporal and interorbital pores absent; 0 to 2 postorbital pores . . . . . → *7*

7a. Two postorbital pores; distance between upper and lower end of each gill opening greater than distance between the right and left gill openings, measured across isthmus . . . . . ***Ariosoma selenops***

7b. Postorbital pores absent; distance between upper and lower end of each gill opening less than distance between the right and left gill openings, measured across isthmus . . . . . → *8*

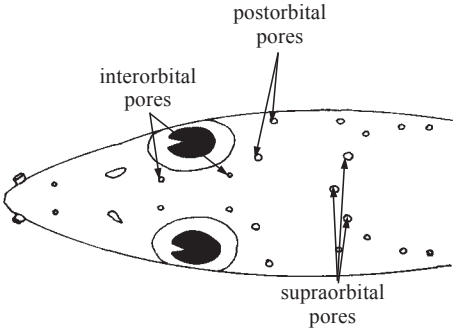


Fig. 4 dorsal view of head

8a. Preanal length 43 to 45% total length; preanal lateral-line pores 47 to 53 . . . . . ***Ariosoma coquettei***

8b. Preanal length 49 to 52% total length; preanal lateral-line pores 55 to 59 . . . . . ***Ariosoma anale***

9a. Preanal lateral-line pores 40 to 43; postorbital pores present; Caribbean, Bahamas, and Gulf of Mexico . . . . . ***Paraconger caudilimbatus***

9b. Preanal lateral-line pores 31 to 36; postorbital pores absent; Guianas and Brazil . . . . . ***Paraconger guianensis***

10a. Inner row of maxillary and mandibular teeth separated from outer rows by an edentulous groove, maxillary and mandibular teeth exposed when mouth closed (Fig. 5) . . . . → *11*

10b. Inner row of maxillary and mandibular teeth not separated from outer rows by an edentulous groove; maxillary and mandibular teeth concealed when mouth closed . . . . . → *13*

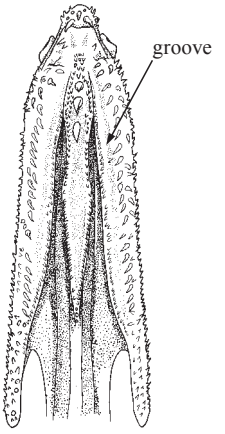


Fig. 5 ventral view of snout and roof of mouth

11a. Posterior nostril between 1/2 and 1 eye diameter or 2 nostril diameters in front of anterior margin of eye . . . . . ***Xenomystax austrinus***

11b. Posterior nostril less than 1/2 eye diameter or 1 nostril diameter in front of anterior margin of eye . . . . . → *12*

12a. Intermaxillary tooth patch longer than broad; dorsal fin begins over or slightly behind base of pectoral fin; stomach and intestine pale . . . . . ***Xenomystax bidentatus***

12b. Intermaxillary tooth patch as broad as long; dorsal fin begins before base of pectoral fin; stomach and intestine black . . . . . ***Xenomystax congroides***

13a. Maxillary and mandibular teeth in 1 or 2 rows, the outer row forming a cutting edge; upper labial flange well developed (Fig. 6) . . . . . → *14*

13b. Maxillary and mandibular teeth in bands or in 2 rows, not forming a cutting edge; upper labial flange reduced or absent . . . . . → *16*

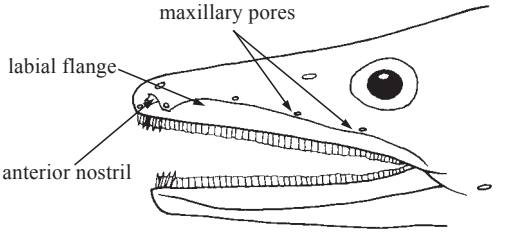


Fig. 6 lateral view of head

14a. Three supratemporal pores; 1 ro 2 postorbital pores; Caribbean, Bahamas, Bermuda . . . . . ***Conger triporiceps***

14b. One supratemporal pore; no postorbital pores . . . . . → ***15***

15a. Preanal lateral-line pores 32 to 36; vertebrae 132 to 137; Caribbean and Bermuda . . . . . ***Conger esculentus***

15b. Preanal lateral-line pores 37 to 44; vertebrae 143 to 147; mainland North America . ***Conger oceanicus***

16a. Tip of tail slightly stiffened and caudal fin somewhat reduced; a narrow upper labial flange present . . . . . → ***17***

16b. Tip of tail soft and flexible, caudal fin not reduced; upper labial flange rudimentary or absent . . . . . → ***19***

17a. Second and approximately seventh to thirteenth lateral-line pores elevated, opening from dorsal side of canal (Fig. 7); stomach black . . . . . ***Gnathophis bathytopos***

17b. Only second and at most 1 other lateral-line pore elevated; stomach pale . . . . → ***18***

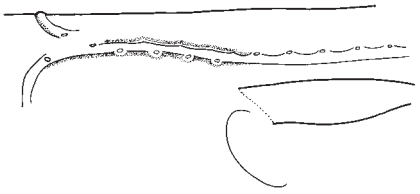


Fig. 7 lateral line pores

18a. Three postorbital pores; 26 to 31 preanal lateral-line pores . . . . . ***Gnathophis bracheatopos***

18b. Two postorbital pores; 34 to 36 preanal lateral-line pores . . . . . ***Gnathophis tritos***

19a. Vomerine teeth in a single row, reaching level of posterior end of maxillary tooth patch (Fig. 8) . . . . . ***Uroconger syringinus***

19b. Vomerine teeth in 2 or more rows, at least anteriorly, ending before posterior end of maxillary tooth patch . . . . . → ***20***

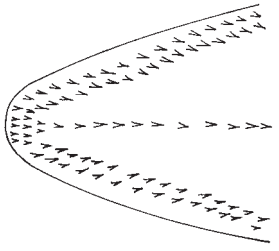


Fig. 8 teeth

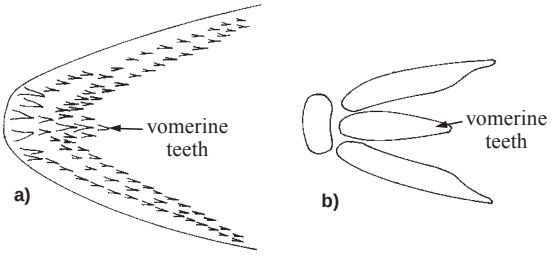


Fig. 9 tooth patches on roof of mouth

20a. Vomerine tooth patch either with a few enlarged teeth or, if teeth granular, patch ends less than halfway to posterior end of maxillary tooth patch (Fig. 9a) . . . . . → ***21***

20b. Vomerine teeth in a more or less broad patch, reaching at least halfway to posterior end of maxillary tooth patch (Fig. 9b) . . . . . → ***29***

21a. Teeth small; vomerine tooth patch round or slightly elongate; rudimentary upper labial flange present; pores along upper jaw small (Fig. 10a) . . . . . → *22*

21b. Vomerine tooth patch with some enlarged teeth, sometimes forming a short row posteriorly; upper labial flange absent; pores along upper jaw enlarged (Fig. 10b) . . . . . → *24*

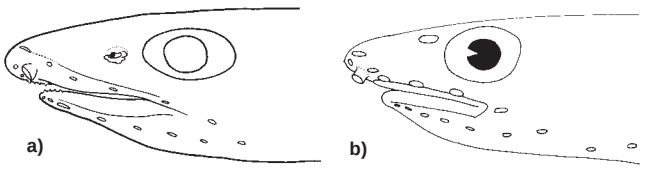


Fig. 10 lateral view of head

22a. A pore present in supraorbital canal between anterior and posterior nostril (Fig. 11) . . . . . *Rhynchoconger gracilior*

22b. No supraorbital pore between anterior and posterior nostril . . . . . → *23*

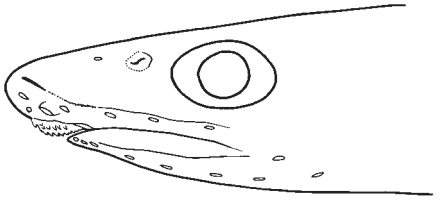
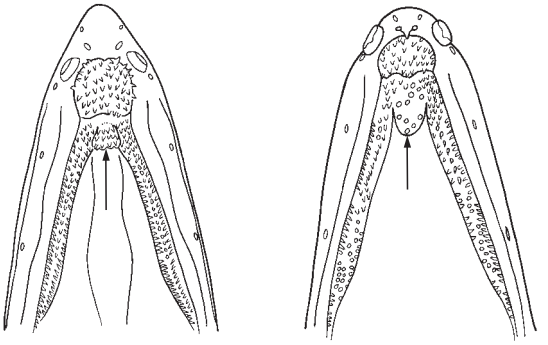


Fig. 11 lateral view of head



a) ***Rhynchoconger flavus*** **b)** ***Rhynchoconger guppyi***

Fig. 12 ventral view of snout and roof of mouth

23a. Vomerine tooth patch as broad as long (Fig. 12a); stomach pale . . . . . *Rhynchoconger flavus*

23b. Vomerine tooth patch slightly longer than broad (Fig. 12b); stomach black . . *Rhynchoconger guppyi*

24a. Upper jaw projecting beyond lower; teeth moderately large, but not fang-like (Fig. 13a) . . . . . → *25*

24b. Jaws nearly equal; anterior teeth very strong, fang-like (Fig. 13b) . . . . . *Bathyuroconger vicinus*

25a. Posterior nostril at mideye level (Fig. 14a) . . . . . *Bathycongrus dubius*

25b. Posterior nostril opposite upper margin of eye (Fig. 14b) . . . . . → *26*

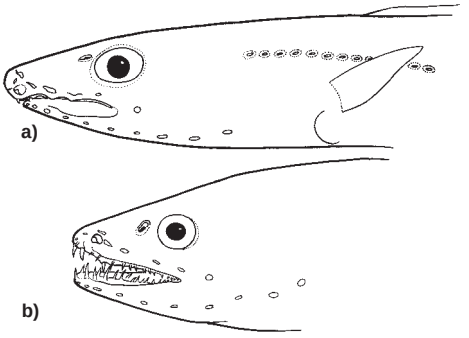


Fig. 13 lateral view of head

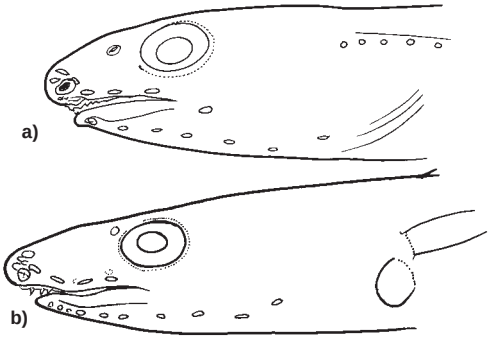


Fig. 14 lateral view of head

26a. Preanal lateral-line pores fewer than 40 . . . . . → *27*
26b. Preanal pores more than 40 . . . . . → *28*

27a. Preanal lateral-line pores about 26 to 29 . . . . . *Bathycongrus thysanochila*
27b. Preanal lateral-line pores 33 to 38. . . . . *Bathycongrus vicinalis*

28a. One supratemporal pore; postorbital pores absent. . . . . *Bathycongrus bullisi*
28b. Three supratemporal pores; postorbital pores present . . . . . *Bathycongrus polyporus*

29a. Intermaxillary tooth patch separated from maxillary and vomerine teeth by a distinct gap (Fig. 15a); supratemporal pores present; dorsal fin begins before pectoral-fin base (Fig. 16a)
. . . . . *Japonoconger caribbeus*

29b. Intermaxillary tooth patch confluent with maxillary and vomerine teeth (Fig. 15b); supratemporal pores absent; dorsal fin begins behind pectoral-fin base (Fig. 16b) . . . . . → *30*

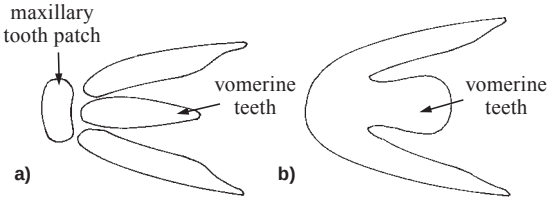
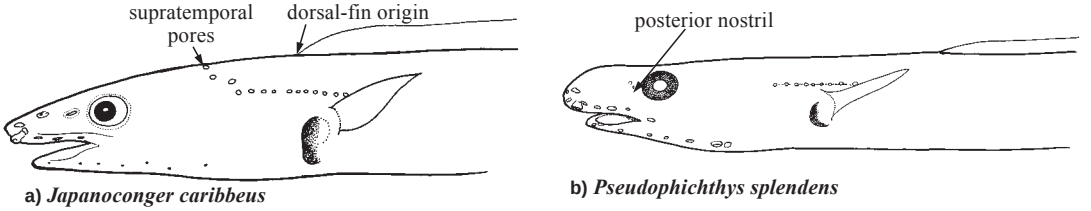


Fig. 15 tooth patches on roof of mouth



a) ***Japanoconger caribbeus*** **b)** ***Pseudophichthys splendens***

Fig. 16 lateral view of head

30a. Posterior nostril at mideye level (Fig. 16b)
. . . . . *Pseudophichthys splendens*

30b. Posterior nostril opposite upper margin of eye (Fig. 17) . . . . . → *31*

31a. Vertebrae 159 to 164 . . . . *Acromycter perturbator*
31b. Vertebrae 167 to 171. . . . . *Acromycter atlanticus*

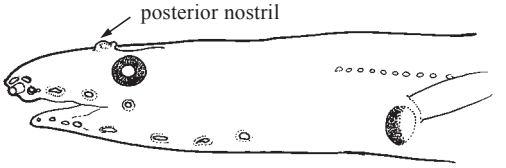


Fig. 17 lateral view of head

List of species occurring in the area

Subfamily Heterocongrinae

Heteroconger longissimus Günther, 1870. To about 50 cm TL. Caribbean and Bahamas, also E tropical Atlantic. (Formerly treated as *Nystactichthys halis*).

Heteroconger luteolus Smith, 1989. Maximum size uncertain, probably similar to *H. longissimus*. Gulf of Mexico and E coast of Florida.

Subfamily Bathymyrinae

Ariosoma anale (Poey, 1860). To 35 to 40 cm TL. Florida to Guianas, also Gulf of Guinea.

Ariosoma balearicum (Delaroche, 1809). To 35 cm TL. Cape Hatteras to N Brazil, also E tropical Atlantic and Mediterranean.

Ariosoma coquettei Smith and Kanazawa, 1977. To around 30 cm TL. Guianas.

Ariosoma selenops Reid, 1934. To 55 cm TL. Florida to Guianas.

Parabathymyrus oregoni Smith and Kanazawa, 1977. To 35 cm TL. Gulf of Mexico to Guianas.

Paraconger caudilimbatus (Poey, 1867). To 50 cm TL. Gulf of Mexico, Bermuda, Bahamas, and Caribbean.
Paraconger guianensis Kanazawa, 1961. To 50 cm TL. Guianas and N Brazil.

Subfamily Congrinae

Acromycter atlanticus Smith, 1989. To 30 cm TL. Florida and Caribbean.
Acromycter perturbator (Parr, 1932). To 30 cm TL. Mid-Atlantic Bight to Caribbean.

Bathycongrus bullisi (Smith and Kanazawa, 1977). To 60 cm TL. Continental margin from N Gulf of Mexico to Brazil.
Bathycongrus dubius (Breder, 1927). To 45 cm TL. Georgia and N Gulf of Mexico to Guianas.
Bathycongrus polyporus (Smith and Kanazawa, 1977). To 42 cm TL. Bahamas and Cuba.
Bathycongrus thysanochilus (Reid, 1934). To 30 cm TL. Bahamas and Caribbean.
Bathycongrus vicinalis (Garman, 1899). To 47 cm TL. Gulf of Mexico to Brazil.

Bathyuroconger vicinus (Vaillant, 1888). To 90 cm TL. Gulf of Mexico to Guianas; also E tropical Atlantic and Indo-West Pacific.

Conger esculentus Poey, 1861. To 160 cm TL. Bermuda and Greater Antilles.
Conger oceanicus (Mitchill, 1818). To 2 m. Cape Cod to Florida and Gulf of Mexico.
Conger triporiceps Kanazawa, 1958. To 1 m TL. Bermuda, Bahamas, and Caribbean.

Gnathophis bathytopos Smith and Kanazawa, 1977. To 35 to 40 cm TL. Cape Hatteras to Yucatan.
Gnathophis bracheatopos Smith and Kanazawa, 1977. To 35 cm TL. North Carolina to E Gulf of Mexico.
Gnathophis tritos Smith and Kanazawa, 1977. To 20 cm TL. Bahamas and Cuba.

Japonoconger caribbeus Smith and Kanazawa, 1977. To 50 cm TL. S Caribbean.

Pseudophichthys splendens (Lea, 1913). To 40 cm TL. Florida to Guianas; also E Atlantic.

Rhynchoconger flavus (Goode and Bean, 1896). To 2 m TL. Gulf of Mexico to Brazil.
Rhynchoconger gracilior (Ginsburg, 1951). To 50 cm TL, possibly greater. E Gulf of Mexico and South Carolina to Guianas.
Rhynchoconger guppyi (Norman, 1925). To 1 m TL. Caribbean.

Uroconger syringinus Ginsburg, 1954. To 40 cm TL. Florida and N Gulf of Mexico to Guianas.

Xenomystax austrinus Smith and Kanazawa, 1989. To 1 m TL. Caribbean.
Xenomystax bidentatus (Reid, 1940). To 55 cm TL. Straits of Florida and Caribbean.
Xenomystax congroides Smith and Kanazawa, 1989. To 90 cm TL. Gulf of Mexico and Bahamas to Brazil; also E tropical Atlantic.

Reference

Smith, D.G. 1989. Family Congridae. In Fishes of the Western North Atlantic, edited by E.B. Böhlke. *Mem. Sears Found. Mar. Res.*, 1(9):460-567.

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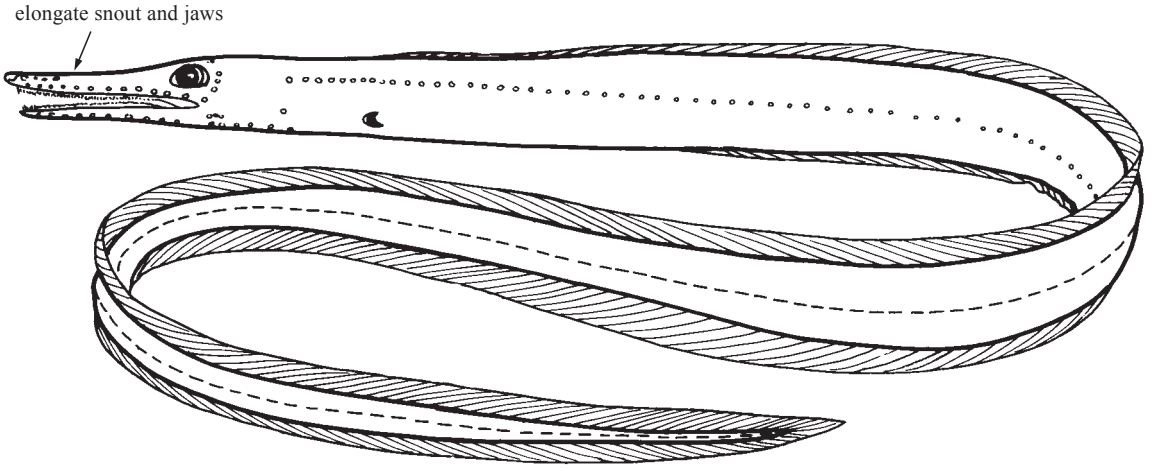
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NETTASTOMATIDAE

Duckbill eels

by D.G. Smith, National Museum of Natural History, Washington, D.C., USA

Diagnostic characters: Maximum size approximately 1 m, usually smaller. **Body elongate**, anus before midlength; **tail slender, attenuate**, often broken and regenerated. **Head slender, snout and jaws elongate, snout projecting a variable distance beyond tip of lower jaw**. Eye well developed. **Mouth large, gape extending to about rear margin of eye; no fleshy flange on upper or lower lip; some teeth exposed when mouth closed**; tip of lower jaw fits into depression behind intermaxillary tooth patch. Teeth on jaws and vomer generally small, conical, multiserial, except in *Hoplunnis*, which has enlarged vomerine fangs. Dorsal and anal fins present, confluent with caudal fin; dorsal fin begins over or slightly behind gill opening. Pectoral fin present or absent. Scales absent. Lateral line complete. **Colour:** brown, lighter ventrally, without markings; dorsal and anal fins often edged in black, especially posteriorly.



Habitat, biology, and fisheries: Nettastomatids live on or near the bottom in moderate to deep water. Although they are occasionally taken in trawls, they have no commercial value.

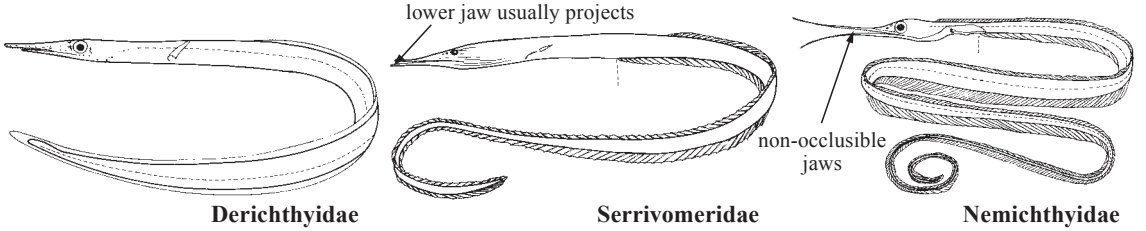
Similar families occurring in the area

The elongate body and head and the attenuate tail distinguish the Nettastomatidae from all but a few other eels.

Derichthyidae (*Nessorhamphus*): the jaws are elongate, but the snout is depressed and spatulate, and the posterior nostril is near the tip of the snout.

Serrivomeridae: have elongate, slender jaws, but the lower jaw usually projects beyond the upper. Most species have enlarged teeth on the vomer, but these are arranged alternately in a double row, resulting in a saw-like appearance, quite different from the separated fangs present on some nettastomatids (*Hoplunnis*). In serrivomerids, the anterior and posterior nostrils are located close together, immediately in front of the eye. Serrivomerids are pelagic in habit, unlike the benthic nettastomatids.

Nemichthyidae: have an elongate snout, but the upper and lower jaws diverge and are non-occlusible.



Key to the species of Nettastomatidae occurring in the area

1a. Pectoral fin present . . . . . → *2*

1b. Pectoral fin absent . . . . . → *6*

2a. Lateral-line pores before anus more than 50; total length often greater than 600 mm . . . . . ***Hoplunnis megista***

2b. Lateral-line pores before anus fewer than 50; total length less than 600 mm . . . . . → *3*

3a. Pterygoid teeth present except in very young individuals; lateral vomerine teeth close-set and numerous (Fig. 1) . . . . . ***Hoplunnis tenuis***

3b. Pterygoid teeth absent; lateral vomerine teeth few and widely spaced or absent . . . . . → *4*

4a. Lateral vomerine teeth absent except in very young individuals; stomach pale . . . . . ***Hoplunnis macrura***

4b. Lateral vomerine teeth present at all stages (Fig. 2); stomach black . . . . . → *5*

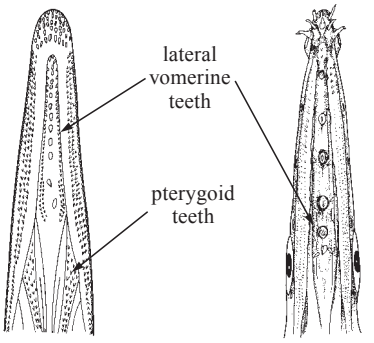


Fig. 1 teeth on roof of mouth

Fig. 2 teeth on roof of mouth

5a. Colour pale with scattered small, dark spots (Fig. 3); intestine pale; vertebrae in intact specimens 222 to 231 . . . . . ***Hoplunnis diomediana***

5b. Colour darkly mottled with brown spots (Fig. 4); intestine black; vertebrae in intact specimens 254 to 260 . . . . . ***Hoplunnis similis***

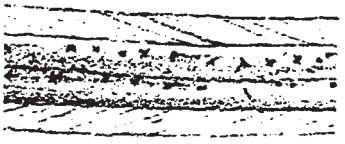


Fig. 3 colour pattern on side of body

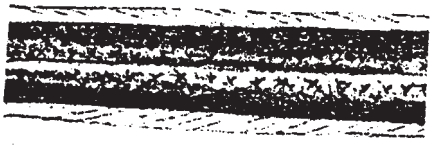


Fig. 4 colour pattern on side of body

6a. Posterior nostril at mid-eye level (Fig. 5); pterygoid teeth present (Fig. 1) . . . . . ***Saurenchelys***

6b. Posterior nostril distinctly above or below mideye level; pterygoid teeth absent . . . . . → *7*

7a. Posterior nostril a slit in upper lip (Fig. 6) . . . . . ***Facciolella***

7b. Posterior nostril above mideye level, located variably from a point in front of anterior margin of eye to dorsal surface of body behind occiput . . . . . → *8*

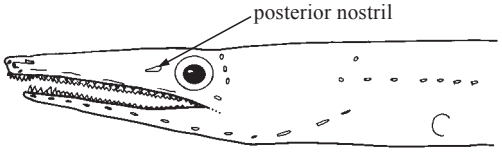


Fig. 5 lateral view of head (*Saurenchelys*)

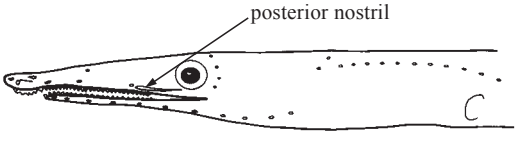


Fig. 6 lateral view of head (*Facciolella*)

8a. Posterior nostril behind posterior margin of eye, on head or dorsal surface of body (Fig. 7); 8 to 10 pores along upper jaw; snout 2.7 to 3.1 in head . . . . . → ***9***

8b. Posterior nostril on head above anterior margin of eye (Fig. 8); 11 to 16 pores along upper jaw; snout 1.8 to 2.8 in head . . . . . → ***11***

9a. Anterior vomerine teeth forming an enlarged median series (Fig. 9); posterior nostril on top of head slightly behind posterior margin of eye (Fig. 7a); small, about 200 mm or less . . . . . ***Nettenchelys pygmaea***

9b. Anterior vomerine teeth not forming an enlarged median series (Fig. 10); posterior nostril at or behind occiput; larger than 200 mm . . . . . → ***10***

10a. Posterior nostril on occiput just before supratemporal canal; median supratemporal pore present (Fig. 7b) . . . . . ***Nettenchelys inion***

10b. Posterior nostril behind supratemporal canal; median supratemporal pore absent (Fig. 7c) . . . . . ***Nettenchelys exoria***

11a. A fleshy proboscis at snout tip (Fig. 11); 8 to 13 pores in supraorbital canal . . . . . ***Venefica procera***

11b. No fleshy proboscis at tip of snout; 4 to 6 pores in supraorbital canal . . . . . → ***12***

12a. Two pores in supraorbital canal between anterior nostril and eye (Fig. 12); lateral-line pores before anus 44 to 49 . . . . . ***Nettastoma melanura***

12b. Three pores in supraorbital canal between anterior nostril and eye (Fig. 13); lateral-line pores before anus 38 to 41 . . . . . ***Nettastoma syntresis***

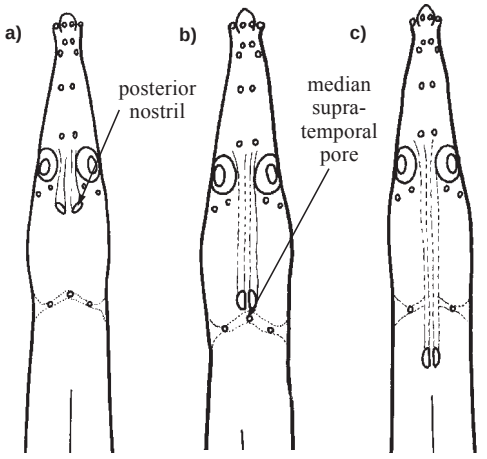


Fig. 7 dorsal view of head and nostrils

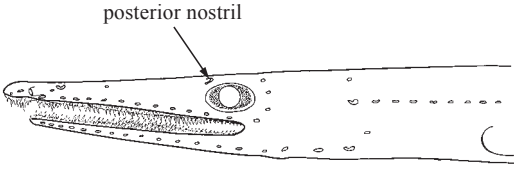


Fig. 8 lateral view of head

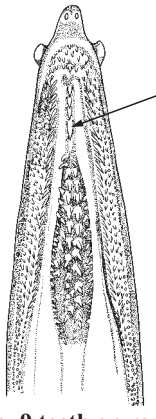


Fig. 9 teeth on roof of mouth

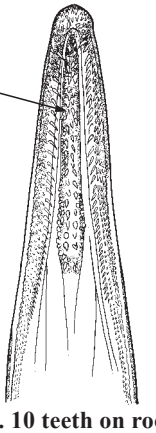


Fig. 10 teeth on roof of mouth

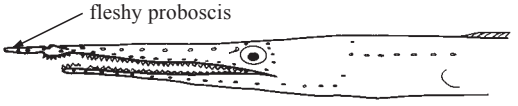


Fig. 11 lateral view of snout (*V. procera*)

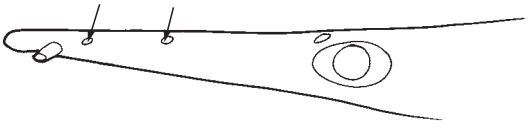


Fig. 12 lateral view of snout (*N. melanura*)

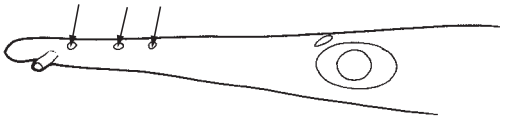


Fig. 13 lateral view of snout (*N. syntresis*)

List of species occurring in the area

Note: The species composition of *Facciolella* and *Saurenchelys* has not been satisfactorily established. Species of these 2 genera are largely indistinguishable as adults, except for vertebral counts, which are of limited use due to the frequent occurrence of broken tails. Leptocephali are easier to distinguish, but most have not yet been linked to an adult. One species of *Saurenchelys* has been described from the area, but others probably exist. At least 2 species of *Facciolella* inhabit the area, based on leptocephali, but they have not yet been diagnosed as adults, and names are not available for them.

Facciolella spp. To approximately 70 cm. Throughout the area.

Hoplunnis diomediana Goode & Bean, 1896. To 55 cm. E Gulf of Mexico and Atlantic coast of US.
Hoplunnis macrura Ginsburg, 1951. To 55 cm. W and S Gulf of Mexico and coast of South America.
Hoplunnis megista Smith & Kanazawa, 1989. To 111 cm. Known from the S Caribbean.
Hoplunnis similis Smith, 1989. To 50 cm. Bahamas and Caribbean.
Hoplunnis tenuis Ginsburg, 1951. To 58 cm. Throughout the area.

Nettastoma melanura Rafinesque, 1810. To 78 cm. Throughout the area except for a restricted region around the Bahamas; also E Atlantic and Mediterranean.
Nettastoma syntresis Smith & Böhlke, 1981. To 55 cm. Found only off the W edge of the Bahamas including: Santaren Channel, E Nicholas Channel, NW Old Bahama Channel, NW Providence Channel; it replaces *Nettastoma melanura* in these places.

Nettenchelys exoria Böhlke & Smith, 1981. To 47 cm. Known from the E coast of Florida.
Nettenchelys inion Smith & Böhlke, 1981. To at least 43 cm. Known from 1 specimen, collected in the Straits of Florida.

Saurenchelys cognita Smith, 1989. To 52 cm. Gulf of Mexico and Atlantic coast of US.
Saurenchelys sp. To 52 cm. Caribbean and S America.

Venefica procera (Goode & Bean, 1883). To 111 cm. Throughout the area.

Reference

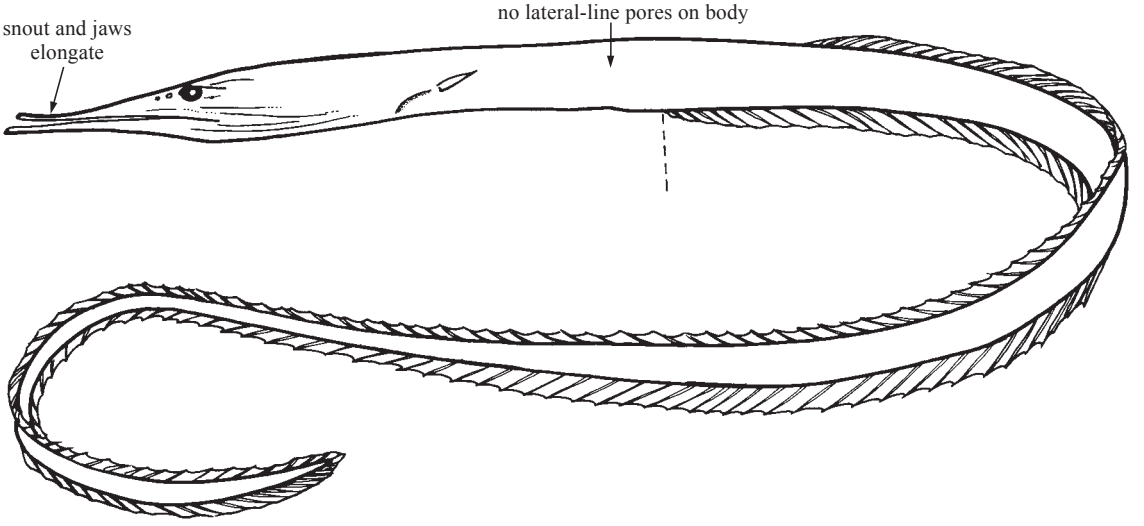
Smith, D.G. 1989. Family Nettastomatidae. In Fishes of the Western North Atlantic, edited by E. B. Böhlke. *Mem. Sears Found. Mar. Res.,* 1(9):568-612.

SERRIVOMERIDAE

Sawtooth eels

by D.G. Smith, National Museum of Natural History, Washington, D.C., USA

Diagnostic characters: Body moderate to elongate, anus before midbody, at about first 1/4 to 1/3 of total length; tail slender but not greatly attenuated. Head slender. Eye fairly well developed. **Snout and jaws elongate and pointed;anterior and posterior nostrils close together, immediately in front of eye**. Mouth large, gape ending approximately under posterior margin of eye; upper and lower jaws approximately equal in length or lower slightly longer; no fleshy flange on upper or lower lip. Maxillary and mandibular teeth relatively small, conical, in 2 to several rows; **vomerine teeth either small and granular, or large and saw-like and arranged in 2 closely set rows**. Dorsal and anal fins present, confluent with caudal fin, anal fin somewhat higher than dorsal; **dorsal fin begins over or slightly behind anus**. Pectoral fin present though small. Scales absent. **Lateral line reduced, pores on body absent and on head limited to 3 small pores between anterior and posterior nostrils. Colour:** dark brown or black, with an irridescent silvery or bronze epidermal layer, the latter often lost during net capture. No markings.

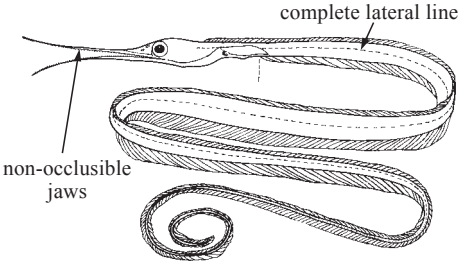


Habitat, biology, and fisheries: Serrivomerids are midwater eels, found mainly at depths of 500 to 1 000 m. At maturity, serrivomerids exhibit some sexual dimorphism; in males the upper jaw shortens, the dentition is modified or reduced, and the anterior nostril becomes tubular. They are of no importance to fisheries.

Similar families occurring in the area

Serrivomerids are distinctive eels and unlikely to be confused with anything else.

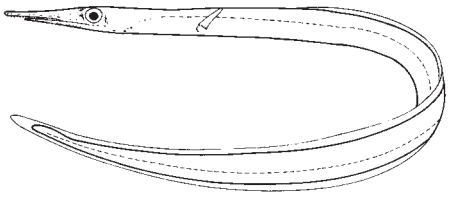
Nemichthyidae: except for sexually mature males, nemichthyids have greatly elongated, non-occlusible jaws. They also have a complete lateral line with well-developed pores.



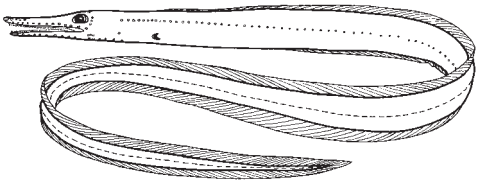
Nemichthyidae

Derichthyidae: *Nessorhamphus* has elongated jaws, but the snout is somewhat depressed and spatulate, and the nostrils are near the tip of the snout. The lateral line is complete.

Nettastomatidae: have elongated jaws, but the anterior nostril is near the tip of the snout, far from the posterior nostril. The lateral line is complete.



Derichthyidae



Nettastomatidae

Key to the species of Serrivomeridae occurring in the area

1a. Dorsal fin begins over or slightly ahead of anus (Fig.1); vomerine teeth small and granular and in several rows (Fig. 2) . . . . . ***Stemonidium hypomelas***

1b. Dorsal fin begins behind anus (Fig. 3); vomerine teeth enlarged and forming a saw-toothed row (Fig. 4) . . . . . → *2*



Fig. 1 lateral view

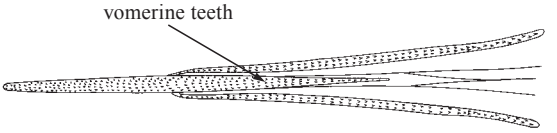


Fig. 2 tooth patches on roof of mouth

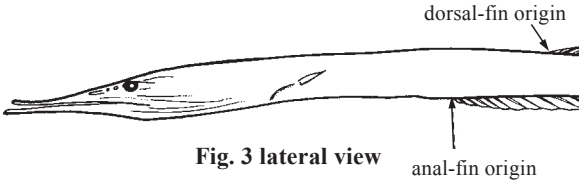


Fig. 3 lateral view

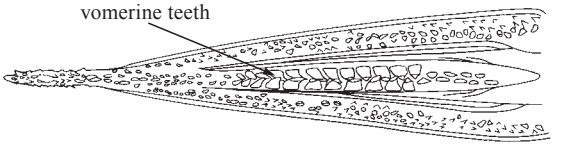


Fig. 4 tooth patches on roof of mouth

2a. Body with a silvery epidermal layer; each vomerine tooth about 3 or 4 times as long as wide; dorsal-fin rays 142 to 173; anal-fin rays 122 to 156; anterior tips of first 4 or 5 branchiostegal rays extend beyond their articulation with hyoid arch (Fig.5) . . . . . ***Serrivomer beanii***

2b. Body with a bronze epidermal layer; each vomerine tooth about twice as long as wide; dorsal-fin rays 175 to 200; anal-fin rays 165 to 192; anterior tips of first 4 or 5 branchiostegal rays not extending beyond their articulation with hyoid arch . . . . . ***Serrivomer lanceolatoides***

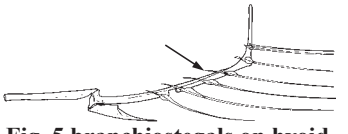


Fig. 5 branchiostegals on hyoid arch

List of species occurring in the area

Note: The nominal species *Platuronides danae, P. ophiocephalus, P. acutus*, and *Serrivomer brevidentatus* are synonyms of *Serrivomer lanceolatoides*.

Serrivomer beanii Gill and Ryder, 1883. To 75 cm. Widely distributed in the N Atlantic, but rare or absent in Caribbean and Gulf of Mexico.

Serrivomer lanceolatoides (Schmidt, 1916). To 64 cm. Throughout the area and E Atlantic.

Stemonidium hypomelas Gilbert, 1905. To 38 cm. Equatorial Atlantic, S of about 15°N; absent from Caribbean and equatorial Indo-Pacific.

Reference

Tighe, K.A. 1989. Family Serrivomeridae. In Fishes of the Western North Atlantic, edited by E.B. Böhlke. *Mem. Sears Found. Mar. Res.*, 1(9):613-627.

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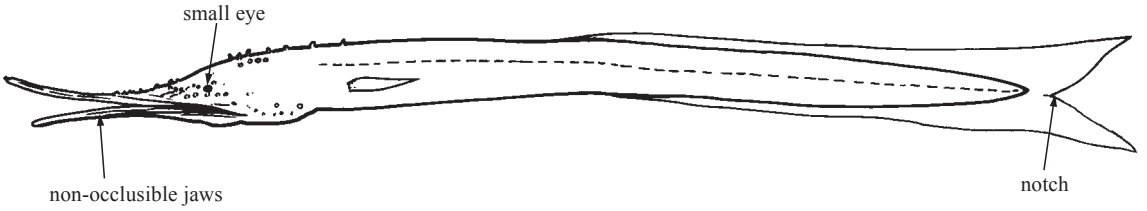
Order SACCOPHARYNGIFORMES

CYEMATIDAE

Bobtail eels

by D.G. Smith, National Museum of Natural History, Washington, D.C., USA

Diagnostic characters: Small eels, maximum size probably not more than 15 cm total length. Body short and stubby, anus at or slightly behind midlength. Eye small. **Jaws long and slender, diverging toward tips, forming a non-occlusible beak; gape of mouth extends well behind eye. Anterior and posterior nostrils close together, immediately in front of eye**; anterior nostril in a low tube. Teeth small and granular, in multiple rows. Dorsal and anal fins complete, continuous with caudal fin; **rays of both dorsal and anal fins lengthened just before tip of tail, giving posterior end of body a notched appearance**. Pectoral fin present. Scales absent. Lateral line reduced; **pores on body absent, replaced by small, dermal papillae**; additional papillae on head; some pores around eye and on snout. **Colour:** black or reddish, without markings.

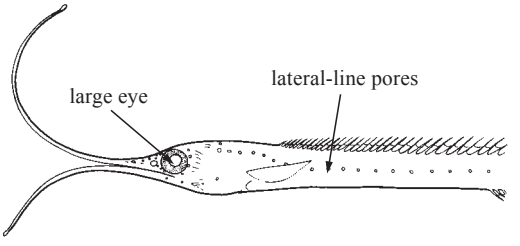


Habitat, biology, and fisheries: Cyematids live in midwater at depths of 1 500 to 3 000 m. Little is known of their biology; there is no indication of sexual dimorphism. They are of no importance to fisheries and are seldom seen except when brought up by deep-towed midwater trawls.

Remarks: Two genera are known, each with a single recognized species. *Cyema atrum* is the most common and occurs in all oceans. *Neocyema erythrosoma* Castle, 1978 is known only from the South Atlantic. Several distinct kinds of leptocephali are known, however, indicating that additional species exist.

Similar families occurring in the area

Cyematids are so distinctive in appearance that they cannot be confused with any other eels. Only the nemichthyids have a prolonged, non-occlusible beak, but nemichthyids are greatly elongate, with large eyes and well-developed lateral-line pores.



Nemichthyidae

List of species occurring in the area

Cyema atrum Günther, 1878. To 14 cm. Worldwide.

Reference

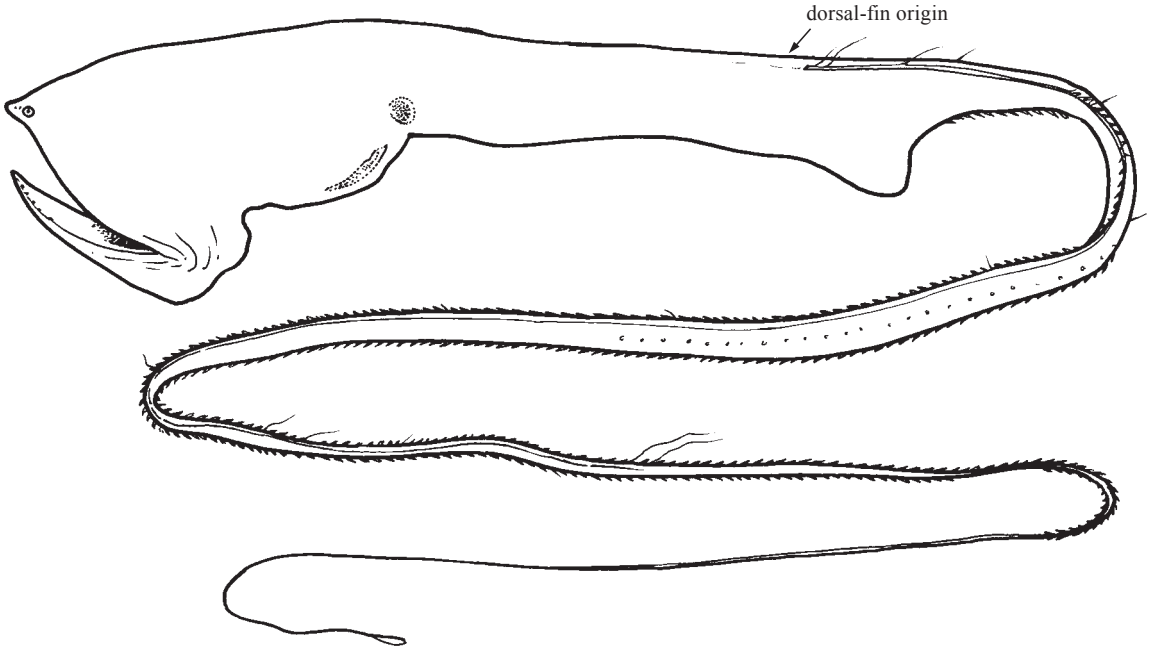
Smith, D.G. 1989. Family Cyematidae. In Fishes of the Western North Atlantic, edited by E.B. Böhlke. *Mem. Sears Found. Mar. Res.*, 1(9):630-635.

SACCOPHARYNGIDAE

Swallower eels

by D.G. Smith, National Museum of Natural History, Washington, D.C., USA

Diagnostic characters: Can reach nearly 2 m in total length, but most of this is the slender, attenuate caudal region. **Body very elongate; tail attenuate and ending in an expanded caudal organ of variable structure, often luminous**; anus near anterior 1/3 to 1/5 of total length; **abdomen distensible, usually distinctly deeper than tail**. Head large and deep, most of its length in postcranial part. Eye small. Snout short, beak-like; anterior and posterior nostrils small and close together, in front of eye. **Mouth greatly enlarged by a backward extension of jaws, gape extending far behind eye**; teeth slender, recurved, depressible, arranged in 3 or 4 overlapping rows. Dorsal and anal fins present, ending before tip of tail; dorsal fin begins well behind head, a short distance in front of anus; caudal fin absent; pectoral fin present. **A pair of white lines or grooves on each side of dorsal fin, of uncertain function**. Scales absent. Lateral line without pores, but with a series of papillae. **Colour:** black, without markings.



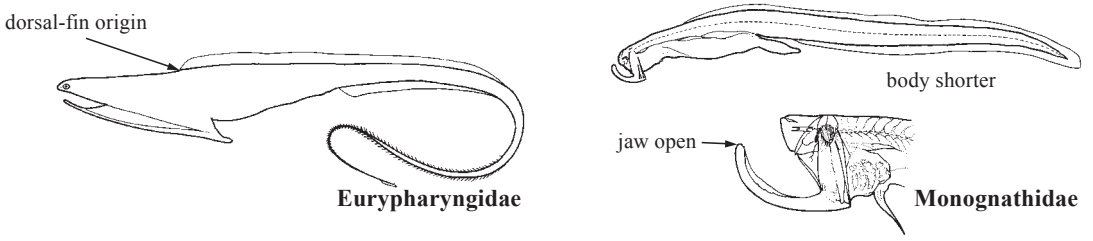
Habitat, biology, and fisheries: Saccopharyngids live pelagically at depths of 1 000 to 3 000 m. They feed mainly on fish, and their large mouth and distensible abdomen enable them to swallow large prey. It has been speculated that the luminous caudal organ serves as a lure to attract prey, but this has not been confirmed by observation. Saccopharyngids display some sexual dimorphism at maturity; males show a reduction of the feeding apparatus and an enlargement of the eye and olfactory organ. Saccopharyngids are rare and of no importance to fisheries.

Remarks: The Saccopharyngidae is one of 3 families of highly modified, midwater eels commonly known as gulpers; the others are the Eurypharyngidae and Monognathidae. Gulpers are characterized by the reduction and loss of many skeletal elements. Their precise relationship to the other eels is still uncertain, but they are usually placed in a separate order, the Saccopharyngiformes. The Saccopharyngidae contains a single genus, *Saccopharynx*, with approximately 9 species worldwide.

Similar families occurring in the area

Eurypharyngidae: the monotypic family Eurypharyngidae is the only fish likely to be confused with *Saccopharynx*. In *Eurypharynx* the mouth is even larger than in *Saccopharynx*, greater than half the preanal length as opposed to less than 40%. In *Eurypharynx* the dorsal fin begins in front of the pectoral fin instead of far behind it. *Eurypharynx* also has smaller teeth.

Monognathidae: the monognathids lack an upper jaw, and their bodies are much less elongate.



Key to the species of Saccopharyngidae occurring in the area

1a. Caudal organ distinctly expanded with angular or notched edges (Fig. 1); body filaments 1 to 3 . . . . . ***Saccopharynx harrisoni***

1b. Caudal organ indistinctly expanded with smoothly curved edges (Figs 2, 3); many body filaments, except in juveniles . . . . . → ***2***



Fig. 1

2a. Body filaments on both trunk and tail; caudal organ without well-developed filaments (Fig. 2) . . . . . ***Saccopharynx ampullaceus***

2b. Body filaments only on tail; caudal organ with well-developed filaments (Fig. 3) . . . . . ***Saccopharynx thalassa***

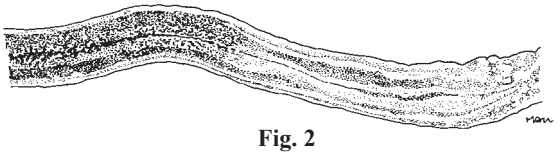


Fig. 2

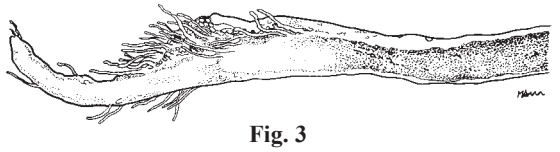


Fig. 3

List of species occurring in the area

Saccopharynx ampullaceus (Harwood, 1827). To 160 cm. Widely distributed in the N Atlantic, but known from few records.

Saccopharynx harrisoni Beebe, 1932. To 170 cm. Known from 3 widely scattered records in the N and S Atlantic; the single record from the area is from Bermuda.

Saccopharynx thalassa Nielsen and Bertelsen, 1985. To 110 cm. Known from 3 specimens, 1 from Bermuda and 2 from the Canary Islands.

Reference

Nielsen, J.G. and E. Bertelsen. 1985. The gulper-eel family Saccopharyngidae (Pisces, Anguilliformes). *Steenstrupia*, 11(6):157-206.

EURYPHARYNGIDAE

Gulper eels

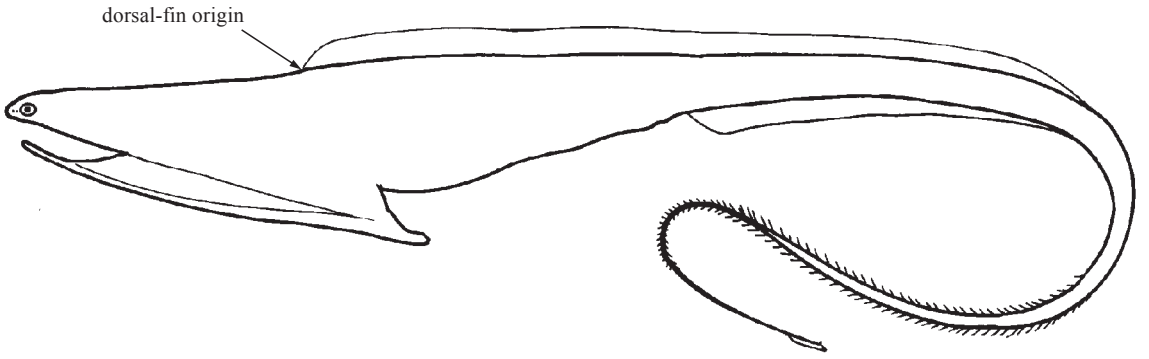
by D.G. Smith, National Museum of Natural History, Washington, D.C., USA

A single species in this family.

Eurypharynx pelecanoides Vaillant, 1882

Frequent synonyms / misidentifications: *Gastrostomus bairdi* Gill and Ryder, 1883 / None.

FAO names: En - Gulper eel.



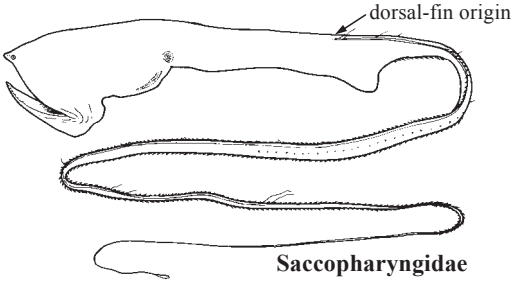
Diagnostic characters: Maximum size about 75 cm, but much of this consists of the slender caudal region. **Body elongate, tail attenuated and ending in an expanded, luminous caudal organ**; anus near anterior third of total length. Head large and deep, most of its length in postcranial part. Eye small. Snout short; anterior and posterior nostrils close together, in front of eye. **Mouth greatly enlarged by a backward extension of jaws, gape comprising half or more of preanal length; buccal cavity greatly distensible**; teeth small, close-set, with recurved tips, in several rows on jaws. Dorsal and anal fins present, but ending before tip of tail; **dorsal fin begins about midway between tip of snout and anus**; caudal fin absent; pectoral fin rudimentary. **A pair of white lines or grooves, 1 on each side of dorsal fin, of uncertain function**. Scales absent. Lateral line with groups of elevated tubules instead of pores. **Colour:** black, without markings.

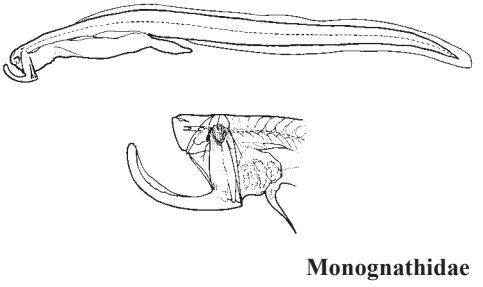
Similar families occurring in the area

Note: The Eurypharyngidae, Saccopharyngidae, and Monognathidae are placed together in the order Saccopharyngiformes and are characterized by the reduction and loss of many skeletal elements. They are unlikely to be confused with any other fishes.

Saccopharyngidae: *Saccopharynx*, the only genus in the Saccopharyngidae, resembles *Eurypharynx* in many ways. It has a smaller mouth, however, some 40% or less of the preanal length. The teeth are larger, and the dorsal fin begins over or slightly in front of the anus.

Monognathidae: have a much shorter body, a smaller mouth, and lack an upper jaw.





Habitat, biology, and fisheries: *Eurypharynx pelecanoides* is a midwater fish, occurring to about 3 000 m. Its principal food seems to be crustaceans, but it also takes fishes, cephalopods, and other invertebrates. Although the mouth is large, the stomach is not greatly distensible, as it is in the related saccopharyngids. This, along with the weak dentition and generally feeble structure of the mouth, indicates that *Eurypharynx* does not take large individual prey organisms. Instead, it seems adapted for engulfing smaller animals along with a quantity of surrounding water. After the prey has been captured, the water is expelled through the gill openings and the prey is swallowed. Males undergo pronounced morphological changes at maturity: the olfactory organs enlarge, the jaws degenerate, and the teeth are reduced or lost. Females remain relatively unchanged. *Eurypharynx pelecanoides* is fairly common in its depth range, but most specimens are badly damaged during net capture, and it is rare to see an intact specimen. It is of no importance to fisheries.

Distribution: *Eurypharynx pelecanoides* is currently considered to be a single cosmopolitan species. In the Atlantic, it occurs over a wide range of latitude, from Iceland in the north to 48°S.

Reference

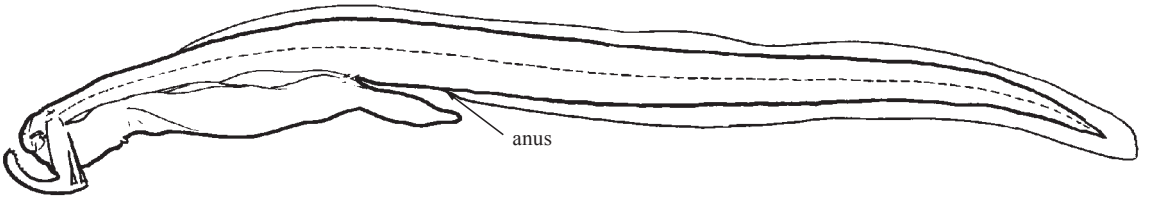
Nielsen, J.G., E. Bertelsen, and Å. Jespersen. 1989. The biology of *Eurypharynx pelecanoides* (Pisces, Eurypharyngidae). *Acta Zoologica* (Stockholm), 70(3):187-197.

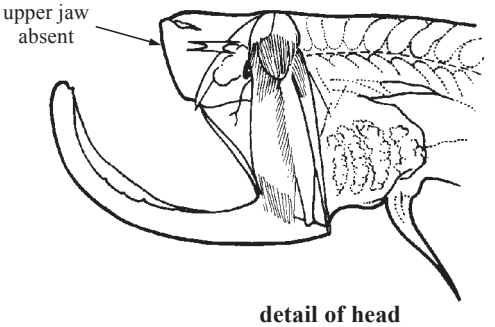
MONOGNATHIDAE

One-jawed eels

by D.G. Smith, National Museum of Natural History, Washington, D.C., USA

Diagnostic characters: Small, fragile fishes, maximum size 16 cm. Body short to moderate; tail moderate, not attenuate; anus near anterior 1/4 to 1/3 of total length; abdomen distensible, posterior part often protruding ventrally into a pouch that may extend behind anus. Head moderate; eye greatly reduced. Snout variable, from short to moderately elongate; olfactory organ reduced to a short tube between anterior and posterior nostrils. **Upper jaw (maxilla and palatopterygoid arcade) absent, lower jaw closes against bottom of neurocranium; lower jaw and suspensorium greatly prolonged**; lower jaw with a single series of small, conical teeth; **front of skull with a median, unpaired fang provided with a venom gland**. Dorsal and anal fins present, reaching tip of tail, may or may not be confluent around tip of tail; true caudal fin absent; dorsal fin begins at or before middle of trunk; pectoral fin absent or present as a dermal flap without rays. Scales absent. Lateral line absent. **Colour:** variable, from unpigmented to light or dark brown.





detail of head

(after Bertelsen and Nielsen, 1987)

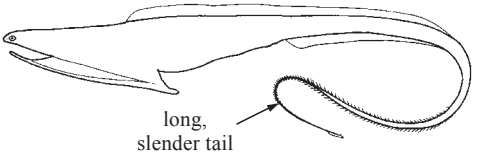
Habitat, biology, and fisheries: Monognathids are pelagic and live at great depths; most of the known specimens have been collected at 2 000 to 5 400 m, making them the deepest-living of all the pelagic eels and eel-like fishes. They appear to feed mainly on shrimp and can take relatively large prey; the venomous fang apparently is used to immobilize the prey and allow it to be swallowed. The single known mature male differs markedly from the females and immatures; the lower jaw is reduced to a rudiment, the rostral fang is short and blunt, the olfactory organs are greatly enlarged, the head is covered with a layer of spongy tissue, and the posterior dorsal- and anal-fin rays are lengthened just before the tip of the tail to form a notched tail fin. The reduction of the feeding apparatus indicates that the male stops feeding at maturity, and hence that spawning is the terminal event in its life. The enlarged olfactory organ and the broadened tail suggests that it locates its mate by following pheromone trails. Beyond this we know nothing about the biology of monognathids; indeed, their odd morphology and their near total lack of sense organs make it difficult to imagine how they function and survive in their environment. Monognathids are rare and of no importance to fisheries.

Remarks: Monognathids belong to an order characterized by the reduction and loss of many skeletal features, but they have carried these trends to bizarre lengths. The absence of an upper jaw is unique among fishes. They are small fishes; the largest specimen known is only 15.9 cm in total length, and most are less than 10 cm. Fourteen species are currently recognized. Although they can be divided into 2 groups based on the length of the snout and the shape of the skull, they are all considered to belong to a single genus, *Monognathus*.

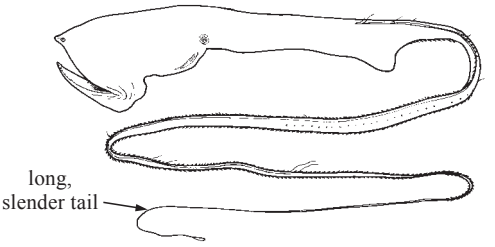
Similar families occurring in the area

Eurypharyngidae: upper jaw present; tail long and slender, ending in a caudal organ.

Saccopharyngidae: upper jaw present; tail long and slender, ending in a caudal organ.



Eurypharyngidae



Saccopharyngidae

List of species occurring in the area

This is a poorly known family, and the following list of species should be considered provisional. Only 1 species has actually been taken in the area, but 5 others are recorded from the eastern Atlantic. Any of these might be present. Additional, undescribed species may be found in the future.

Monognathus bertini Bertelsen and Nielsen, 1987. NE Atlantic and SW Pacific.
Monognathys boehlkei Bertelsen and Nielsen, 1987. Bermuda, also NE Atlantic.
Monognathus herringi Bertelsen and Nielsen, 1987. NE Atlantic.
Monognathus jesperseni Bertin, 1936. NE Atlantic.
Monognathus nigeli Bertelsen and Nielsen, 1987. NE Atlantic
Monognathus taningi Bertin, 1936. NE Atlantic.

Reference

Bertelsen, E. and J. Nielsen. 1987. The deepsea eel family Monognathidae (Pisces, Anguilliformes). *Steenstrupia*, 13(4):141-198.

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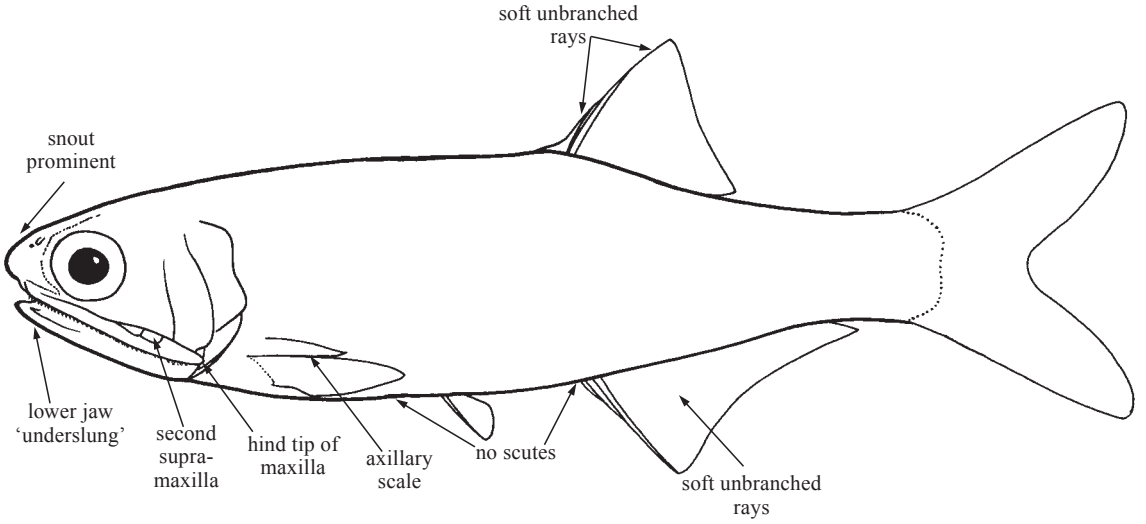
Order CLUPEIFORMES

ENGRAULIDAE

Anchovies

by M.S. Nizinski and T.A. Munroe, National Marine Fisheries Service,
National Museum of Natural History, Washington D.C., USA

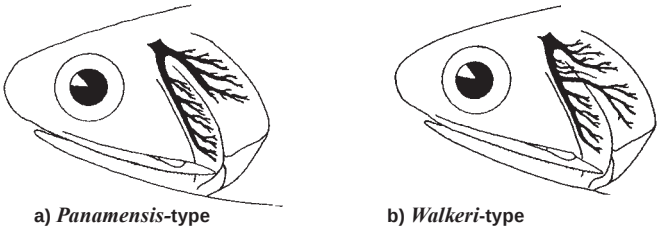
Diagnostic characters: Small to moderate-sized silvery fishes (to 30 cm standard length, commonly 8 to 15 cm standard length), usually with fusiform, subcylindrical bodies but sometimes quite strongly compressed; **no scutes present along abdomen in New World species (except for plate-like scute at pelvic-fin bases)**. Characterized by **a usually prominent pig-like snout projecting beyond tip of lower jaw. Lower jaw almost always long and slender and characteristically 'underslung'; its articulation extending posterior to vertical through posterior margin of eye, and usually extending to point well beyond vertical through posterior margin of eye**. Typically with 2 supramaxillae. Maxilla (posterior tip of upper jaw) short and rounded or long and pointed; **jaw teeth usually small or minute, but sometimes absent (*Cetengraulis*) or canine-like (*Lycengraulis*)**. Eyes large, with adipose eyelid completely covering eyes. **Pseudobranch (gill-like structure on inner face of gill cover) present**. Branchiostegals usually 11 or 12 (but only 8 in *Cetengraulis*). **Gill rakers usually short and not numerous (but long and up to 100 or more in *Anchovia*). No spiny rays in fins; dorsal fin single, short, and usually near midpoint of body** (far back in *Pterengraulis*); anal fin short or moderate; caudal fin forked; pectoral fins set low on body; pelvic fins usually inserted about midway between pectoral-fin base and anal-fin origin. **Scales always cycloid (smooth to touch), moderate, with posterior striae or striations, very often shed upon capture; no lateral line. Colour:** typically dorsum blue-green or translucent grey, **sides wholly silver or with a bright silver midlateral stripe**; darker markings may include stripe down side and duskiness of fins, especially distal margin of caudal fin.



Habitat, biology, and fisheries: Most anchovies are marine, but some can tolerate low salinities and a number of species either regularly migrate into rivers to spawn or are confined to fresh water. Most are plankton filter-feeders and are major forage species in the natural food chain. Some brackish-water species are bottom-living carnivores. Although usually small (mostly 8 to 15 cm), many species school in such numbers that they form the basis of sizeable fisheries. Some species are valued as food fishes, while others are used as bait or as fish meal. Although all species are edible, transportation and large-scale marketing of these fishes is difficult because of the soft consistency of their flesh, especially for smaller species of *Anchoa* and *Anchoviella*, which are only consumed locally. Presence of anchovies in markets has been steadily increasing in the past few years. The total reported catch of engraulid species for the area from 1995 to 1999 ranged between 903 and 1 762 t. The major fishery was for *Cetengraulis edentulus* (41 t in 1995; Venezuela only). Anchovies are usually caught with fine-meshed beach seines.

Remarks: Some authors have found the branching pattern of cutaneous canals across the gill cover to be a useful character for identification of species of *Anchoa* and *Anchoviella*. These canals, however, are not easy to see and may or may not be a useful field character. Information is provided here for completeness. The *panamensis*-type refers to canals on the gill cover in which the pre-opercular branch is only on the

preoperculum and does not pass onto the operculum. The *walkeri*-type refers to the form in which the preopercular branch passes back onto the operculum and runs downward and parallel to the temporal canal. Those species with *panamensis*-type gill cover canals include: *Anchoa colonensis, A. filifera, A. hepsetus, A. lyolepis, A. mitchilli, A. spinifer, A. trinitatis, Anchoviella blackburni, An. brevirostris, An. cayennensis, An. elongata* and *An. perfasciata*. Species possessing *walkeri*-type gill cover canals are: *Anchoa cayorum, A. choerostoma, A. cubana, A. januaria, A. lamprotaenia, A. parva, Anchoviella guianensis* and *An. lepidentostole*.

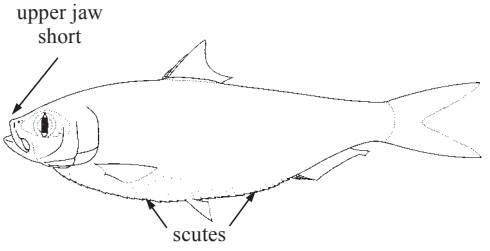


gill covers showing canal patterns

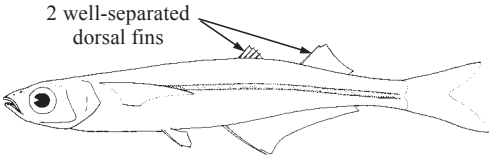
Similar families occurring in the area

Clupeidae: upper jaw short, lower jaw deep, and in most cases, scutes forming distinct keel along abdomen.

Atherinidae: mouth terminal, upper jaw short, 2 dorsal fins, and no scutes.



Clupeidae



Atherinidae

Key to the species of Engraulidae occurring in the area

1a. Anal-fin origin equal with or posterior to vertical at dorsal-fin origin; pectoral fins short, not reaching posteriorly beyond pelvic-fin base . . . . . → *2*

1b. Anal-fin origin anterior to vertical at dorsal-fin origin (Fig. 1); pectoral fins long, reaching posteriorly beyond pelvic-fin base . . . . . *Pterengraulis atherinoides*

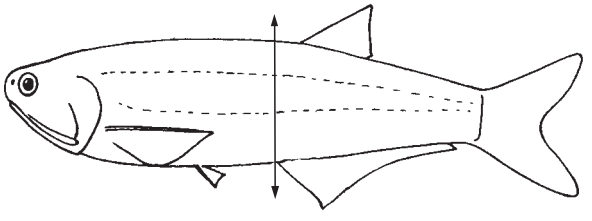


Fig. 1 anal fin origin

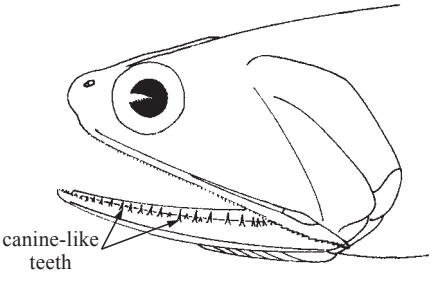


Fig. 2 *Lycengraulis*

2a. Teeth on lower jaw small and evenly spaced or absent . . . . . → *3*

2b. Teeth on lower jaw enlarged and canine-like (Fig. 2) . . . . . *(Lycengraulis)* → *24*

3a. Lower gill rakers on first arch less than 45 . . . . . → *4*

3b. Lower gill rakers on first arch greater than or equal to 45 . . . . . → *26*

4a. Maxilla short, tip blunt, not reaching or just reaching anterior margin of preoperculum (Fig. 3) . . . . . → ***5***

4b. Maxilla long, tip pointed, reaching onto or beyond preoperculum (Fig. 4) . . . . . ***(Anchoa)*** → ***12***

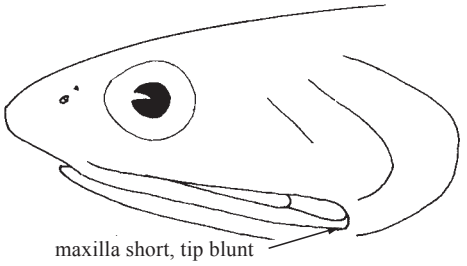


Fig. 3

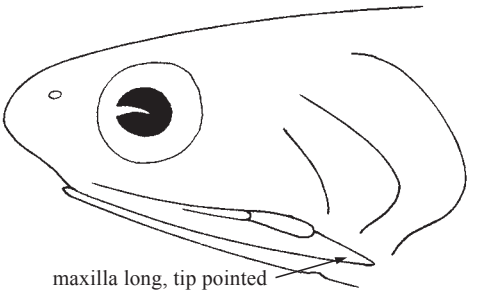


Fig. 4

5a. Pseudobranch short, less than eye diameter (Fig. 5, 6a) . . . . . ***(Anchoviella)*** → ***6***

5b. Pseudobranch long, greater than eye diameter (Fig. 5, 6b) . . . . . ***Engraulis eurystole***

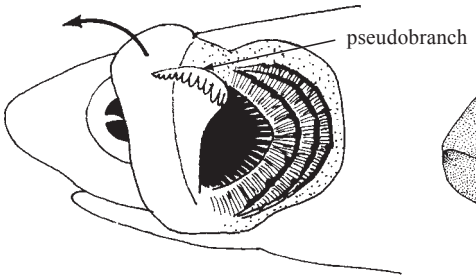
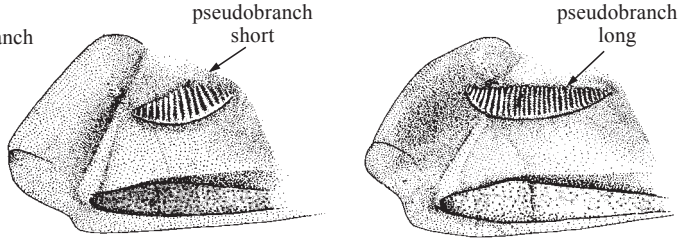


Fig. 5 location of pseudobranch with gill cover folded forward



a) ***Anchoviella*** **b)** ***Engraulis eurystole***

Fig. 6 inner side of gill cover

6a. Maxilla failing to reach anterior margin of preoperculum by 1/3 to 1/2 pupil diameter . . . . . → ***7***

6b. Maxilla longer; reaching to anterior margin of preoperculum . . . . . → ***11***

7a. Anal-fin origin slightly in advance of body midpoint . . . . . ***Anchoviella blackburni***

7b. Anal-fin origin posterior to body midpoint . . . . . → ***8***

8a. Snout very short; projecting only slightly beyond lower jaw; lower jaw symphysis almost at tip of snout . . . . . ***Anchoviella brevirostris***

8b. Snout longer, projecting beyond lower jaw; lower jaw symphysis more posterior, not at tip of snout . . . . . → ***9***

9a. Axillary scale of pectoral fin reaching only to about midpoint of fin . . . . . ***Anchoviella guianensis***

9b. Axillary scale of pectoral fin reaching beyond midpoint but failing to reach tip of fin . . . . . → ***10***

10a. Snout 1/2 eye diameter; lower gill rakers 29 to 35 . . . . . ***Anchoviella cayennensis***

10b. Snout 3/4 eye diameter; lower gill rakers 24 to 30 . . . . . ***Anchoviella perfasciata***

11a. Axillary scale of pectoral fin about half as long as fin; body more moderately compressed (5 to 6 times in standard length); silver stripe narrow, less than eye diameter throughout entire length . . . . . ***Anchoviella elongata***

11b. Axillary scale of pectoral fin reaching beyond midpoint but failing to reach tip of fin; body deeper (4 to 5 times in standard length); silver stripe wide, greater than eye diameter below about middle of dorsal fin . . . . . ***Anchoviella lepidentostole***

12a. Pseudobranch long, greater than eye diameter, extending onto inner face of operculum (Fig. 6b) . . . . . → ***13***

12b. Pseudobranch short, not extending onto inner face of operculum (Fig. 6a) . . . . . → ***14***

13a. Pectoral fin with first ray extended as a filament (often broken) . . . . . ***Anchoa filifera***

13b. Pectoral fin without first ray extended as a filament . . . . . ***Anchoa lyolepis***

14a. Posterior margin of gill cover with small triangular projection on subopercular (Fig. 7) . . . . . ***Anchoa spinifer***

14b. Posterior margin of gill cover without small triangular projection on subopercular . . . . . → ***15***

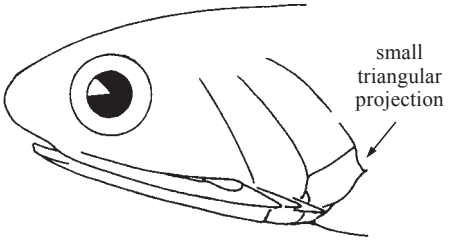


Fig. 7 ***Anchoa spinifer***

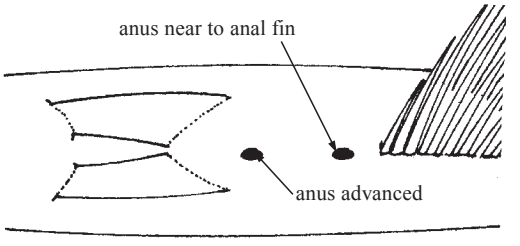


Fig. 8 ventral view of body

15a. Anus closer to anal-fin origin than to pelvic-fin tips (Fig. 8) . . . . . → ***16***

15b. Anus opening nearer to pelvic-fin tips than to anal-fin origin (Fig. 8) . . . . . → ***18***

16a. Anal fin moderately long with 21 to 26 rays . . . . . ***Anchoa cayorum***

16b. Anal fin shorter with less than 21 rays . . . . . → ***17***

17a. Maxilla reaching to posterior margin of preoperculum; silver stripe narrow (about width of pupil) . . . . . ***Anchoa colonensis***

17b. Maxilla longer, reaching beyond posterior margin of preoperculum; silver stripe broad (about 3/4 eye diameter) . . . . . ***Anchoa hepsetus***

18a. Anal-fin origin at vertical through dorsal-fin origin . . . . . ***Anchoa mitchilli***

18b. Anal-fin origin more posterior, at or near vertical through midpoint of dorsal fin . . . . . → ***19***

19a. Anal fin with more than 25 rays . . . . . ***Anchoa trinitatis***

19b. Anal fin with 25 rays or less . . . . . → ***20***

20a. Lower gill rakers 17 to 21 . . . . . ***Anchoa lamprotaenia***

20b. Lower gill rakers 23 to 30 . . . . . → ***21***

21a. Axillary scale of pectoral fin only reaching midpoint of fin; distribution limited to Bermuda . . . . . ***Anchoa choerostoma***

21b. Axillary scale of pectoral fin reaching beyond midpoint of fin; not found in Bermuda . . . . . → ***22***

22a. Maxilla moderate, not reaching or just reaching posterior margin of preoperculum . . ***Anchoa januaria***

22b. Maxilla longer, reaching beyond posterior margin of preoperculum . . . . . → ***23***

23a. Body compressed (body depth 5 to 6 times in standard length); maxilla projecting at least 1/2 eye diameter beyond second supramaxilla, reaching beyond posterior margin of preoperculum; snout about 3/4 eye diameter . . . . . ***Anchoa cubana***

23b. Body deeper (body depth 4.5 to 5 times in standard length); maxilla reaching to or just beyond posterior margin of preoperculum; snout shorter, about 1/2 eye diameter . . . . . ***Anchoa parva***

24a. Lower gill rakers 12 to 15 . . . . . ***Lycengraulis batesii***

24b. Lower gill rakers more than 15 . . . . . → ***25***

25a. Body depth 23 to 24.5% standard length; maxilla reaching margin of operculum; pelvic fin usually inserted nearer to anal-fin origin than to pectoral-fin base, occasionally equidistant between these points; total gill rakers on first arch 30 to 36 . . . . . ***Lycengraulis grossidens***

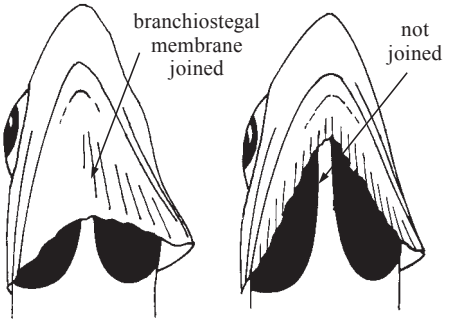
25b. Depth of body 21 to 23% standard length (in specimens greater than 100 mm total length); maxilla not reaching margin of operculum; pelvic fin inserted nearer to pectoral-fin base than to anal-fin origin; total gill rakers on first arch 37 to 42 . . . . . ***Lycengraulis limnichthys***

26a. Branchiostegal membrane broadly joined across isthmus (Fig. 9a); branchiostegal rays 8 . . . . . ***Cetengraulis edentulus***

26b. Branchiostegal membrane not broadly joined across isthmus (Fig. 9b); branchiostegal rays 9 or more . . . . . → ***27***

27a. Maxilla short, not extending beyond end of second supramaxilla; anal fin moderate (20 to 25 rays), its origin about at vertical through middle of dorsal-fin base . . . . ***Anchovia surinamensis***

27b. Maxilla moderate, extending beyond end of second supramaxilla and reaching onto preoperculum; anal fin long (28 to 35 rays); its origin at vertical through anteriormost dorsal-fin rays . . . . . ***Anchovia clupeoides***



a) *Cetengraulis edentulus* b) *Anchovia*

Fig. 9 ventral view of head

List of species occurring in the area

The symbol is given when species accounts are included.

Anchoa cayorum (Fowler, 1906).
Anchoa choerostoma (Goode, 1874).
Anchoa colonensis Hildebrand, 1943.
Anchoa cubana (Poey, 1868).
Anchoa filifera (Fowler, 1915).
Anchoa hepsetus (Linnaeus, 1758).
Anchoa januaria (Steindachner, 1879).
Anchoa lamprotaenia Hildebrand, 1943.
Anchoa lyolepis (Evermann and Marsh, 1900).
Anchoa mitchilli (Valenciennes in Cuvier and Valenciennes, 1848).
Anchoa parva (Meek and Hildebrand, 1923).
Anchoa spinifer (Valenciennes in Cuvier and Valenciennes, 1848).
Anchoa trinitatis (Fowler, 1915).

Anchovia clupeoides (Swainson, 1839).
Anchovia surinamensis (Bleeker, 1866).

Anchoviella blackburni Hildebrand, 1943.
Anchoviella brevirostris (Günther, 1868).
Anchoviella cayennensis (Puyo, 1946).
Anchoviella elongata (Meek and Hildebrand, 1923).
Anchoviella guianensis (Eigenmann, 1912).
Anchoviella lepidentostole (Fowler, 1911).
Anchoviella perfasciata (Poey, 1860).

Cetengraulis edentulus (Cuvier, 1829).

Engraulis eurystole (Swain and Meek, 1885).

Lycengraulis batesii (Günther, 1868).
Lycengraulis grossidens (Agassiz in Spix and Agassiz, 1829).
Lycengraulis limnichthys Schultz, 1949.

Pterengraulis atherinoides (Linnaeus, 1766).

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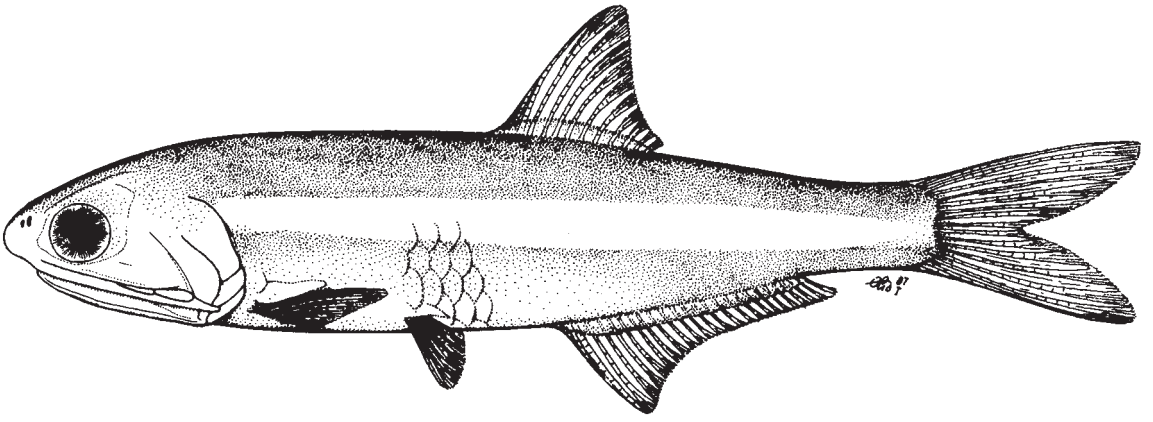
Cervigón, F., R. Cipriani, W. Fischer, L. Garibaldi, M. Hendrickx, A.J. Lemus, R. Márquez, J.M. Poutiers, G. Robaina, and B. Rodriguez. 1993. *FAO species identification sheets for fishery purposes. Field guide to the commercial marine and brackish-water resources of the northern coast of southern America*. Rome, FAO, 513 p.

Whitehead, P.J.P., G.J. Nelson, and T. Wongratana. 1988. FAO species catalogue. Vol. 7. Clupeoid fishes of the world (Suborder Clupeoidei). An annotated and illustrated catalogue of the herrings, sardines, pilchards, sprats, anchovies and wolf-herrings. Part 2. Engraulididae. *FAO Fish. Synop*., (125)Vol.7,Pt.2:305-579.

Anchoa cayorum (Fowler, 1906)

Frequent synonyms / misidentifications: None / None.

FAO names: En - Key anchovy; **Fr** - Anchois de banc; **Sp** - Anchoa de cayo.

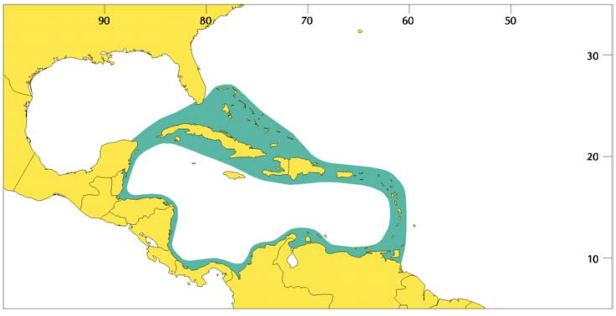


Diagnostic characters: Body somewhat compressed, slender, body depth about 5 times in standard length. Snout less than eye diameter; **maxilla long, tip pointed, reaching almost to gill opening**; jaw teeth small. **Pseudobranch short**, not extending onto inner face of operculum. Lower gill rakers 16 to 19; gill cover canals of *walkeri*-type. **Anal fin moderately long, with 21 to 26 branched rays**, its origin about equal to vertical through midpoint of dorsal-fin base. **Anus closer to anal-fin origin than to pelvic-fin tips. Colour:** midlateral silver stripe, width slightly less than eye diameter.

Size: Maximum about 9 cm total length.

Habitat, biology, and fisheries: Marine, pelagic, in coastal shelf areas as well as clear oceanic waters. A plankton-feeding species, often occurring in dense schools. Probably of little interest to fisheries. Caught occasionally with beach seines.

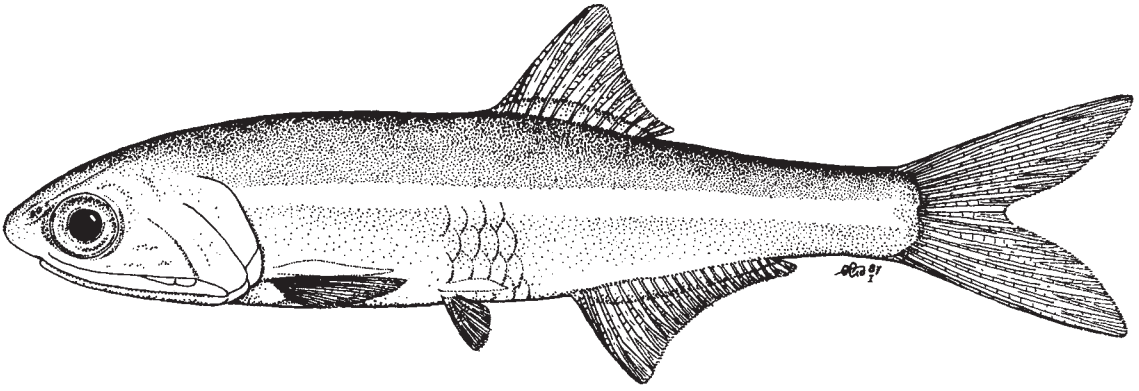
Distribution: Caribbean area (Florida Keys, Cuba, Bahamas, Antilles, also Los Roques Archipelago off Venezuela; from Yucatán to northern coasts of Venezuela and Colombia; Trinidad and Tobago; not in Gulf of Mexico).



Anchoa colonensis Hildebrand, 1943

Frequent synonyms / misidentifications: *Anchoa hepsetus colonensis* Hildebrand, 1943 / *Anchoa hepsetus* (Linnaeus, 1758).

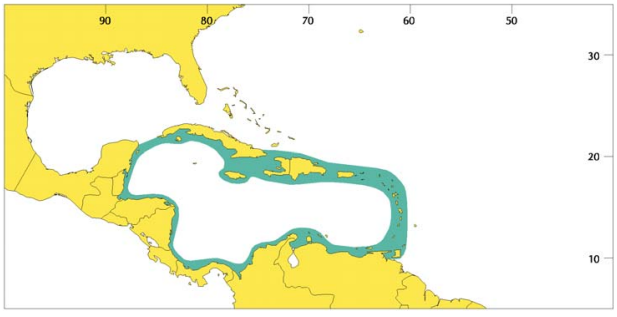
FAO names: En - Narrowstriped anchovy; **Fr** - Anchois à bande étroite; **Sp** - Anchoa banda estrecha.



Diagnostic characters: Body somewhat compressed, elongate, body depth about 5 times in standard length. Snout pointed, about 3/4 eye diameter; **maxilla long, tip pointed, reaching to posterior margin of preoperculum**; jaw teeth small. **Pseudobranch short**, not extending onto inner face of operculum. Lower gill rakers 19 to 22; gill cover canals of *panamensis*-type. **Anal fin short, with 17 to 21 branched rays. Anus nearer to anal-fin origin than to pelvic-fin tips. Colour:** dorsum blue-green, with **narrow midlateral silver stripe**, about width of pupil.

Size: Maximum 14 cm total length, commonly to 10 cm total length.

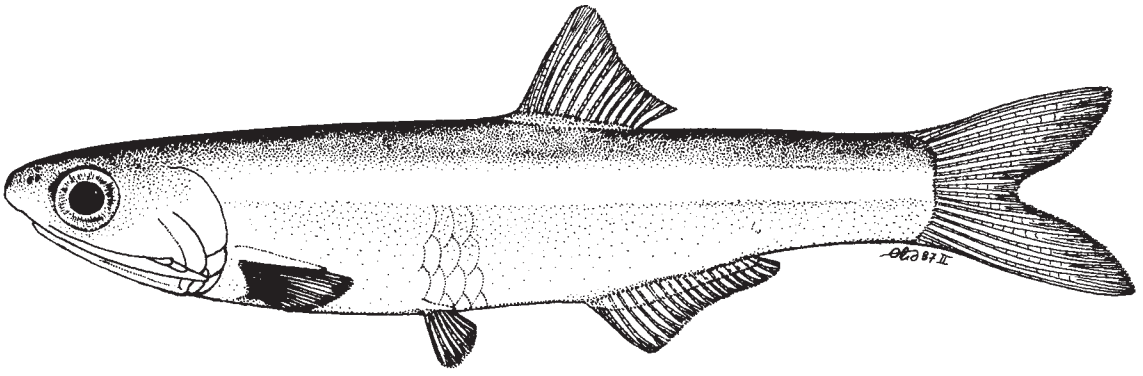
Habitat, biology, and fisheries: Marine, pelagic, coastal, forming dense schools, often in shallow water close to shore. Other aspects of its biology probably similar to those of *Anchoa hepsetus*. Interest to fisheries is unknown. Taken occasionally in beach seines. Because of its larger size, it is one of the anchovy species best suited for marketing purposes in regions along northern coast of South America.



Distribution: Caribbean area (Greater and Lesser Antilles to Trinidad; Venezuela westward to Panama and Yucatán), where it replaces the more widespread *A. hepsetus*.

Anchoa cubana (Poey, 1868) EAU

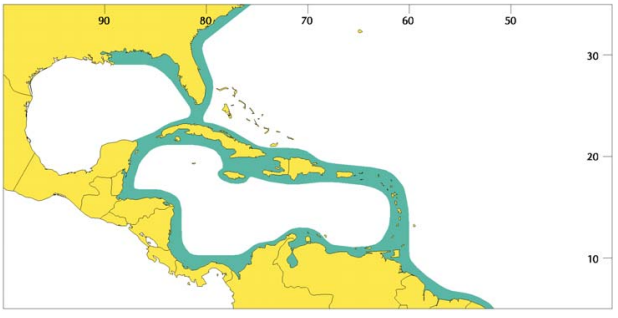
Frequent synonyms / misidentifications: *Anchoviella astilbe* (Jordan and Rutter, 1897) / None.
FAO names: En - Cuban anchovy; **Fr -** Anchois cubain; **Sp -** Anchoa cubana.



Diagnostic characters: Body somewhat compressed, elongate, **body depth 5 to nearly 6 times in standard length**. Snout pointed, about 3/4 eye diameter; **maxilla long, tip pointed and projecting at least 1/2 eye diameter beyond second supramaxilla, reaching beyond posterior margin of preoperculum**; jaw teeth small. **Pseudobranch shorter than eye diameter**, not extending onto inner face of operculum. **Lower gill rakers 24 to 30**; gill cover canals of *walkeri*-type. **Anal fin short, with 16 to 21 branched rays, its origin about at vertical through midpoint of dorsal-fin base**. **Axillary scale of pectoral fin almost reaching tip of pectoral fin. Anus nearer to pelvic-fin tips than to anal-fin origin. Colour:** narrow midlateral silver stripe, width about equal to pupil diameter, disappearing on preservation. Dorsum usually with dusky punctulations not arranged in definite longitudinal series. Side of head silvery.

Size: Maximum 10 cm total length, commonly to 8 cm total length.

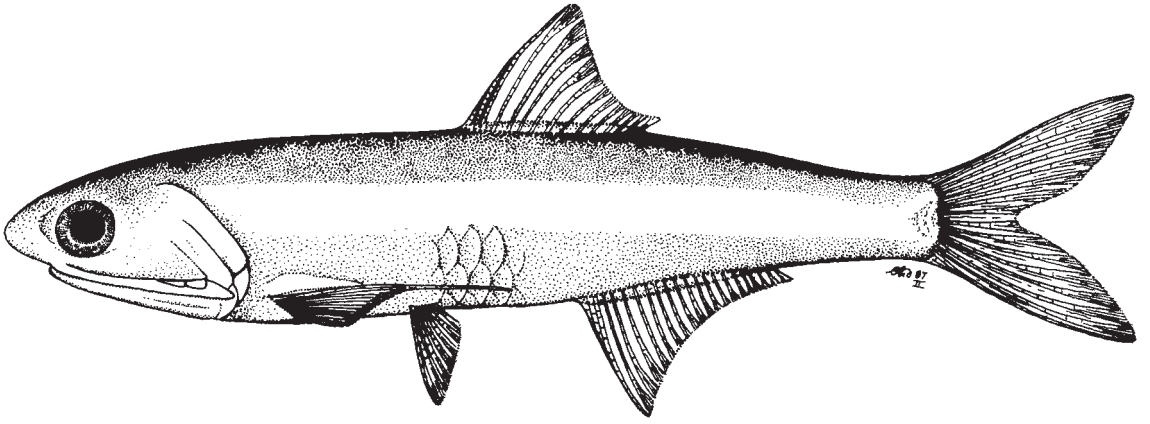
Habitat, biology, and fisheries: Marine, pelagic, coastal, forming dense schools along beaches in water of 1 m or less; occurs down to about 60 m. Also reported from clear waters around islands. Feeds on plankton. Perhaps of local interest to fisheries since it forms dense schools. Caught occasionally with beach seines.



Distribution: Western central Atlantic (North Carolina, both coasts of Florida, northern part of Gulf of Mexico (but perhaps throughout), Cuba and probably throughout the Greater and Lesser Antilles, Yucatán south and east to Venezuela and Suriname) and western South Atlantic (entire coast of Brazil south to at least Santos).

Anchoa filifera (Fowler, 1915) EAF

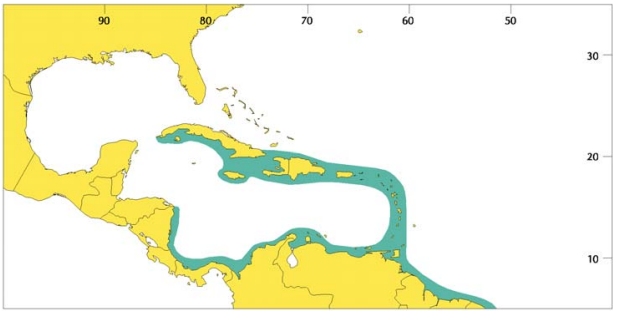
Frequent synonyms / misidentifications: *Anchoa howelli* Hildebrand, 1943 / None.
FAO names: En - Longfinger anchovy; **Fr** - Anchois fil; **Sp** - Anchoa de hebra.



Diagnostic characters: Body moderately round, elongate, body depth about 5 to 5.5 times in standard length. Snout long and pointed, only slightly less than eye diameter; maxilla long, tip pointed, reaching almost to gill opening, teeth near tip somewhat enlarged. **Pseudobranch longer than eye diameter**, with 30 or more filaments, extending onto inner face of operculum. Lower gill rakers 21 to 27; gill cover canals of *panamensis*-type. Anal fin short, with 17 to 21 branched rays, its origin at or posterior to vertical through base of last dorsal-fin ray; **pectoral fin with first ray extended as a filament reaching as far as vertical through dorsal-fin origin in larger fishes** (but often broken). **Colour:** broad midlateral silver stripe, about as wide as eye, apparently without dark line above it. Side of head and lower part of side silvery. Upper parts of head and dorsum with numerous punctulations not arranged in lateral series.

Size: Maximum 12 cm total length, commonly to 10 cm total length.

Habitat, biology, and fisheries: Marine, pelagic, coastal in continental shelf areas as well as in clear waters around islands; trawled down to depths of 25 m off Brazil, but equally taken in shore seines and recorded in brackish water (7.94 to 8.21‰) in the Canal de Santa Cruz, Pernambuco. A plankton-feeding species often occurring in large schools. Caught occasionally in beach seines. Contributes to total clupeoid catches, but no special fishery.

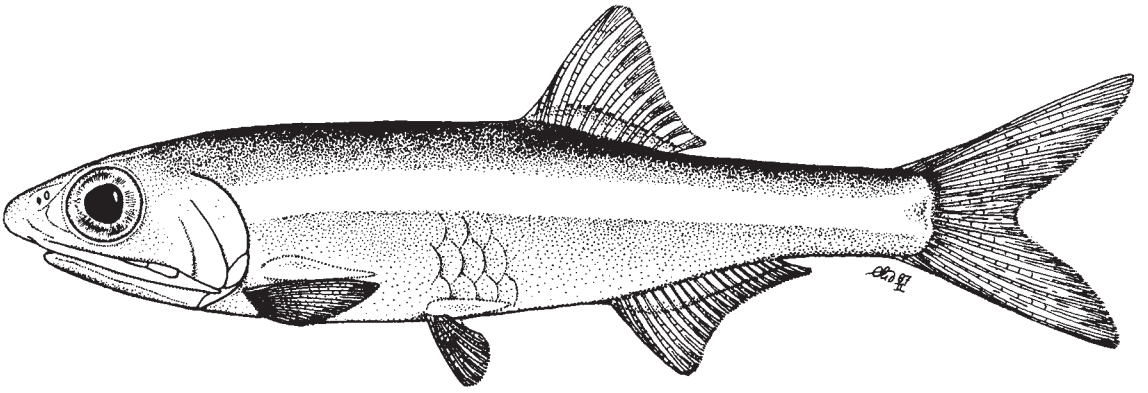


Distribution: Western Atlantic (Antilles, Trinidad and south to Brazil, apparently as far south as 24°58'S; also Venezuela to Panama and Honduras, but not in Gulf of Mexico).

Anchoa hepsetus (Linnaeus, 1758) ENP

Frequent synonyms / misidentifications: *Engraulis hepsetus* (Linnaeus, 1758) / *Anchoa lamprotaenia* Hildebrand, 1943.

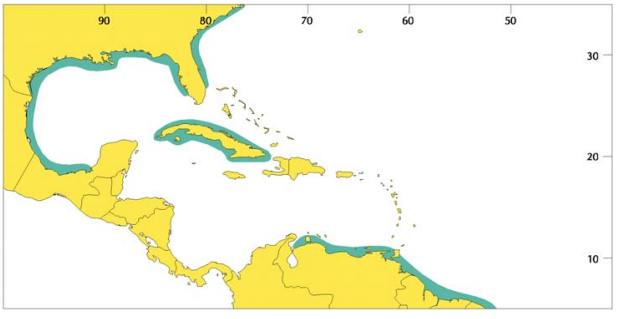
FAO names: En - Broad-striped anchovy (AFS: Striped anchovy); **Fr** - Anchois rayé; **Sp** - Anchoa legítima.



Diagnostic characters: Body fusiform, slightly compressed, elongate, body depth about 5 times in standard length. Snout prominent and pointed, about 3/4 eye diameter; **maxilla long, posterior tip of maxilla pointed, reaching beyond posterior margin of preoperculum**, sometimes almost to gill opening; jaw teeth small. **Pseudobranch shorter than eye**. Lower gill rakers 19 to 25; gill cover canals of *panamensis*-type. **Anal fin short** with 16 to 23 branched rays, its **origin anterior to vertical through last dorsal-fin ray**. **Anus nearer to anal-fin origin than to pelvic-fin tips. Colour:** dorsum blue-green, with **broad midlateral silver stripe** (a dark line above) of uniform width (about 3/4 eye diameter) except narrowed immediately behind gill opening.

Size: Maximum 15 cm total length, commonly 9 to 11 cm total length.

Habitat, biology, and fisheries: Inhabits shallow coastal waters, but also reported from depths as great as 70 m; often forms large schools. Apparently able to tolerate a wide range of salinities, from hypersaline to almost fresh; frequently found in brackish-water bays and estuaries. Spawns in harbours, estuaries, and sounds, as well as offshore (innercontinental shelf) during spring and summer; in Terminos Lagoon, Mexico, eggs restricted to polyhaline waters close to the Puerto Real inlet and central zone of the lagoon. Eggs elliptical (about 1.4 to 1.6 mm by 0.7 to 0.85 mm), transparent, without oil globule, yolk appearing 'cellular'. Relative fecundity and minimum size at maturity for females in Terminos Lagoon, Mexico, estimated to be 1 298 eggs/g and 85.5 mm, respectively. Feeds on copepods when young, then also on gastropods, foraminifera, ostracods, and an occasional annelid. Adults feed on small planktonic and bottom-living animals. No special fishery; it does not appear to be widely exploited. Caught with beach and boat seines; also with fine-mesh trawls. Used as a foodfish to the north of the area, perhaps also in this area. Separate statistics are not reported for this species.

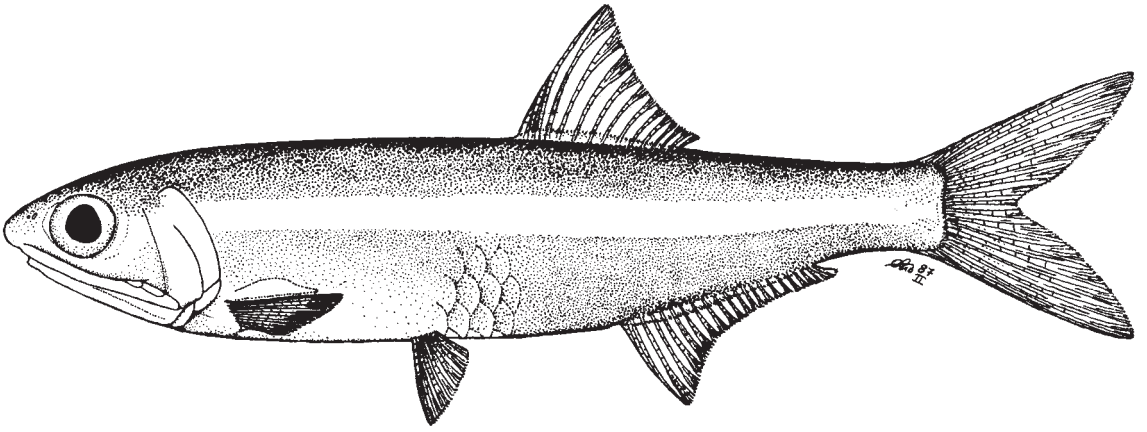


Distribution: Probably occurs throughout the area, but more abundant in northern part; reaches northward to Massachusetts (or even Nova Scotia) and southward to Florida (not the Florida Keys) and to southern Gulf of Mexico; Cuba; also western Venezuela to Brazil.

Anchoa januaria (Steindachner, 1879) EAJ

Frequent synonyms / misidentifications: None / None.

FAO names: En - Rio anchovy.

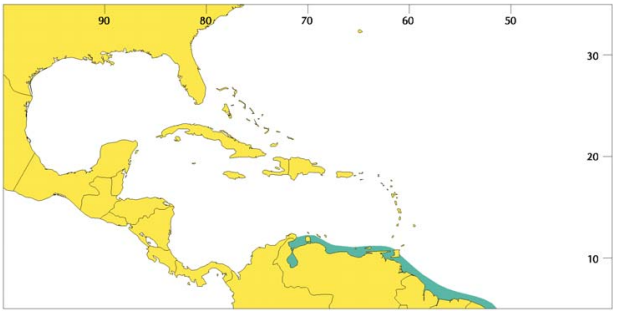


Diagnostic characters: Body somewhat compressed, moderately elongate, body depth about 5 times in standard length. Snout moderate, about 1/2 eye diameter or slightly more; **maxilla** moderate, tip not sharply pointed, **not or only just reaching posterior margin of preoperculum**; jaw teeth small. Pseudobranch shorter than eye. **Lower gill rakers 24 to 29**; gill cover canals of *walkeri*-type. **Anal fin fairly short**, with 19 to 25 (usually 22 to 24) branched rays, its **origin about at vertical through midpoint of dorsal-fin base. Axillary scale of pectoral fin reaching beyond midpoint of fin. Anus advanced, nearer to pelvic-fin tips than to anal-fin origin. Colour:** narrow midlateral silver stripe, width about 1/2 eye diameter or a little more.

Size: Maximum to 8 cm total length, commonly 5 to 6 cm total length.

Habitat, biology, and fisheries: Marine, pelagic, coastal, entering estuaries; schooling. In Santa Cruz canal, Pernambuco, the species was recorded in salinities of 7.9 to 31.3‰. Feeds preferentially on zooplankton, especially copepods and their larvae; phytoplankton seldom represent principle food items. More data needed on this species, based on correct identifications.

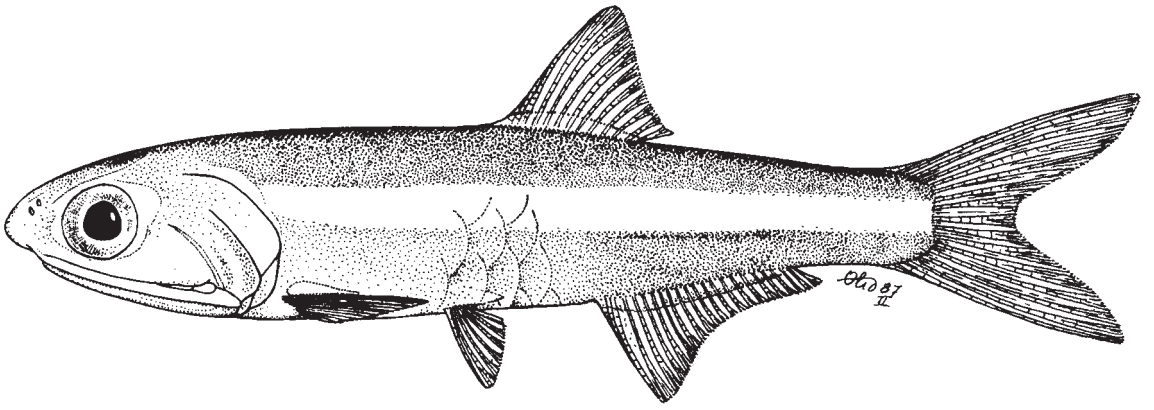
Distribution: Lake Maracaibo (the western region of Venezuela) and western south Atlantic (Brazil, from Ceará and the Santa Cruz canal, Itamaracá, Pernambuco, northeast of Brazil, coastally to Santa Catarina and São Paulo (southern Brazil). More intensive collecting is needed to determine the full extent of the range.



Anchoa lamprotaenia Hildebrand, 1943 EAL

Frequent synonyms / misidentifications: None / *Anchoa hepsetus* (Linnaeus, 1758).

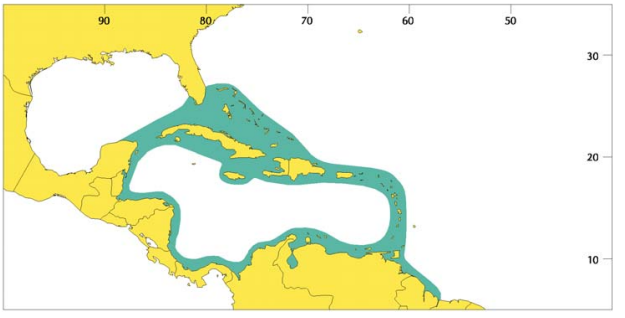
FAO names: En - Bigeye anchovy; **Fr** - Anchois caraïbe; **Sp** - Anchoa ojona.



Diagnostic characters: Body somewhat compressed, elongate, body depth about 5 times in standard length. Snout pointed, about 3/4 eye diameter; maxilla long, tip pointed, reaching to posterior margin of preoperculum; jaw teeth small. Pseudobranch short, not extending onto inner face of operculum. **Lower gill rakers 17 to 21** (rarely 22); gill cover canals of *walkeri*-type. **Anal fin** moderate, with 18 to 23 (rarely 24) branched rays; its **origin about equal to vertical through midpoint of dorsal-fin base**. **Anus advanced, nearer to pelvic-fin tips than to anal-fin origin. Colour:** broad midlateral silver stripe, width about 3/4 eye diameter, a dark line above.

Size: Maximum 12 cm total length; commonly to 10 cm total length.

Habitat, biology, and fisheries: Marine, coastal, pelagic in continental shelf areas, and in clear waters around islands; not entering mangrove-lined lagoons of Venezuelan mainland, but the dominant species of the Los Roques Archipelago and there found as much in the lagoons as outside them. A zooplankton-feeding species occurring in dense schools. Frequently collected in mixed schools (with *Anchoa mitchilli*) in the Miami area. Ripe females recorded off Florida in June and July. Caught occasionally with beach seines.

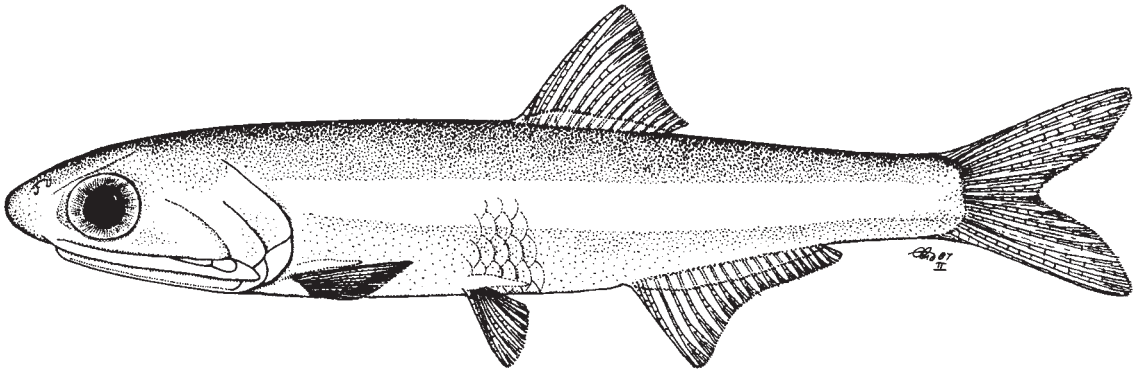


Distribution: Caribbean area (southern Florida, Cuba, Bahamas, Greater and Lesser Antilles, and Yucatán to Colombia and Venezuela); also Trinidad and Tobago, south to Guyana; possibly Brazil.

Anchoa lyolepis (Evermann and Marsh, 1900) EAY

Frequent synonyms / misidentifications: *Anchoa nasuta* Hildebrand and Carvalho, 1948 / None.

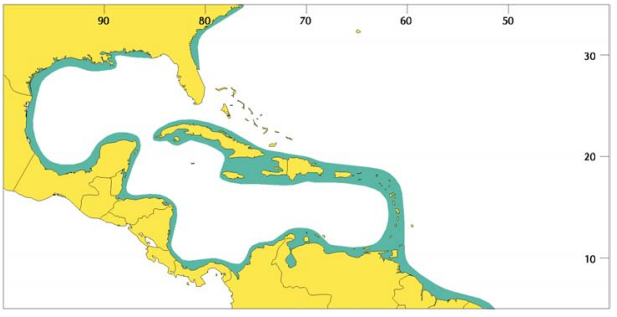
FAO names: En - Shortfinger anchovy (AFS:Dusky anchovy); **Fr** - Anchois longnez; **Sp** - Anchoa trompalarga.



Diagnostic characters: Body fusiform, slightly compressed. Head long and pointed; snout prominent and obtusely pointed; **posterior tip of maxilla pointed, reaching beyond anterior margin of preoperculum**, almost to gill opening; jaw teeth small. **Pseudobranch longer then eye**, extending posteriorly onto operculum. Lower gill rakers 19 to 28 (the higher figures apply to Florida, Gulf of Mexico, and Venezuelan fishes); gill cover canals of *panamensis*-type. **Anal fin** with 19 to 24 branched rays, its **origin at or posterior to vertical through last dorsal-fin rays. Anus closer to origin of anal fin than to tip of pelvic fin. Colour:** dorsum dark translucent grey, sides with broad midlateral silver stripe in which the upper margin is sometimes darkly pigmented; dorsal, anal, and caudal fins with dark spots along fin rays and around their bases.

Size: Maximum 12 cm total length, commonly to 6 to 8 cm total length.

Habitat, biology, and fisheries: Shallow coastal waters, especially off beaches and mangrove-lined lagoons, and in harbours; also apparently trawled to depths of 25 to 55 m; absent in low salinity bays and estuaries. Often occurs in large, compact schools. No special fishery for this species. Caught with beach and boat seines, often using light (Venezuela); also in trawls. Not commonly used as a food fish, but mainly for bait (Colombia, Venezuela). Separate statistics are not reported for this species.

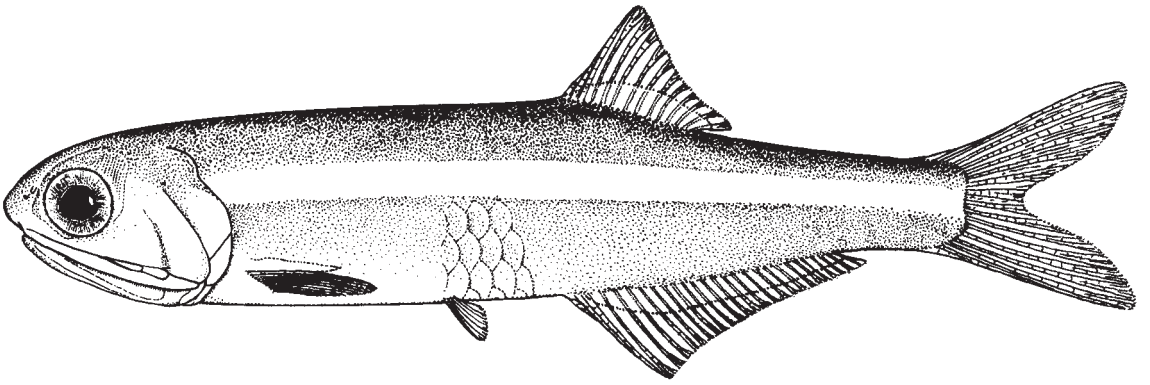


Distribution: Western Atlantic, New York south to Florida (rare on Gulf coast of Florida), northern Gulf of Mexico south to Yucatán, Panama, Venezuela; Antilles, Trinidad and south to Brazil.

Anchoa mitchilli (Valenciennes, 1848) ANB

Frequent synonyms / misidentifications: None / None.

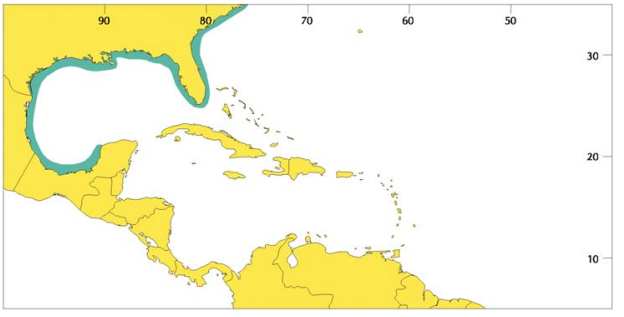
FAO names: En - Bay anchovy; **Fr** - Anchois baie; **Sp** - Anchoa de caleta.



Diagnostic characters: Body fusiform, moderately compressed. **Snout fairly short and blunt; posterior tip of maxilla pointed, reaching beyond anterior margin of preoperculum**; jaw teeth small. **Pseudobranch shorter than eye**. Lower gill rakers 20 to 26; gill cover canals of *panamensis*-type. **Anal fin with 23 to 30 branched rays**, its **origin at vertical through anteriormost portion (unbranched rays) of dorsal fin. Anus advanced, opening nearer to pelvic-fin tips than anal-fin origin. Colour:** dorsum dark translucent grey, with narrow midlateral silver stripe (hidden until scales are shed).

Size: Maximum about 10 cm total length, commonly to 8 cm total length.

Habitat, biology, and fisheries: Pelagic, shallow coastal waters, estuaries, and lagoons; found along beaches down to 36 m, but more common in areas with muddy bottoms and brackish waters less than 25 m; tolerates wide range of salinities (virtually fresh to full salinity or hypersaline conditions). A schooling species; schools tend to be located near surface, but changes in depth distribution occur seasonally and diurnally that are not well understood. Serial spawner; spawning takes place in the evening from late April to mid-July, perhaps through August off North Carolina, from May to November or February in water less than 20 m deep off Texas, possibly year-round off Biscayne Bay, Florida. In Terminos Lagoon, Mexico, eggs of *A. mitchilli* were abundant, found in polyhaline waters, and present throughout the year, with peak abundance in August, September, and May. Relative fecundity and minimum size at maturity for females in Terminos Lagoon, Mexico, estimated to be 823.8 eggs/g and 37 mm, respectively; in Chesapeake Bay, Virginia, annual egg production was estimated to be 45 110 eggs/female (55 mm fork length), with average batch fecundity of 643 to 740 eggs/g. Eggs pelagic, transparent, barely elliptical, 0.84 to 1.11 mm. Feeds on zooplankton, predominately copepods, also on gastropods, isopods, mysid shrimps, and small fishes. No special fishery. Caught with beach seines, also with trawls. Mainly used as a baitfish and to a small extent for anchovy paste. In areas where abundant, extremely important in estuarine and coastal food webs; links secondary plankton production to fisheries output. Separate statistics are not reported for this species.

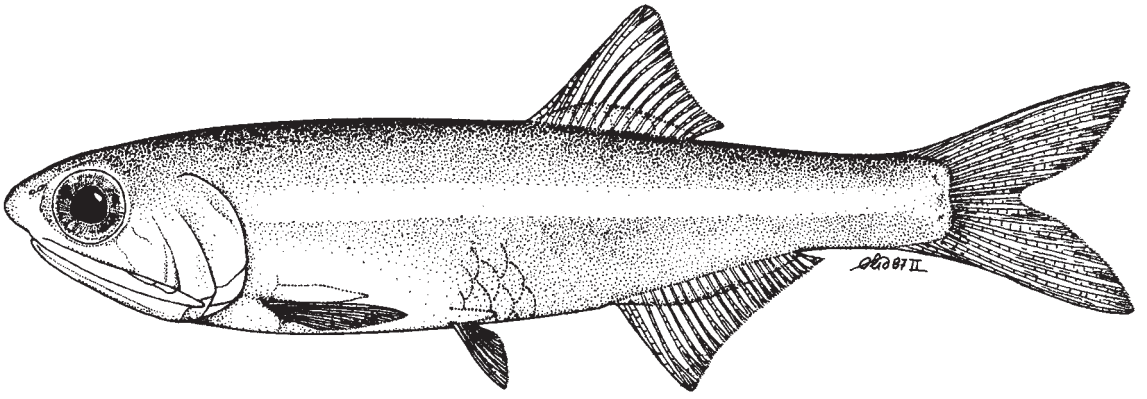


Distribution: Western north and central Atlantic (Maine south to the Florida Keys; westward around the Gulf of Mexico, south to Yucatán; probably not in the Antilles or the Caribbean).

Anchoa parva (Meek and Hildebrand, 1923)

Frequent synonyms / misidentifications: None / *Anchoa januaria* (Steindachner, 1879).

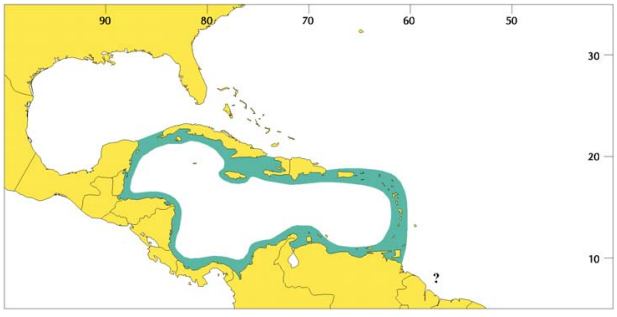
FAO names: En - Little anchovy; **Fr** - Anchois mignon; **Sp** - Anchoa chiquita.



Diagnostic characters: Body fusiform, a little compressed, **body depth 4.5 to 5 times in standard length. Snout** pointed, **short (about 1/2 eye diameter); posterior tip of maxilla sharply pointed**, **just reaching beyond posterior margin of preoperculum**; jaw teeth small. **Pseudobranch shorter than eye. Lower gill rakers 24 to 29**; gill cover canals of *walkeri*-type. **Anal fin** moderately **short** with 21 to 25 branched rays, its **origin about at vertical through midpoint of dorsal-fin base. Axillary scale of pectoral fin reaching beyond midpoint of fin. Anus closer to pelvic-fin tips than to anal-fin origin. Colour:** dorsum dark translucent grey, with narrow midlateral silver stripe.

Size: Maximum about 8 cm total length, commonly to 5 cm total length.

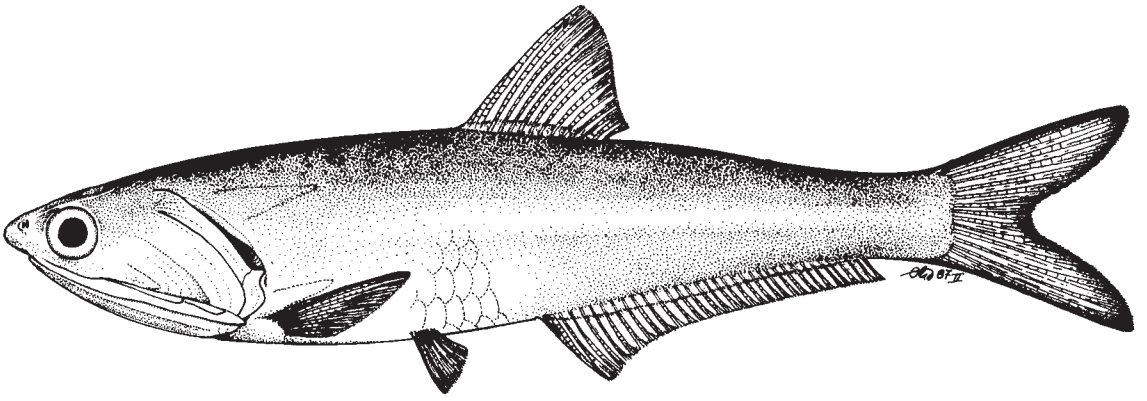
Habitat, biology, and fisheries: Shallow coastal waters; especially abundant in brackish, mangrove-lined lagoons (eastern Venezuela); and apparently in fresh water. Average length at maturity for fishes off the Colombian coast was 4.5 to 4.8 cm total length. Batch fecundity off Colombia 450 to 2 250 eggs/female. Eggs are elliptical, translucent, 200 to 437 microns. Caught with seines. Hardly used for food, mainly a baitfish. No special fishery. Separate statistics are not reported for this species.



Distribution: Western central Atlantic (Cuba and Jamaica to Puerto Rico, the Lesser Antilles; Yucatán to Colombia, Venezuela, Trinidad and Tobago; probably southward to Brazil).

Anchoa spinifer (Valenciennes, 1848) EAH

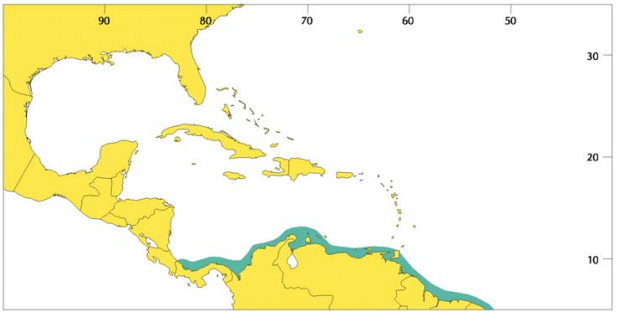
Frequent synonyms / misidentifications: *Anchoa argenteus* Schultz, 1949 / None.
FAO names: En - Spicule anchovy; **Fr** - Anchois de fond; **Sp** - Anchoa de fonda.



Diagnostic characters: Body fusiform, somewhat compressed; snout prominent, pointed; **posterior tip of maxilla pointed, reaching beyond anterior margin of preoperculum**, almost to gill opening; **small triangular projection at posterior margin of operculum (on suboperculum)** slightly above pectoral-fin base; jaw teeth small. **Pseudobranch shorter than eye**. Lower gill rakers 12 to 19, preceded by short stumps in larger fishes; gill cover canals of *panamensis*-type. **Anal fin long, with 36 to 40 branched rays**, its origin at vertical through midpoint of dorsal-fin base. **Colour:** large specimens yellow-orange or rosy orange, but smaller fishes paler and often with distinct midlateral silver stripe. Dorsal-fin tip and caudal-fin margin darkly pigmented.

Size: Maximum 24 cm total length, commonly to 16 to 20 cm total length.

Habitat, biology, and fisheries: Shallow coastal waters, lagoons, and mouths of rivers, usually at 5 to 30 m, but down to 50 m off the Orinoco mouth; also in brackish waters, and occasionally fresh water. Demersal over soft bottoms of the continental shelf. Carnivorous, feeding on small fishes and crustaceans. No special fishery; it is landed in large quantities and taken mainly as bycatch in the industrial trawl fishery for shrimps; also caught with seines, traps and trawls. Mainly used in the manufacture of byproducts. Also marketed fresh, although the market for human consumption is small at present. Separate statistics are not reported for this species.



Distribution: Western central and south Atlantic (Panama to Trinidad and south to at least Santos, Brazil); also eastern central Pacific (Costa Rica south to northern border of Peru).

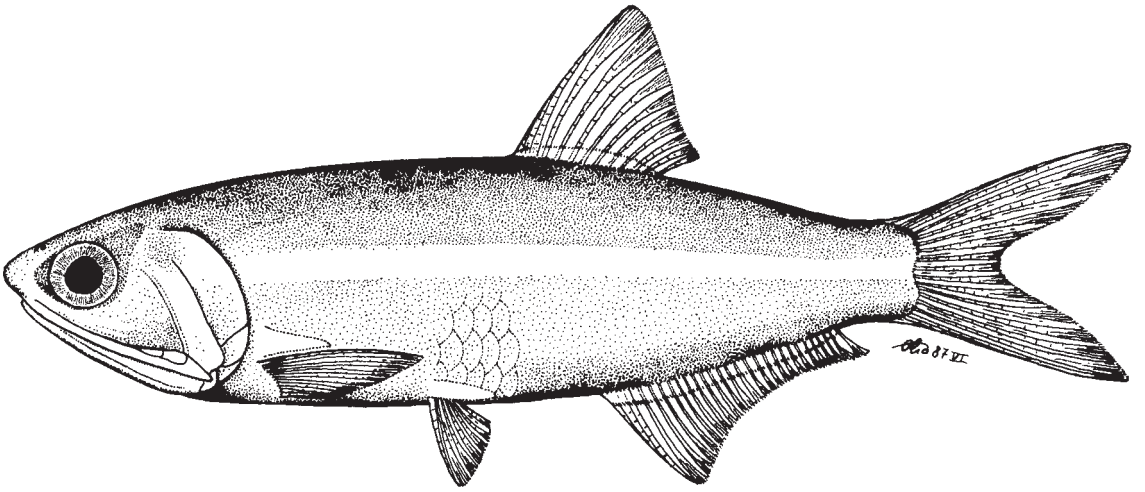
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Anchoa trinitatis (Fowler, 1915) EAK

Frequent synonyms / misidentifications: None / None.

FAO names: En - Trinidad anchovy; **Fr** - Anchois machète; **Sp** - Anchoa machete.

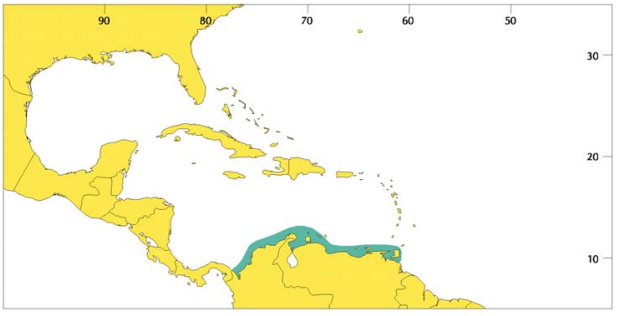


Diagnostic characters: Body fusiform, strongly compressed. Snout pointed; **posterior tip of maxilla pointed**, reaching beyond anterior margin of preoperculum, almost to gill opening; jaw teeth small. **Pseudobranch shorter than eye. Lower gill rakers 13 to 21**; gill cover canals of *panamensis*-type. Dorsal-fin origin slightly nearer to posterior margin of eye than to caudal-fin base; **anal fin with 26 to 30 branched rays, its origin about at vertical through midpoint of dorsal-fin base. Anus advanced, opening nearer to pelvic-fin tips than to anal-fin origin. Colour:** dorsum blue-green, with **distinct and fairly broad midlateral silver stripe**; fins hyaline, but dark pigmentation at bases of anal and caudal fins.

Size: Maximum 14 cm total length, commonly to 12 cm total length.

Habitat, biology, and fisheries: Shallow coastal waters, especially abundant in mangrove-lined lagoons. Sometimes captured very close to the bottom over soft sediments. Often forms large schools. Caught with seine nets. Marketed fresh, but mainly used as bait. No special fishery; not very suitable as a foodfish because of its strongly compressed body. Separate statistics are not reported for this species.

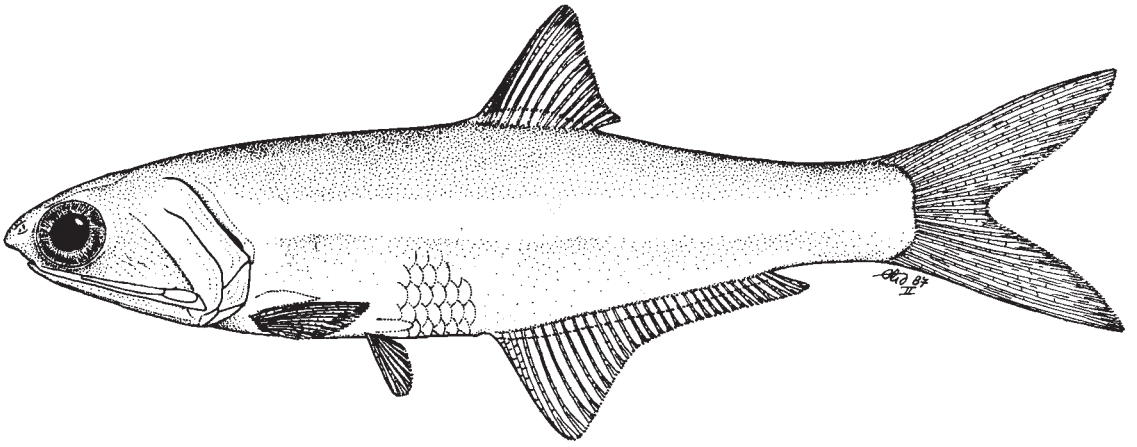
Distribution: Northern coasts of Colombia and Venezuela, and Trinidad.



Anchovia clupeoides (Swainson, 1839) AHU

Frequent synonyms / misidentifications: *Engraulis productus* Poey, 1866; *Anchovia nigra* Schultz, 1949 / None.

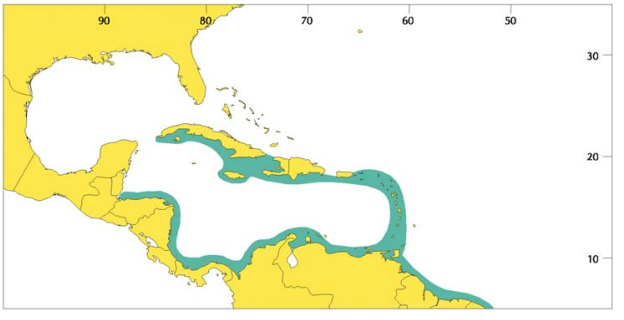
FAO names: En - Zabaleta anchovy; **Fr** - Anchois hachude; **Sp** - Anchoa bocona.



Diagnostic characters: Body fusiform, fairly compressed. Snout prominent and slightly pointed; **posterior tip of maxilla broad, but obliquely truncated**, **extending beyond end of second supramaxilla and reaching onto preoperculum**; minute denticulations in both jaws. Branchiostegal rays 13. **Branchiostegal membrane normal, not broadly joined across isthmus; upper limb of third gill arch without any gill rakers on inner face; gill rakers very fine and slender**, 100 or more on lower limb of anterior arch in larger fishes. **Anal fin long** with 28 to 35 branched rays, **its origin at vertical through anterior portion of dorsal-fin base. Colour:** dorsum blue-green, sides silvery, but with distinct midlateral silver stripe in fishes less than 5 cm; dorsal and caudal fins yellow with dark pigmentation along outer margins.

Size: Maximum 24 cm total length, commonly to 17 cm total length.

Habitat, biology, and fisheries: Shallow coastal waters, mangrove-lined lagoons, and estuaries; demersal over shallow, soft, usually muddy bottoms, normally in vicinity of river mouths. Tolerates wide range of salinities; also found in brackish waters, hypersaline lagoons and occasionally fresh water. Average length at maturity for fishes off the Colombian coast was 15.1 to 16.2 cm total length. Batch fecundity relatively high; 3 500 to 28 050 eggs/female. Eggs are elliptical, translucent, 366 to 597 microns. Feeds on plankton, often forms large schools. Artisanal fishery. Caught mainly with seines and occasionally with bottom trawls. Marketed fresh; sometimes used as food (although flesh is of low quality), but mainly for bait. In view of its apparent abundance, this species might be suitable as a source for fish meal. Separate statistics are not reported for this species.

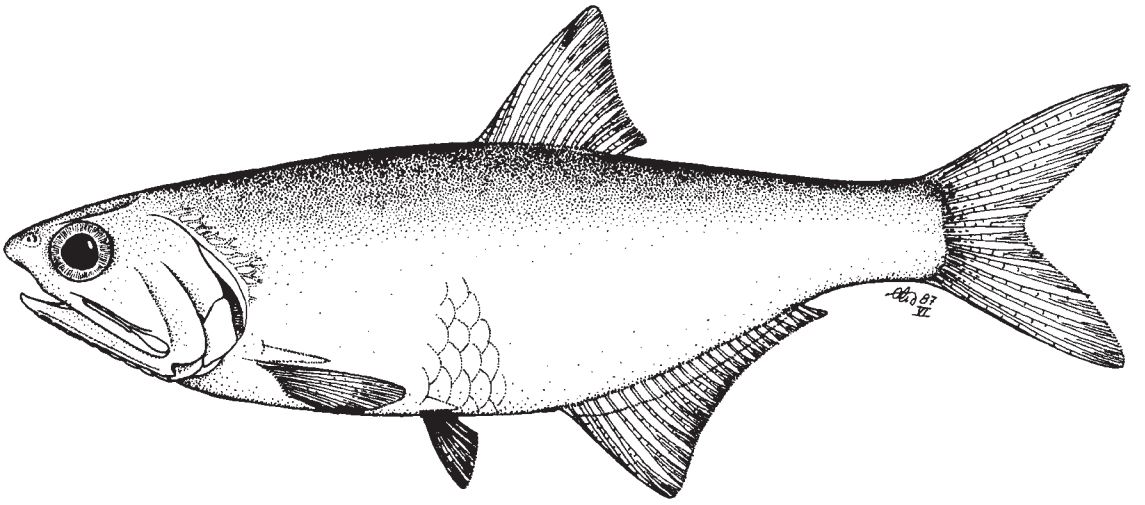


Distribution: Western central and south Atlantic (Antilles, from Cuba, and perhaps throughout; Guatemala south and east to Trinidad and southward to Rio de Janeiro, Brazil).

Anchovia surinamensis (Bleeker, 1866)

Frequent synonyms / misidentifications: *Anchovia pallida* Starks, 1913; *Anchoviella venezuelae* Fowler, 1931 / None.

FAO names: En - Suriname anchovy; **Fr** - Anchois de Suriname; **Sp** - Anchoa de río.

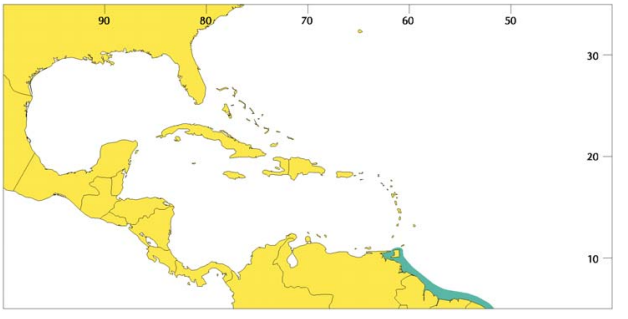


Diagnostic characters: Body moderately deep and compressed, body depth 3.0 to 3.5 times in standard length. Snout moderate and pointed, its tip well above centre of eye; **maxilla short**, tip blunt, failing to reach articulation of lower jaw by about 1/3 eye diameter, **not extending posterior to second supramaxilla; suboperculum with angular posterior margin**, but not formed into a triangular projection; very fine denticulations on lower jaw. **Branchiostegal rays 10 to 13. Branchiostegal membrane normal, not broadly joined across isthmus**; lower gill rakers 51 to 62, fine and slender. **Anal fin moderate**, with 20 to 25 branched rays, its **origin about at vertical through midpoint of dorsal-fin base. Colour:** midlateral silver stripe, width up to 1.5 eye diameter at widest.

Size: Maximum 13 cm total length; commonly to 8 cm total length.

Habitat, biology, and fisheries: Estuarine (no data on salinity tolerance) and riverine (to above Manaus and into Rio Janaperi at least 80 km above its junction with Rio Negro). Predominately demersal over soft bottoms. Exclusively an artisanal fishery. Caught with fine-meshed beach seines. Occasionally consumed in some areas.

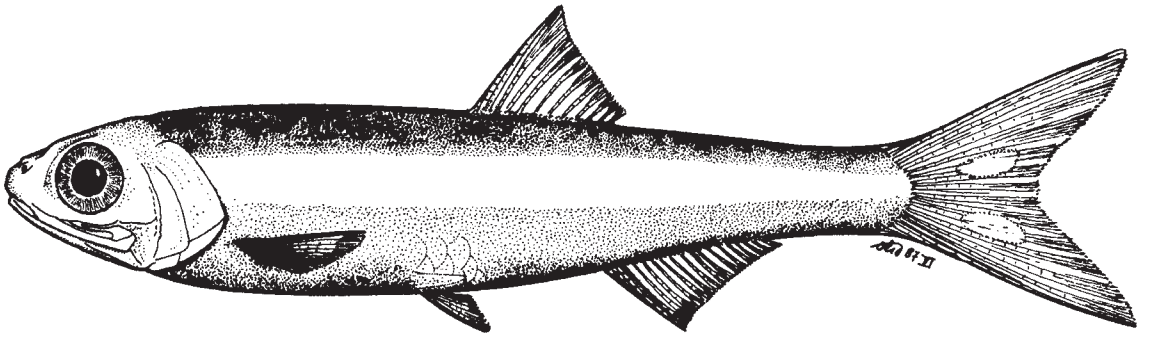
Distribution: Western central and south Atlantic drainage (lower parts of rivers from Trinidad and eastern Venezuela south to Para, Brazil).



Anchoviella brevirostris (Günther, 1868) EVB

Frequent synonyms / misidentifications: *Anchoviella brasiliensis* Hildebrand, 1943; *Anchoviella hildebrandi* Carvalho, 1950 / None.

FAO names: En - Snubnose anchovy; **Fr** - Anchois nez court; **Sp** - Anchoveta chata.

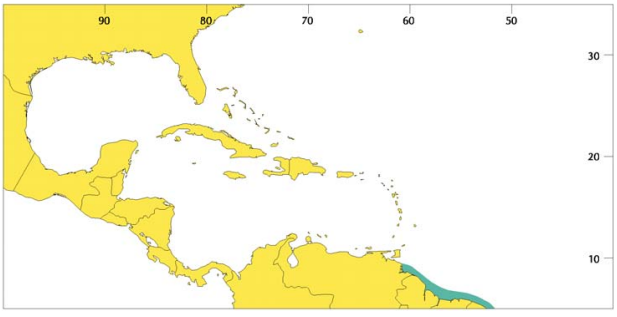


Diagnostic characters: Body fairly slender, somewhat compressed, body depth about 4 to 5 times in standard length. **Snout very short, about 1/2 eye diameter and projecting only slightly beyond lower jaw; maxilla short, tip bluntly rounded, failing to reach preoperculum by about 1/2 pupil diameter**; lower jaw longer than upper, its symphysis almost at tip of snout; fine teeth in lower jaw. Pseudobranch short, less than eye diameter. Lower gill rakers 23 to 27; gill cover canals of *panamensis*-type. **Anal fin short, with 15 to 17 (rarely 15) branched rays, its origin below posteriormost portion of dorsal-fin base (but not behind it).** **Colour:** midlateral silver stripe, width narrow anteriorly and about 3/4 eye diameter over anal fin.

Size: Maximum 9 cm total length; commonly to 7 cm total length.

Habitat, biology, and fisheries: Coastal, pelagic to a depth of 50 m, but also found in estuaries, sometimes at very low salinities. Ripe or almost ripe individuals caught in March and May. One female (71.5 mm) contained 20 000 eggs of similar size. Occasionally caught in beach seines. Probably contributes to artisanal clupeoid catches in estuaries.

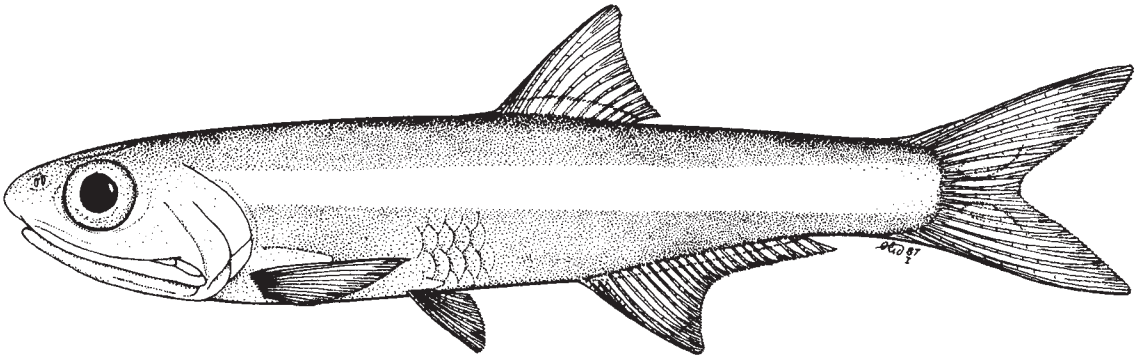
Distribution: Western central and south Atlantic (Orinoco mouth, the Guianas south to Rio Ribeiro do Iguape, São Paulo coast, Brazil).



Anchoviella elongata (Meek and Hildebrand, 1923) EVE

Frequent synonyms / misidentifications: None / None.

FAO names: En - Elongate anchovy; **Fr** - Anchois allongé; **Sp** - Anchoveta alargada.

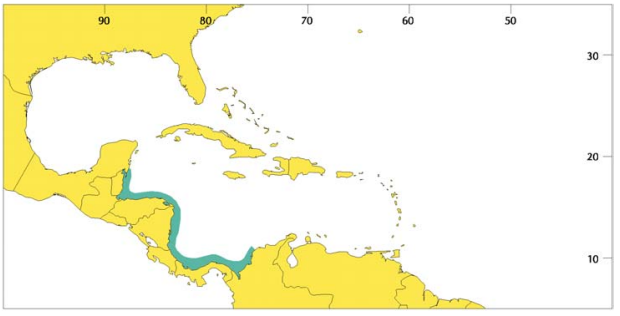


Diagnostic characters: Body slender, moderately compressed, body depth 5.0 to 5.5 times in standard length. Snout moderate, about 2/3 eye diameter; **maxilla relatively long**, tip bluntly rounded, **reaching to or slightly posterior to the anterior margin of preoperculum**; fine teeth in lower jaw. Pseudobranch short, less than eye diameter. Lower gill rakers 21 to 24; gill cover canals of *panamensis*-type. Anal fin fairly long, with 18 to 22 branched rays; its origin about equal to a vertical through middle of dorsal-fin base. **Axillary scale of pectoral fin about half as long as fin. Colour: midlateral silver stripe, width less than eye diameter.**

Size: Maximum 11 cm total length; commonly to 9 cm total length.

Habitat, biology, and fisheries: Occurs in vicinity of sand beaches; also in estuaries, lagoons and other brackish-water habitats; apparently tolerates very wide range of salinities, but probably does not enter fresh water. Probably one component in anchovy catches of artisanal fisheries.

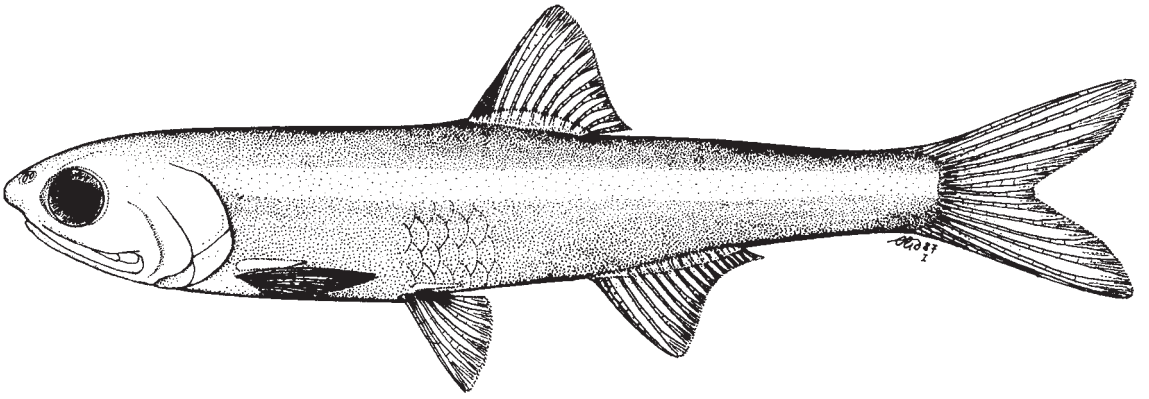
Distribution: Southwestern Caribbean (Belize south to Panama and northwestern part of Colombian coast).



Anchoviella guianensis (Eigenmann, 1912) EVG

Frequent synonyms / misidentifications: None / None.

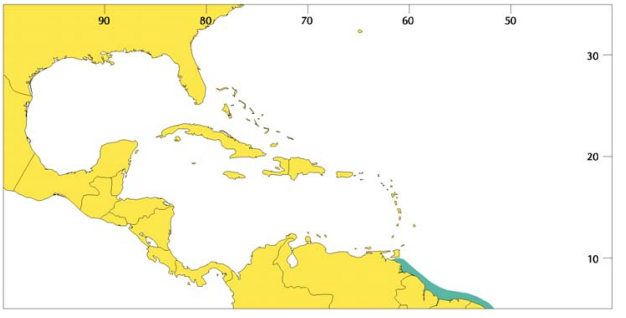
FAO names: En - Guiana anchovy; **Fr** - Anchois de Guiane; **Sp** - Anchoveta de río.



Diagnostic characters: Body fairly slender, moderately compressed, body depth 4 to 5 times in standard length. Snout short, slightly longer than 1/2 eye diameter; **lower jaw symphysis posterior to tip of snout; maxilla** moderate, tip bluntly rounded, **failing to reach preoperculum by 1/3 to 1/2 pupil diameter**; fine teeth in lower jaw. Pseudobranch short, less than eye diameter. Lower gill rakers 20 to 26; gill cover canals of *walkeri*-type. **Anal fin short, with 14 to 18 branched rays, its origin slightly posterior to vertical through posteriormost dorsal-fin ray. Axillary scale of pectoral fin reaching only to about midpoint of fin. Colour:** midlateral silver stripe, widening to about 1/2 eye diameter over anal-fin base.

Size: Maximum 9 cm total length; commonly to 6 cm total length.

Habitat, biology, and fisheries: Occurs in low salinity brackish waters, but predominantly in fresh water. Breeding occurs in December, one female (58 mm standard length) contained 1 980 eggs. Probably contributes to landings of artisanal river fisheries.

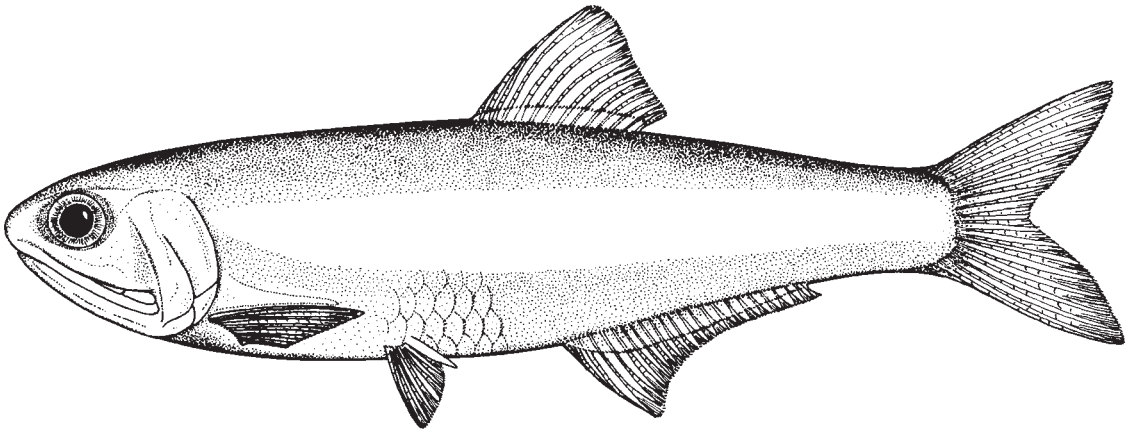


Distribution: Western central and south Atlantic, Gulf of Paria to Brazil; also Orinoco system, as far up as Puerto Gaitan on Manacacias River in Colombia, certainly in delta; lower parts of rivers of Guyana, Suriname and French Guiana; lower part of Amazon (but lower limits within Amazon system not known).

Anchoviella lepidentostole (Fowler, 1911) EVL

Frequent synonyms / misidentifications: *Anchoviella iheringi* Fowler, 1941; *Anchoviella hubbsi* Hildebrand, 1943; *Anchoviella nitida* Hildebrand and Carvalho, 1948 / None.

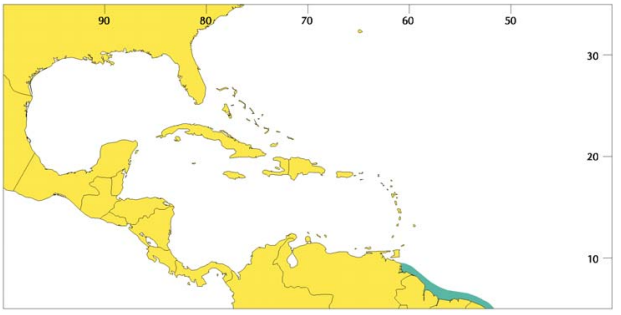
FAO names: En - Broadband anchovy; **Fr** - Anchois gras; **Sp** - Anchoa ñata.



Diagnostic characters: Body fusiform, moderately compressed, **body depth about 4 to 5 times in standard length**. Snout prominent but bluntly rounded; **posterior tip of maxilla bluntly rounded, not reaching beyond anterior margin of preoperculum**; fine teeth in lower jaw. Pseudobranch short, less than eye diameter. Lower gill rakers 19 to 25 (higher numbers in specimens from southern portion of range); gill cover canals of the *walkeri*-type. Anal fin with 22 to 25 branched rays, its origin about at vertical through midpoint of dorsal-fin base; **pectoral fin** not reaching to pelvic-fin base, **axillary scale reaching beyond midpoint but failing to reach tip of fin. Colour:** dorsum translucent grey, **broad and very bright midlateral silver stripe**, its width equal to eye diameter but narrower at each end; fins transparent except caudal fin yellow with dusky outer edges and posterior margin.

Size: Maximum about 11 cm total length, commonly to 9 cm total length.

Habitat, biology, and fisheries: Coastal waters and estuaries; occurs mainly in river mouths and estuaries, but also offshore down to 50 m. Found predominately in brackish waters, but also in the sea; most likely anadromous, entering estuaries and penetrating into fresh water. Apparently spawns in May in Orinoco delta, perhaps migrating into fresh water from the estuary. Males mature at 5 cm standard length, females 7 cm standard length, with about 20 202 eggs in specimen of 7.7 cm; both sexes have large amount of visceral and intermuscular fat at maturity. Plankton-feeding species occurring in schools. Caught with seines, also with trawls. Marketed mostly fresh (Guyana). Taken as bycatch in industrial trawl fisheries, mainly those for shrimps. No special fishery; a component of anchovy catches taken by artisanal fisheries. In view of its relatively large size and rounded body, this species is best suited for marketing purposes. Separate statistics are not reported for this species.

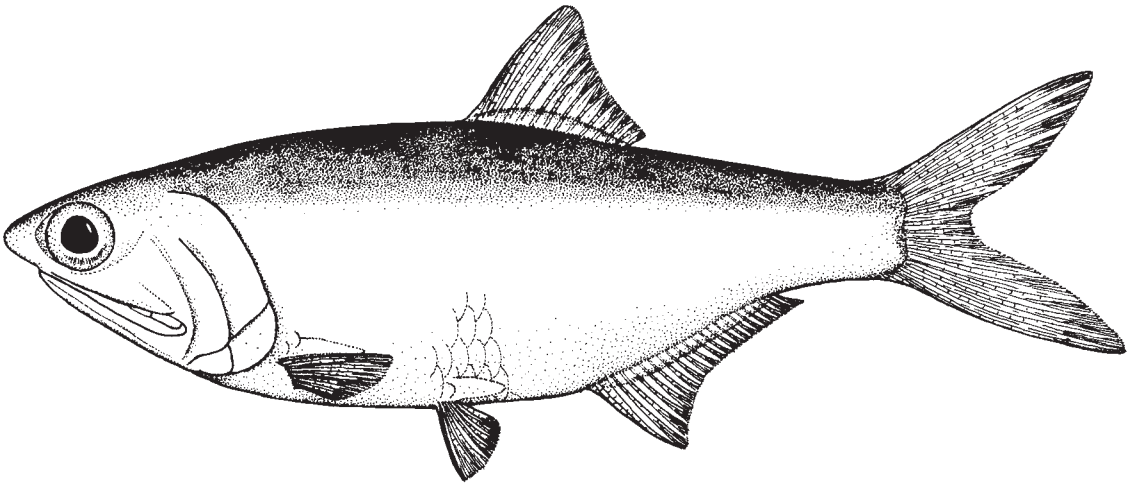


Distribution: Western central and south Atlantic (Orinoco delta to Guyana and Suriname; reaches southward to Santos, Brazil).

Cetengraulis edentulus (Cuvier, 1829) AVA

Frequent synonyms / misidentifications: None / None.

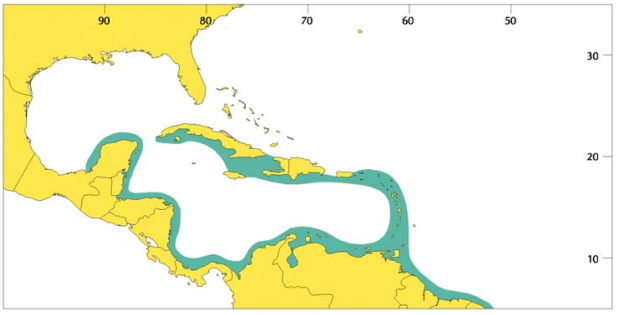
FAO names: En - Atlantic anchoveta; **Fr** - Anchois queue jaune; **Sp** - Anchoveta rabo amarillo.



Diagnostic characters: Body moderately deep and compressed. **Snout sharply pointed and prominent**; posterior tip of maxilla rounded, not reaching to articulation of lower jaw; upper jaw teeth very small, lower jaw lacking teeth. **Branchiostegal membrane very broad, expanded posteriorly to cover isthmus; branchiostegal rays 8, long. Gill rakers fine and very numerous (45 or more), but absent on inner face of upper limb of third gill arch. Colour:** dorsum dark blue-green, sides silvery; small fishes with silver midlateral stripe (variously retained in adults); fins hyaline.

Size: Maximum about 17 cm total length, commonly to 16 cm total length.

Habitat, biology, and fisheries: Pelagic in shallow coastal waters, often forming large schools; found along beaches and also down to depths of 25 m; also entering brackish waters of lagoons and estuaries and tolerating salinities of 10.3 to 31‰. Spawns off Araya Peninsula, Venezuela, between October and January with a distinct peak in mid-November. In Terminos Lagoon, Mexico, spawning occurs throughout the year, peaking in February; eggs are found in eastern and central portions of the lagoon, coincident with low temperatures and polyhaline and ultrahaline conditions. Relative fecundity and minimum size at maturity for females in Terminos Lagoon, Mexico, estimated to be 585.5 eggs/g. and 97.5 mm, respectively. Eggs oval, small, ranging in volume from 0.18 to 0.34 mm^3; eccentricity of eggs ranges from 0.74 to 0.94. Spawning occurs between 2400 and 0500 hours along shore-line out to about 1.5 km. Embryonic development is completed in about 20 to 24 hrs. Filter-feeds on minute planktonic organisms (presumably both animal and plant), especially diatoms. Caught with seines and cast nets May to November (Venezuela). Fresh fish little used for human consumption, but valued as a source of fish meal (Venezuela). The reported catch for this species between 1995 and 1999 ranged from 8 to 119 t.

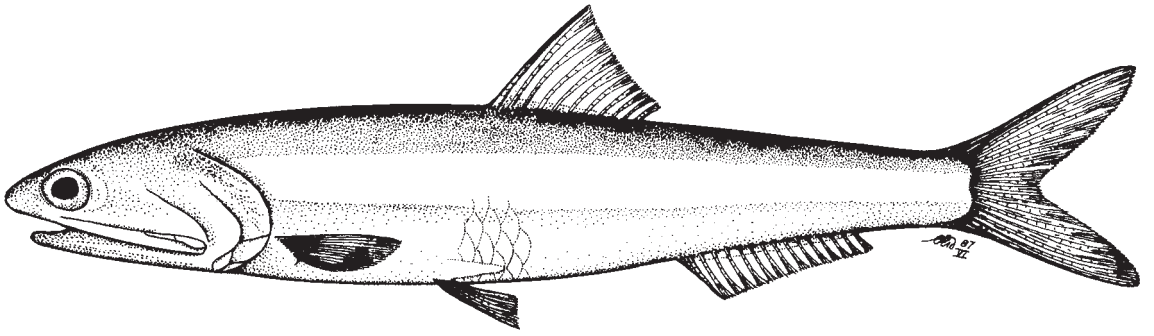


Distribution: Western central and south Atlantic (Antilles from Cuba southward; southern Gulf of Mexico (Terminos Lagoon) south and east to Colombia and Venezuela, Trinidad, to southern Brazil).

Engraulis eurystole (Swain and Meek, 1885)

Frequent synonyms / misidentifications: *Anchoviella eurystole* (Swain and Meek, 1885); *Anchoviella estauquae* Hildebrand, 1943 / None.

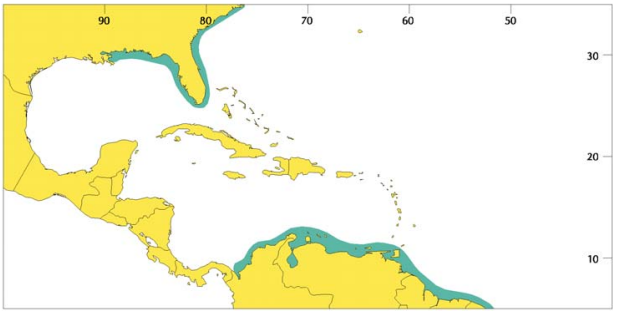
FAO names: En - Silver anchovy; **Fr** - Anchois gris; **Sp** - Anchoita negra.



Diagnostic characters: Body fusiform, subcylindrical. Snout prominent and pointed; **posterior tip of maxilla truncate, bluntly tipped, not projecting beyond anterior margin of preoperculum; isthmus not reaching to posterior margin of branchiostegal membrane, leaving exposed a vertical bony urohyal plate**; jaw teeth small. **Pseudobranch longer than eye**, extending posteriorly onto operculum. **Lower gill rakers 27 to 43**. Anal-fin origin posterior to vertical through posteriormost dorsal-fin ray. **Colour:** dorsum blue-green, sides silvery, sometimes with broad silver midlateral stripe, with dark (or black in preserved specimens) upper edge.

Size: Maximum 12 cm total length, commonly to 8 cm total length.

Habitat, biology, and fisheries: Pelagic in shallow coastal waters, especially in sheltered areas (harbours), but also taken at depths of 20 to 65 m. A plankton-feeding species that often forms dense, compact schools. Spawning occurs during summer. Caught with seines and with liftnets operating at night with lights; also with trawls. Marketed fresh in small quantities, apparently not common in markets. No special fishery, but enters artisanal fisheries in the southern part of its range. Separate statistics are not reported for this species.

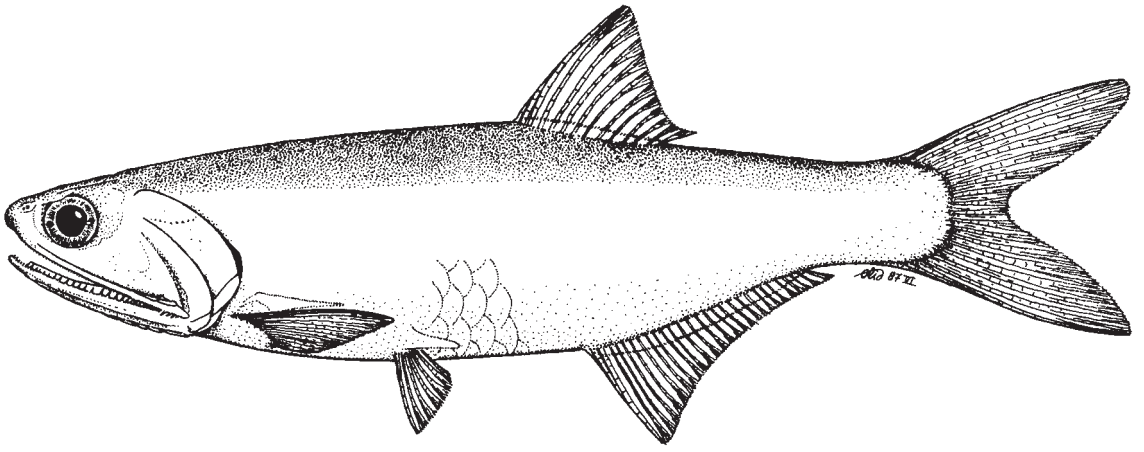


Distribution: Western north and central Atlantic (Massachusetts to Florida, northeastern Gulf of Mexico, at least to about Mississippi Sound); also, Caribbean coasts of Colombia and Venezuela, south to northern Brazil (2 19'N).

Lycengraulis batesii (Günther, 1868) ELB

Frequent synonyms / misidentifications: *Lycengraulis barbouri* Hildebrand, 1943 / *Lycengraulis grossidens* (Agassiz, 1829).

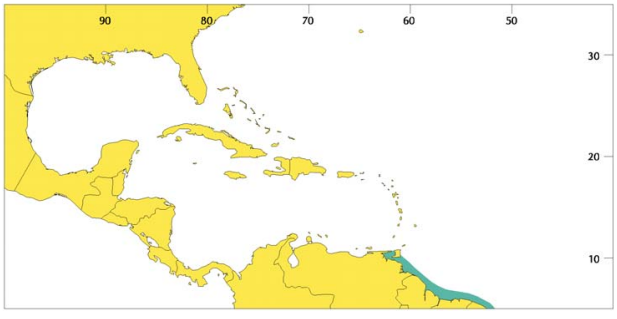
FAO names: En - Bates' sabretooth anchovy; **Fr** - Anchois-tigre; **Sp** - Anchoa tigre.



Diagnostic characters: Body fairly elongate and compressed, body depth about 4 to 5 times in standard length (small fish more slender). Snout moderate, about 3/4 eye diameter, maxilla moderate, tip pointed, reaching almost to or just posterior to anterior margin of preoperculum; **teeth becoming larger toward tip of jaw; lower jaw with small teeth at front, followed by larger canine-like teeth, especially around midpoint of jaw. Lower gill rakers 12 to 15, short and stumpy, anterior 1 to 3 rakers rudimentary in fish larger than 10 cm standard length.** Dorsal-fin origin well behind midpoint of body; anal fin long, with 26 to 30 branched rays, it origin equal to vertical through first to fourth branched dorsal-fin ray. **Colour:** broad midlateral silver stripe, twice eye diameter at widest point, but disappearing in fish larger than 10 to 12 cm standard length; with curve of black dots on upper part of operculum.

Size: Maximum 30 cm total length; commonly to 15 to 20 cm total length.

Habitat, biology, and fisheries: Found in low salinity estuarine waters and fresh water. A ripe female of 17.2 cm standard length was recorded at Tucupita, Orinoco delta. A carnivorous predator feeding on small fishes and probably crustaceans; not occurring in large schools. Caught in beach seines. Marketed locally in small quantities.

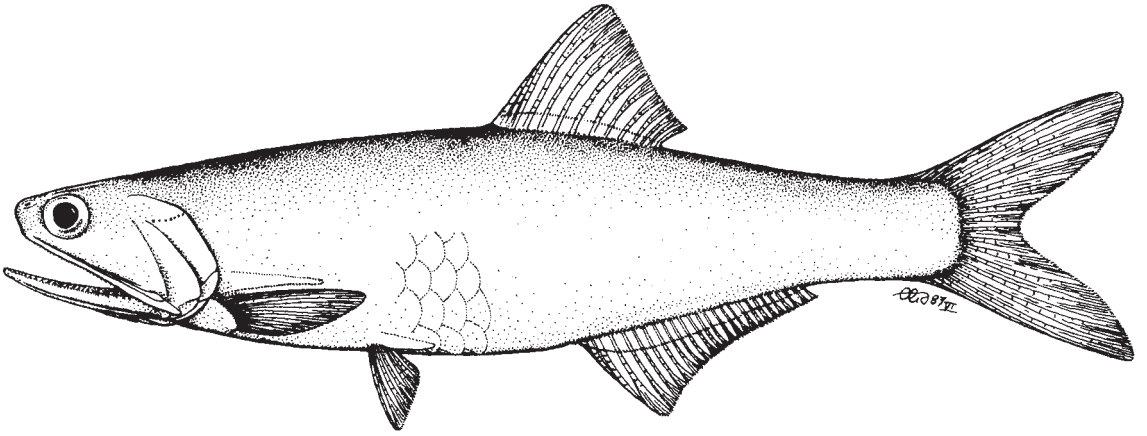


Distribution: Gulf of Paria to Brazil; and west central and south Atlantic drainages (Orinoco, as far up as the Río Manacacias in Colombia, rivers of the Guianas, and Amazon at least as far up as Teffe and the Jutahi River).

Lycengraulis grossidens (Agassiz, 1829) ANR

Frequent synonyms / misidentifications: *Lycengraulis olidus* (Eigenmann, 1907); *Anchovia abbotti* Fowler, 1915; *Lycengraulis schroederi* Hildebrand, 1943; *Lycengraulis limnichthys* Schultz, 1949 / *Lycengraulis batesii* (Günther, 1868).

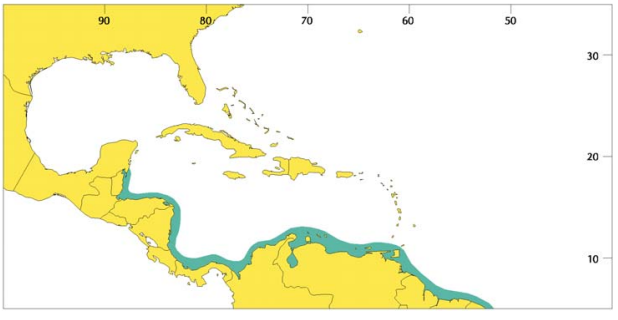
FAO names: En - Atlantic sabretooth anchovy; **Fr** - Anchois goulard; **Sp** - Anchoa dentona.



Diagnostic characters: Body fusiform, elongate, moderately compressed; **body depth 23 to 24.5% standard length. Snout prominent but bluntly rounded, about 2/3 eye diameter, eye far forward; posterior tip of maxilla sharply pointed, reaching** posteriorly beyond articulation of lower jaw **to margin of operculum; teeth in lower jaw enlarged, widely spaced, canine-like** (especially in larger fishes). **Lower gill rakers 16 to 26** (young fishes with more than adults); total gill rakers on first arch 30 to 36. Dorsal-fin origin posterior to midpoint of body; anal fin with 26 to 28 branched rays, its origin below middle of dorsal-fin base. **Pelvic fin usually inserted nearer to anal-fin origin than to pectoral-fin base**, occasionally equidistant between these points. **Colour:** dorsum grey-blue, sides silver; with short arc of dark spots on upper part of operculum; fins colourless.

Size: Maximum about 26 cm total length, commonly to 20 cm total length.

Habitat, biology, and fisheries: Shallow coastal waters down to about 40 m, over soft, usually muddy, sediments; also estuaries, lagoons, river mouths, and fresh water. A carnivorous predator, feeding on small fishes and crustaceans. Caught with seines, beach nets, and trawls; also taken as bycatch in industrial trawl fisheries for shrimps. Marketed mostly fresh; of little commercial importance. No special fishery. Separate statistics are not reported for this species.

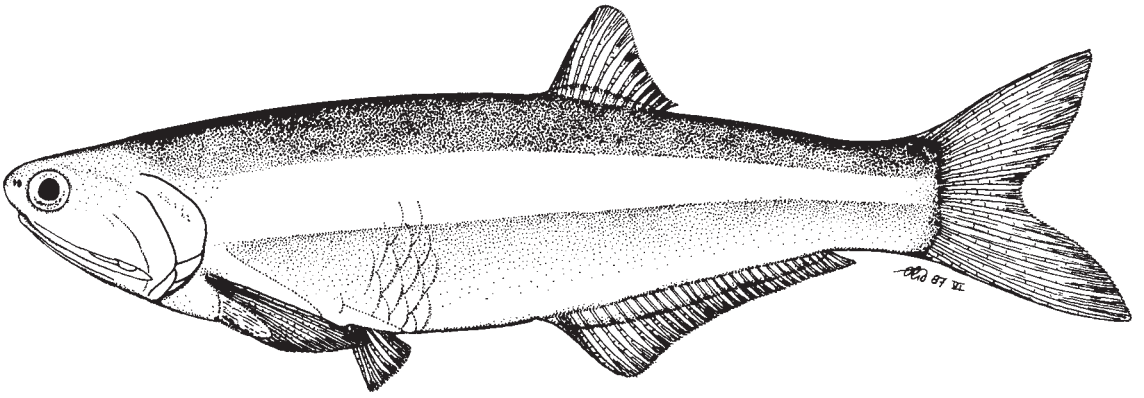


Distribution: Central and southern Atlantic (Belize to Panama east to Venezuela, Trinidad, and the Guyanas; south to southern Brazil).

Pterengraulis atherinoides (Linnaeus, 1766) EPH

Frequent synonyms / misidentifications: None / None.

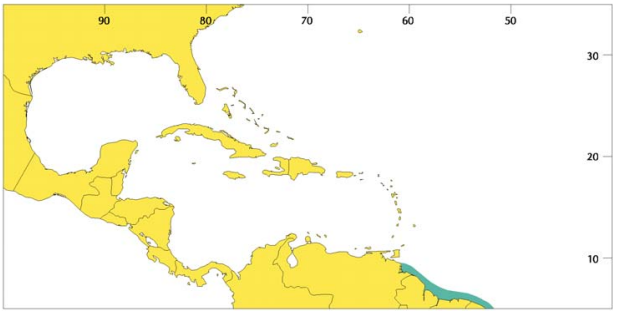
FAO names: En - Wingfin anchovy; **Fr** - Anchois grande aîle; **Sp** - Anchoa aletona.



Diagnostic characters: Fairly large in size; body strongly compressed, fairly elongate, body depth about 3.5 to 4.5 times in standard length. Snout short, about 2/3 eye diameter; maxilla moderate; tip bluntly rounded, not quite or just reaching lower jaw articulation. Teeth in jaws short and even; **small patches of teeth on upper edge of hyoid bones**. Pseudobranch small, covered by skin. Lower gill rakers 12 to 14, short, often with single rudimentary raker in front. **Dorsal fin short, far back on body; anal fin long, with 28 to 32 branched rays, its origin anterior to vertical through dorsal-fin origin; pectoral fins large, reaching beyond pelvic-fin base. Colour:** silver lateral stripe, broadest anteriorly, narrowing over anal fin.

Size: Maximum size to 30 cm total length; commonly to 20 cm total length.

Habitat, biology, and fisheries: Found in low salinity estuarine waters and in fresh water, reaching some distance inland (at least 17 km up the Suriname River; to above Santarem on the Amazon). A carnivorous predator, feeding mainly on shrimp and small fishes (particularly other engraulids). Of local importance in artisanal fisheries. Caught with beach seines. Marketed locally.

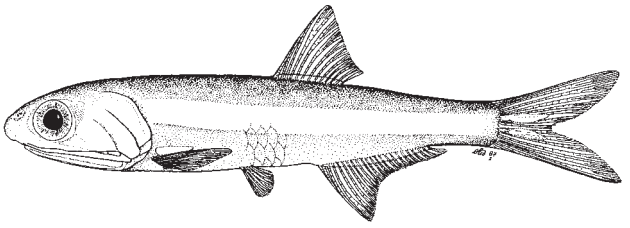


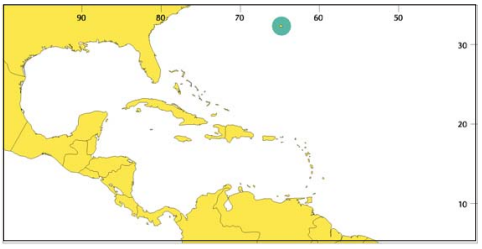
Distribution: Western central and south Atlantic coasts and drainage (Orinoco delta, the Guyanas, south to Ceará, Brazil).

Anchoa choerostoma (Goode, 1874) EAC

En - Bermuda anchovy.

Maximum size to about 8 cm standard length. Marine, pelagic, coastal, schooling; common. Specimens with well-developed eggs taken in June, suggesting summer spawning period. Probably of little interest to fisheries, but will school under a light and are of great value as a baitfish. Found only in Bermuda.

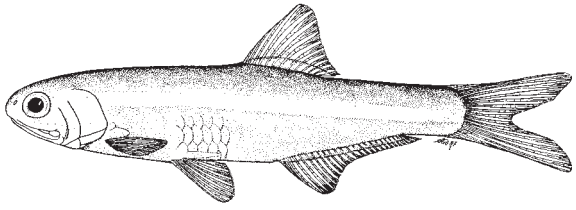


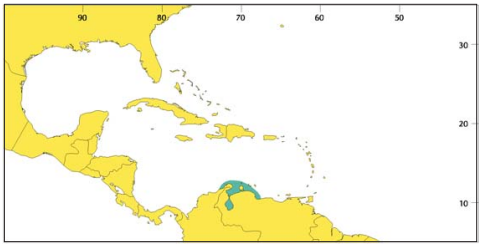


Anchoviella blackburni Hildebrand, 1943

En - Blackburn's anchovy.

Size to at least 4 cm total length (type material is probably a juvenile). Marine, pelagic, coastal, but also in small lagoons and in Lake Maracaibo. Probably of no interest to fisheries, considering its apparent rarity. Although some authors question the validity of this species, it is recognized here until a family revision is conducted. Southern Caribbean (north coast of Venezuela), possibly also Suriname.

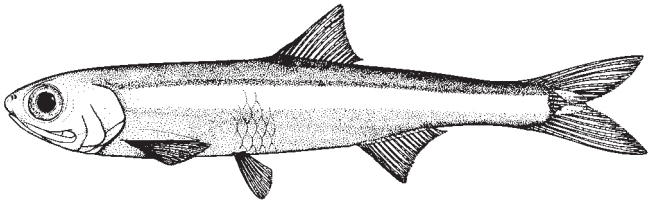


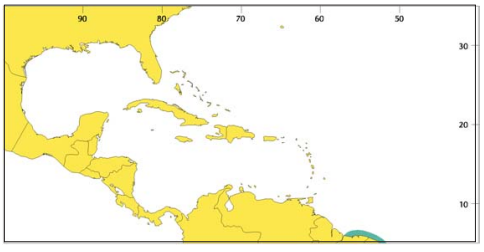


Anchoviella cayennensis (Puyo, 1946) EVN

En - Cayenne anchovy; **Fr** - Anchois de Cayennes; **Sp** - Anchoveta de Cayena.

Maximum size to 12 cm standard length; commonly to 9 cm standard length. Occurs in estuaries but whether it also occurs in marine waters or in fresh water is unknown. Probably a component of anchovy catches in artisanal fisheries, but apparently not abundant. Western, central, and south Atlantic from the Guyanas to Brazil.

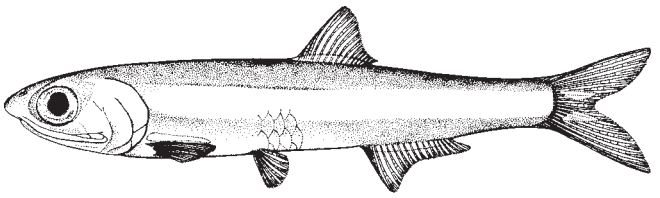


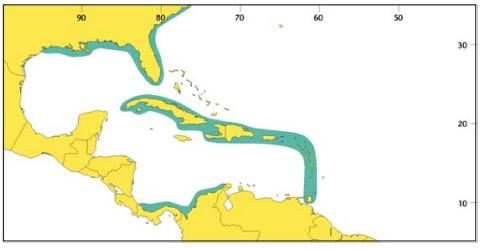


Anchoviella perfasciata (Poey, 1860)

En - Poey's anchovy (AFS: Flat anchovy); **Sp** - Anchoveta cubana.

Maximum size to 11 cm total length; commonly to 9 cm total length. Coastal, pelagic in marine waters; its presence in brackish waters is not confirmed. Probably an occasional component of artisanal fisheries landings. Apparently not very abundant. Western central Atlantic (Beaufort, North Carolina, south to Florida; Antilles from Cuba to St. Lucia, also Trinidad and Tobago and Panama, probably the northern coast of Colombia).

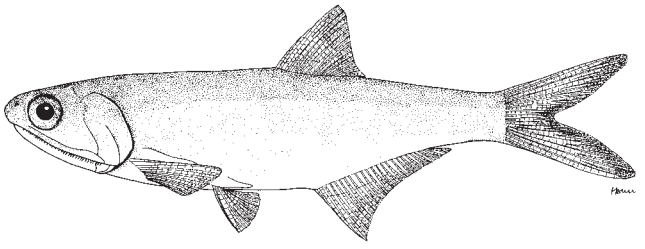


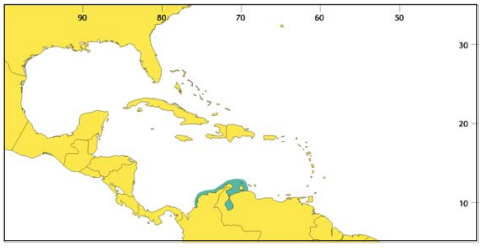


Lycengraulis limnichthys Schultz, 1949

En - Schultz's sabretooth anchovy.

Maximum size to about 15 cm standard length. In fresh to slightly brackish water. Several females with large eggs were taken in Lake Maracaibo in May indicating that at least some spawning takes place in the spring of the year. From Colombia (Cartagena Bay) to western Venezuela (including Lake Maracaibo).





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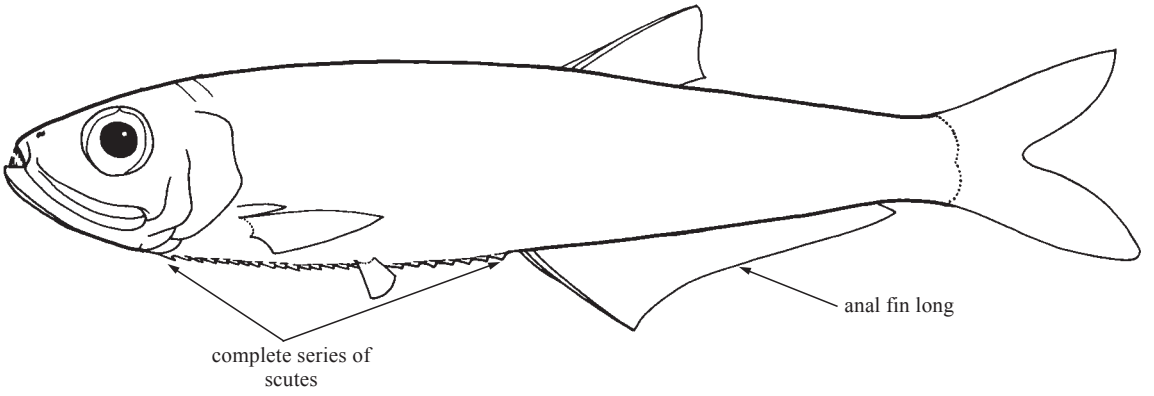
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PRISTIGASTERIDAE

Pellonas

T.A. Munroe, National Marine Fisheries Service, National Museum of Natural History, Washington D.C., USA

Diagnostic characters: Moderate or sometimes quite large clupeoid fishes (usually to about 20 to 25 cm standard length), but some South American members (*Pellona*) up to 50 cm standard length. Body compressed, very deep in some (*Pristigaster*), more elongate in others; **with complete series of scutes along abdomen. Mouth terminal or more often with lower jaw projecting beyond upper; with 2 supramaxillae, and jaw teeth usually small or minute** (but enlarged canines in *Chirocentrodon*). **A toothed hypomaxillary bone present in some genera, joining posterior tip of premaxilla to blade of maxilla. Tooth plates fused to second basibranchial and to one or more pairs of hypobranchials, especially the second pair. Adipose eyelids with broad vertical opening in middle. No spiny rays in dorsal fin; single, short dorsal fin (if present) near midpoint of body**. Dorsal-fin origin (if present) near body midpoint in very deep-bodied forms, but posterior to midpoint in elongate forms; reduction of dorsal fin occurs in long-bodied pristigasterids (*Opisthopterus*, etc.), but only *Raconda* has completely lost this fin. **Predorsal bones either upright or inclined forward (inclined backward in all clupeids, except upright in *Ramnogaster*)**. Pectoral fins moderate or large in elongate species; pelvic fins small, with 6 or 7 fin rays, but absent in some genera; **anal fin long, with at least 30 fin rays (60 or more in some species)**. Caudal fin forked. **No gap between second and third hypural bones (upper and lower caudal-fin rays separated by this gap in clupeids). Scales cycloid**, without posterior striations, adherent or easily lost, of moderate size (about 35 to 55 in lateral series). **No lateral line. Colour:** typically blue-green on dorsum and silvery on sides, but generally without distinctive colour patterns.



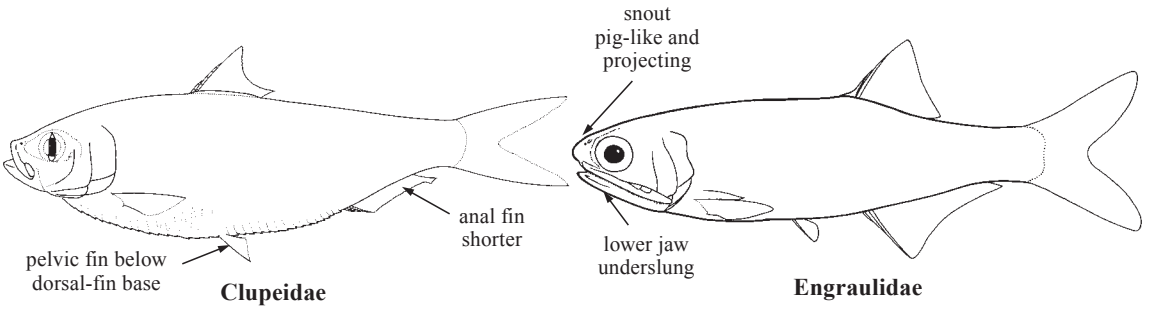
Habitat, biology, and fisheries: Mostly marine, coastal, and schooling fishes of tropical and subtropical seas. They are found on both sides of the Pacific and Atlantic oceans and throughout the Indian Ocean, from about 30 N (southern Japan) to about 30 S (South Africa). Some species enter estuaries and a few species in South America appear to be restricted to fresh water. No special fisheries exist for particular species and catches for only three species (*Ilisha elongata, I. africana*, and *Pellona ditchela*) are reported. Because of their usual small average size and soft consistency of their flesh, they have little value as food fishes. Pristigasterids are locally abundant in some regions, and can be utilized in the manufacture of fishery byproducts. They are sometimes common in tropical fish markets and probably make a substantial contribution to clupeoid catches.

Remarks: Until recently, pristigasterines were considered a subfamily of the Clupeidae.

Similar families occurring in the area

Clupeidae: articulation of lower jaw always anterior to vertical through middle of eye; usually with complete series of scutes along abdomen; anal fin with less than 28 fin rays; pelvic fins inserting below dorsal-fin base.

Engraulidae: articulation of lower jaw well posterior to vertical through posterior margin of eye, lower jaw usually slender; snout pig-like and projecting, lower jaw underslung; adipose eyelid completely covering eyes; scales with posterior striae or striations.



Key to the species of Pristigasteridae occurring in the area

1a. Toothed hypomaxilla present (Fig. 1a) . . . . . → *7*

1b. No hypomaxilla (Fig. 1b) . . . . . → *2*

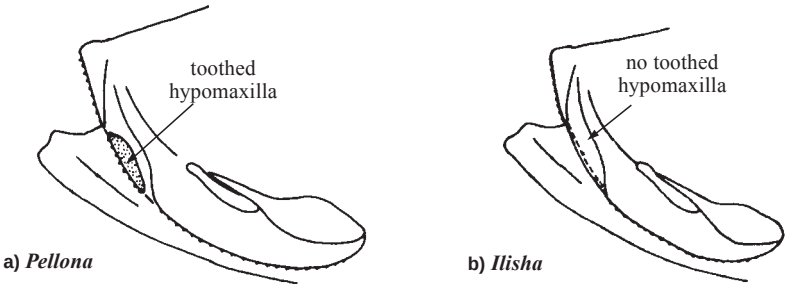


Fig. 1 lateral view of snout

2a. Pelvic fins present . . . . . → *3*

2b. Pelvic fins absent . . . . . → *4*

3a. No enlarged jaw teeth; jaw teeth small or minute, absent at centre of upper jaw (fresh water tributaries of Amazon River) . . . . . ***Ilisha amazonica***

3b. Canine-like teeth in both jaws, enlarged teeth present at centre of upper jaw (Fig. 2) . . ***Chirocentrodon bleekerianus***

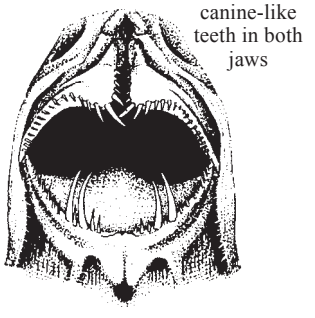


Fig. 2 *Chirocentrodon bleekerianus*

4a. Body elongate; dorsal-fin origin posterior to midpoint of body. . . . . → ***5***

4b. Body very deep (Fig. 3), depth about half of standard length; dorsal-fin origin anterior to midpoint of body (fresh water; perhaps in Amazon River estuary) . . . . . ***Pristigaster cayana***

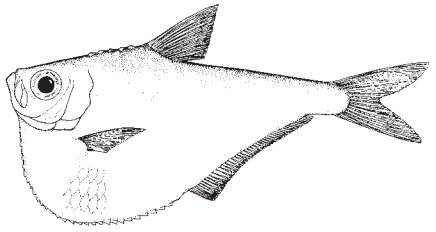
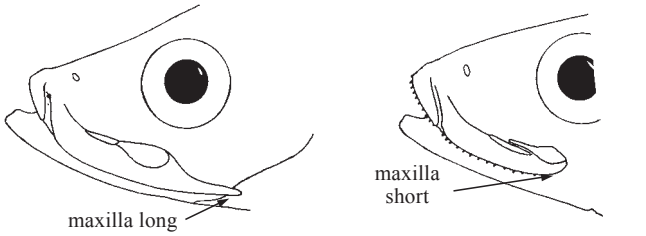


Fig. 3 ***Pristigaster cayana***



a) ***Odontognathus*** **b)** ***Neoopisthopterus cubanus***

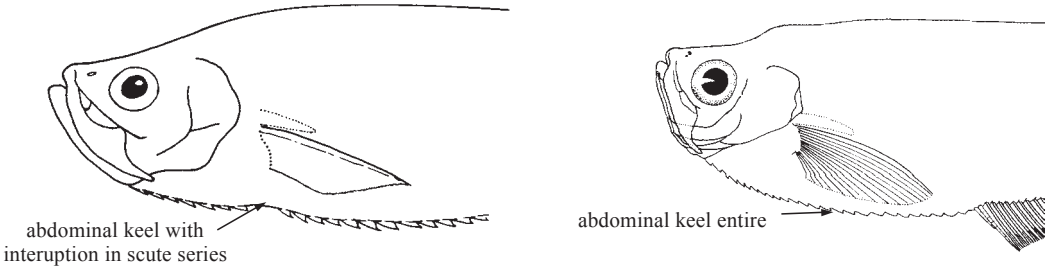
Fig. 4 lateral view of head

5a. Maxilla long (Fig. 4a), reaching to or beyond gill opening . . . . . ***(Odontognathus)*** → ***6***

5b. Maxilla short (Fig. 4b), not reaching posteriorly beyond vertical through posterior margin of eye . . . . . ***Neoopisthopterus cubanus***

6a. Abdominal keel with interruption in scute series below pectoral-fin base (Fig. 5a); 7 or 8 pre-pectoral scutes, followed by gap, then 12 or 13 post-pectoral scutes; outer edges of scutes smooth, not serrate; anal-fin rays 70 to 85 . . . . . ***Odontognathus mucronatus***

6b. Abdominal keel entire (Fig. 5b), without interruption in scute series below pectoral-fin base; scutes 24 to 29; outer edges of scutes distinctly serrate; anal-fin rays 52 to 62 . . . . . ***Odontognathus compressus***



a) ***Odontognathus mucronatus*** ***b) Odontognathus compressus***

Fig. 5 lateral view of anterior body

7a. Post-pelvic scutes 8 to 14; distinct pelvic axillary scale present . . . . . → ***8***

7b. Post-pelvic scutes 5 to 7, usually 6; no distinct pelvic axillary scale . . . . . ***Pellona harroweri***

8a. Gill rakers on lower limb of anterior arch 9 to 14 (in fishes 20 to 50 cm standard length); pelvic fins yellow; anal-fin rays 34 to 38 (fresh water; may occur in estuaries) . . . ***Pellona castelnaeana***

8b. Gill rakers on lower limb of anterior arch 23 to 31 (in fishes 10 to 50 cm standard length); pelvic fins white; anal-fin rays 38 to 46 (fresh water; may occur in estuaries) . . . ***Pellona flavipinnis***

List of species occurring in the area

The symbol is given when species accounts are included.

Chirocentrodon bleekerianus (Poey, 1867).

Neoopisthopterus cubanus Hildebrand, 1948.

Odontognathus compressus Meek and Hildebrand, 1923.

Odontognathus mucronatus Lacepède, 1800.

Pellona castelnaeana Valenciennes, 1847 Freshwater, may enter estuaries.

Pellona flavipinnis (Valenciennes, 1837) Freshwater, may enter estuaries.

Pellona harroweri (Fowler,1917).

Pristigaster cayana Cuvier, 1829 Freshwater.

References

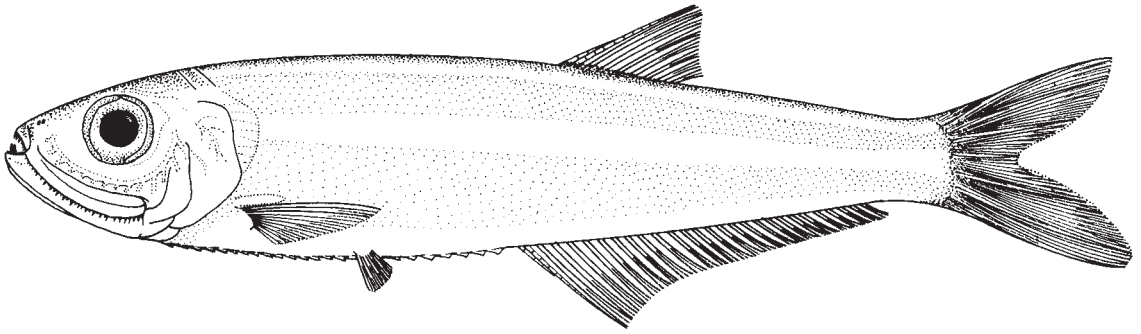
Cervigón, F., R. Cipriani, W. Fischer, L. Garibaldi, M. Hendrickx, A.J. Lemus, R. Márquez, J.M. Poutiers, G. Robaina, and B. Rodriguez. 1993. *FAO species identification sheets for fishery purposes. Field guide to the commercial marine and brackish-water resources of the northern coast of southern America*. Rome, FAO, 513 p.

Whitehead, P.J.P. 1985. FAO species catalogue. Vol. 7. Clupeoid fishes of the world. An annotated and illustrated catalogue of the herrings, sardines, pilchards, sprats, anchovies and wolf-herrings. Part. 1 - Chirocentridae, Clupeidae and Pristigasteridae. *FAO Fish. Synop.*, (125)Vol.7,Pt.1:303 p.

Chirocentrodon bleekerianus (Poey, 1867) CBK

Frequent synonyms / misidentifications: *Ilisha caribbaea* Meek and Hildebrand, 1923 / *Neoopisthopterus cubanus* Hildebrand, 1948.

FAO names: En - Dogtooth herring; **Fr** - Poisson-papier dentu; **Sp** - Arenquillo dentón.

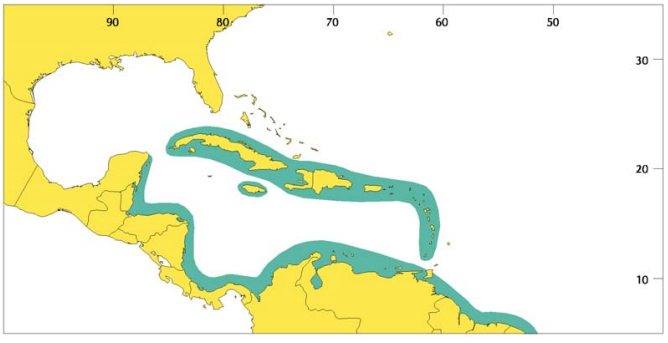


Diagnostic characters: Body elongate, moderately compressed; body depth 20 to 27% standard length; abdomen with 25 to 28 scutes (rarely 30) forming distinct keel. **Mouth terminal, lower jaw not strongly projecting; strong conical teeth in both jaws; anterior jaw teeth enlarged, canine-like**; with series of large and small pointed teeth along entire length of maxilla, including medial edge at centre of upper jaw. **No hypomaxilla present.** Gill rakers on lower limb of anterior arch 14 to 17. **Dorsal-fin origin posterior to vertical through centre point of body; pelvic fins small, with 6 rays,** set well anterior to vertical through dorsal-fin origin; **anal fin long, with 38 to 44 rays**, its origin anterior to vertical through origin of dorsal fin. **Colour:** dorsum creamy yellow to light brown, and with a lateral silver stripe.

Size: Maximum to 11 cm standard length; common to 9 cm standard length.

Habitat, biology, and fisheries: Marine and coastal waters over soft, usually muddy, bottoms, recorded to depths of about 40 m, but also found in shallower waters, including river mouths and lagoons, and possibly entering water of lowered salinity. Possibly spawns in coastal waters of the Caribbean area during winter months. Throughout its range, usually taken in small numbers; considerable quantities are taken off the Orinoco river mouth at depths of 9 to 27 m, but there is no special fishery for this species. Separate statistics not reported for this species. Caught mainly with beach seines and as bycatch in the shrimp trawl fishery. Although abundant, this species is apparently not often found in markets due to the soft consistency of its flesh.

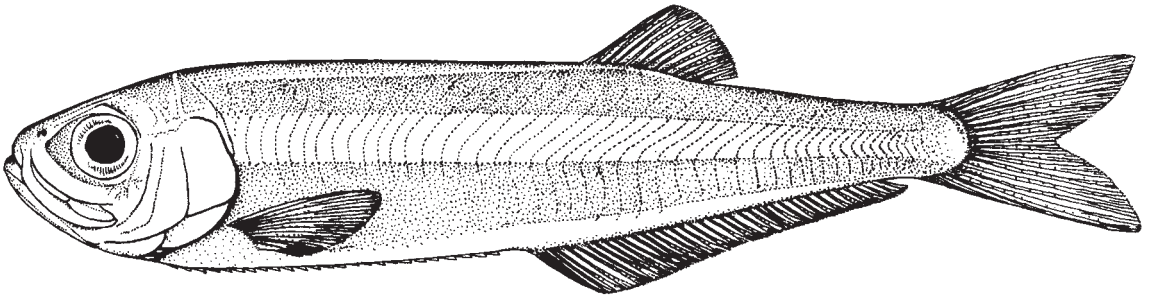
Distribution: Atlantic coasts of Central and South America; West Indies (Cuba, Haiti, Jamaica, Puerto Rico, Trinidad; also from Panama and coasts of Venezuela, including Orinoco mouth, Guyana, Suriname, south to Ubatuba, near Santos, Brazil). Not recorded from the Gulf of Mexico.



Neoopisthopterus cubanus Hildebrand, 1948

Frequent synonyms / misidentifications: None / None.

FAO names: En - Cuban longfin herring.

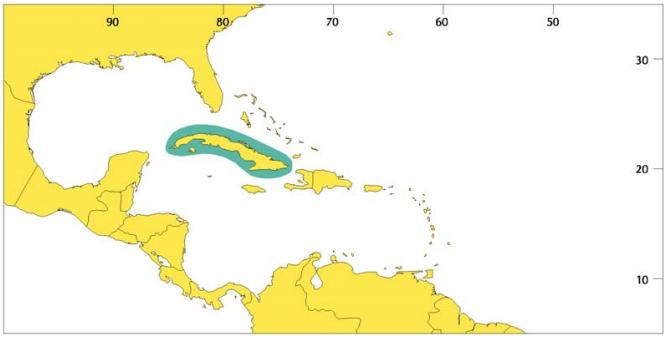


Diagnostic characters: Body elongate, moderately compressed, body depth about 17 to 22% standard length; abdomen with 23 to 28 scutes. Mouth terminal, lower jaw not strongly projecting; **maxilla short, not extending posteriorly beyond vertical through posterior margin of eye**; posterior tip of maxilla meets and is overlapped by lower bulge of maxilla blade; teeth very small or minute; 17 or 18 gill rakers on lower limb of first arch. **Dorsal fin well behind midpoint of body; pelvic fins absent**; anal fin long, with 39 to 43 rays, its origin before a vertical through dorsal-fin origin. **Colour (based on preserved material):** body uniformly pale with midlateral silvery stripe, about equal to 1/2 eye diameter; upper surface of head posteriorly brownish with large dusky melanophores; median margin of snout and anterior portion of mandible with dusky melanophores; middle of dorsum also with scattered dusky melanophores; caudal-fin base with dusky melanophores, forming a crossbar extending onto caudal-fin lobes; anal-fin base with row of dark melanophores, anal fin also with dusky melanophores chiefly near distal margin.

Size: Maximum probably to 9 cm standard length, commonly to 4 to 5 cm standard length.

Habitat, biology, and fisheries: Marine, coastal. More data needed. Appears to be uncommon. Of no interest to fisheries.

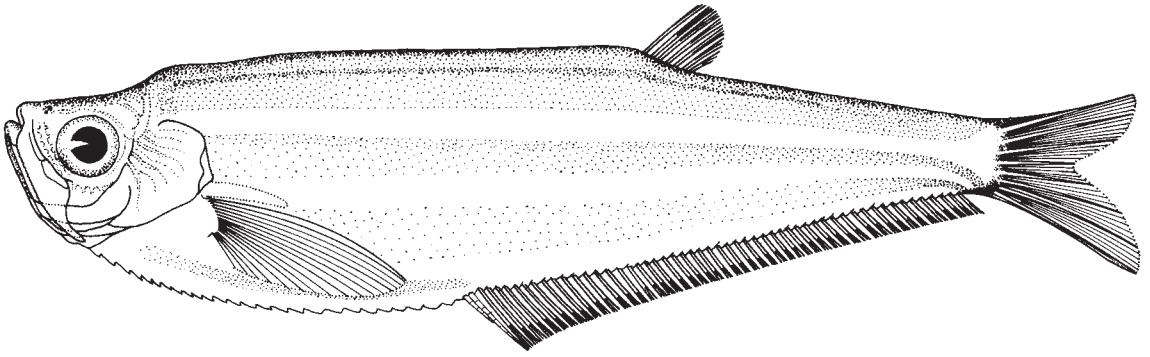
Distribution: Western central Atlantic (Cuba; probably more widespread).



Odontognathus compressus Meek and Hildebrand, 1923

Frequent synonyms / misidentifications: None / None.

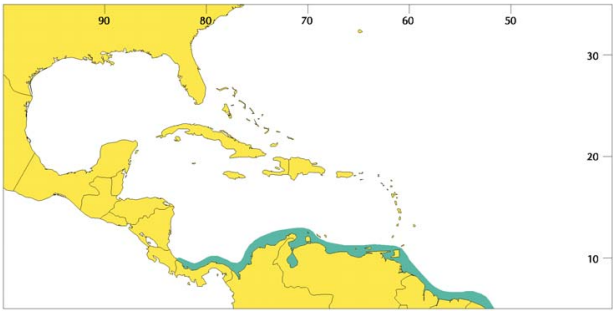
FAO names: En - Caribbean longfin herring; **Fr** - Poisson-papier vénézuelien; **Sp** - Arenquillo machete.



Diagnostic characters: Body elongate, very strongly compressed; abdomen with 24 to 29 scutes forming distinct, uninterrupted keel. Outer edges of scutes distinctly serrate. Mouth small, directed upward, lower jaw prominent. Upper jaw broad at midpoint, tapering posteriorly; maxilla long, reaching to or beyond opercular margin. **No hypomaxilla present**. Dorsal fin small and placed far back on body. **Anal fin very long**, **with 52 to 63 rays**; its origin well anterior to vertical through anterior dorsal-fin base. Pectoral fins large. **Pelvic fins absent**. **Colour:** body pale, translucent, with narrow midlateral silver stripe; head silvery; a dark line present along dorsum posterior to dorsal fin (preserved specimens); fins hyaline, base of caudal fin dark.

Size: Maximum to 15 cm standard length; common to 12 cm standard length.

Habitat, biology, and fisheries: In coastal, inshore waters over soft, mainly muddy substrates, enters estuaries; can tolerate salinities to 9‰. Small quantities of larvae were collected in June in northern Tablazo Bay, an estuarine area of the Lake Maracaibo system, Venezuela. Taken in artisanal fisheries throughout its range, but not specifically targeted and apparently not abundant. Separate statistics not reported for this species. Caught with beach seines and as bycatch in the industrial shrimp trawl fishery. Apparently uncommon in markets, its market value limited by the soft consistency of its flesh.



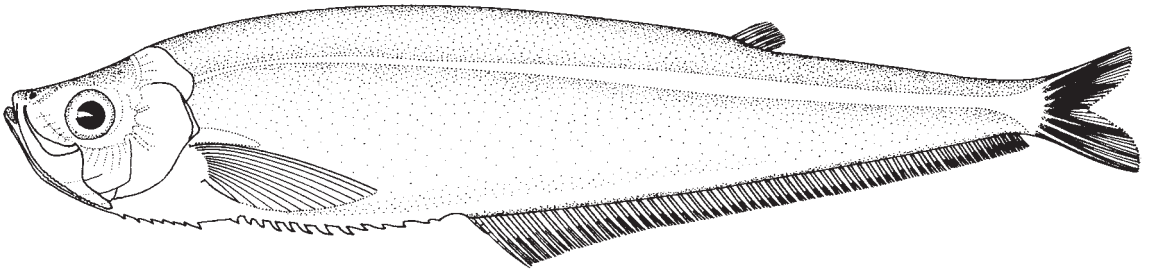
Distribution: Atlantic coasts and perhaps estuaries of Central and South America, from Panama to Trinidad and Suriname.

Odontognathus mucronatus Lacepède, 1800

PNA

Frequent synonyms / misidentifications: None / None.

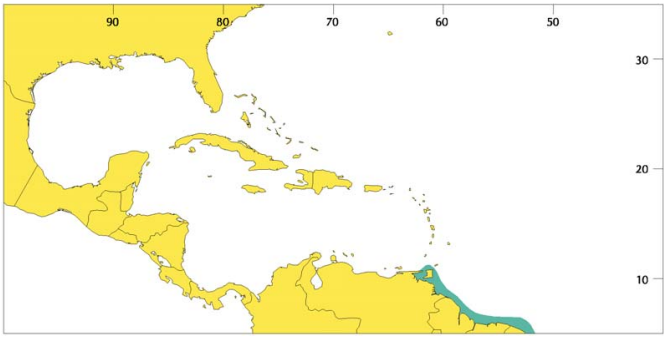
FAO names: En - Guiana longfin herring; **Fr** - Poisson-papier guyanais; **Sp** - Arenquillo cuchilla.



Diagnostic characters: Body elongate, very strongly compressed; abdomen with distinct, but interrupted, keel of scutes (a short gap under pectoral-fin base). Abdominal scutes 7 or 8 prepectoral, then a gap, followed by 12 or 13 postpectoral along abdomen. Outer edges of scutes smooth and not serrate; total number of scutes 19 to 21. Mouth small, directed upward, lower jaw prominent. Upper jaw broad at midpoint, tapering posteriorly, maxilla long, reaching to or beyond opercular margin. **No hypomaxilla present**. Dorsal fin small and placed far back on body. **Anal fin very long, with 70 to 85 rays**, its origin well anterior to vertical through dorsal-fin base. Pectoral fins large. **Pelvic fins absent. Colour:** body yellowish white with thin white midlateral stripe; head silvery; top of head and midline of dorsum dark. Anal fin dark, other fins hyaline or white.

Size: Maximum to 16 cm standard length; common to 12 cm standard length.

Habitat, biology, and fisheries: In shallow coastal waters over sand and mud bottoms to depths of about 30 m, but usually occurring much shallower; also close to shore, abundant in estuaries, and ascends rivers. Possibly spawns in rivers. Taken in artisanal fisheries off the Guianas, but no special fishery. Separate statistics not reported for this species. Caught with beach seines and trawls and as bycatch in the industrial trawl fishery for shrimps. A foodfish in some localities, but the soft consistency of its flesh strongly reduces its market value.

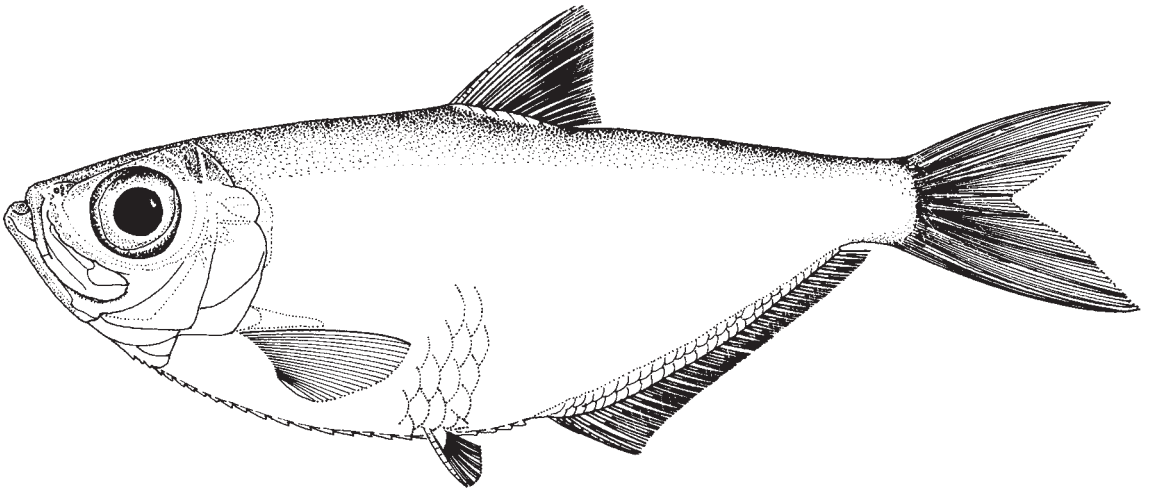


Distribution: Atlantic coasts and rivers of South America; Gulf of Paria and Trinidad to southern Brazil.

Pellona harroweri (Fowler, 1917)

Frequent synonyms / misidentifications: *Ilisha harroweri* Hildebrand, 1964; *Ilisha argentata* Meek and Hildebrand, 1923 / None.

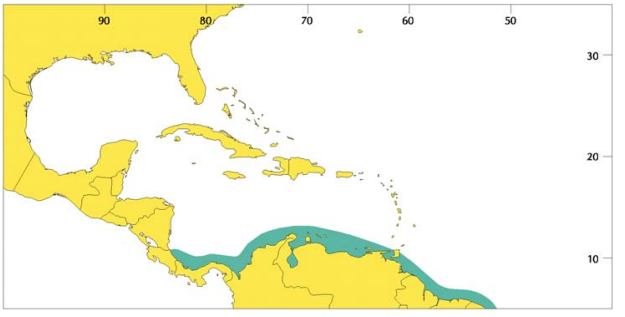
FAO names: En - American costal pellona; **Fr** - Alose-caille brésilienne; **Sp** - Sardinata marina.



Diagnostic characters: Body moderate or very deep, fairly strongly compressed, **body depth 35 to 42% standard length; abdomen with 17 to 20 prepelvic** and **5 to 7 (usually 6) postpelvic scutes, total scutes 22 to 26**, forming distinct keel. **Eye large. Lower jaw strongly projecting beyond upper when mouth closed; upper jaw with toothed hypomaxilla present between posterior tip of premaxilla and lower bulge of maxilla blade.** Gill rakers on lower limb of first arch 23 to 25. Dorsal fin at about centre point of body. **Anal fin fairly long, with 36 to 42 rays; its origin equal with vertical through posterior part of dorsal fin. Pelvic fins small**, with 6 rays; **without distinct axillary scale**; pelvic-fin origin just anterior to vertical through dorsal-fin origin. Scales deciduous, large, fewer than 60 vertical rows on sides of body. **Colour:** dorsum blue-grey, sides silvery. Dorsal and anal fins yellow; dorsal-fin tip and margin of caudal fin dusky.

Size: Maximum to 18 cm standard length; common to 12 cm standard length.

Habitat, biology, and fisheries: Coastal waters, estuaries, and surrounding areas, over muddy bottoms to a depth of about 35 m (usually less); perhaps not tolerating very low salinities. Small quantities of larvae were collected in northern Tablazo Bay, an estuarine area of the Lake Maracaibo system, Venezuela, in July and September. Usually taken as bycatch in the industrial trawl fishery for shrimps. Captured in artisanal fisheries throughout its range, but especially off Venezuela and the Guianas; otherwise, no special fishery for this species. Separate statistics not reported for this species. Consumed locally, but apparently not abundant in markets; of little commercial importance.



Distribution: Western Atlantic from Panama to Trinidad, the Guyanas, entire Brazilian coast south of the Amazon to Rio Grande do Sul at about 30 S.

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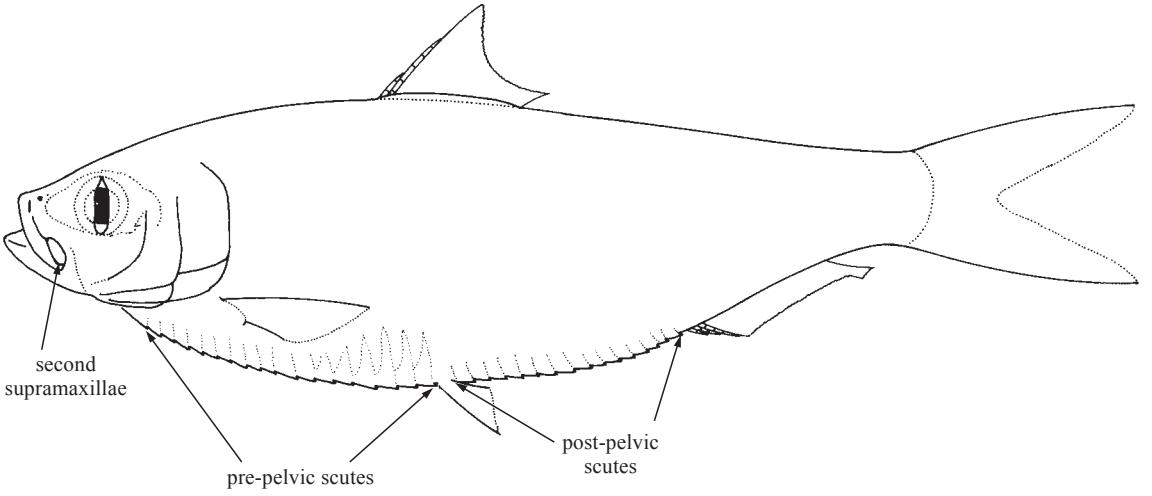
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CLUPEIDAE

Herrings (shads, menhadens)

by T.A. Munroe and M.S. Nizinski, National Marine Fisheries Service,
National Museum of Natural History, Washington D.C., USA

Diagnostic characters: Small, **mostly silvery fishes**, usually with fusiform, subcylindrical bodies but sometimes quite strongly compressed; **with a complete series of scutes present along abdomen** (absent in *Etrumeus* and *Jenkinsia*), **pelvic scute always present. Terminal mouth**; lower jaw short but deep, **giving typical clupeid mouth shape** (except gizzard shads with inferior mouth and *Etrumeus* with pointed mouth); **usually 2 supramaxillae; and small or minute jaw teeth**. Eyelids with vertical opening in middle (completely covering eyes only in *Etrumeus*). **Fins lacking spiny rays; a single dorsal fin**, usually short and at midpoint of body; pectoral fins set low on body; pelvic fins about equidistant between pectoral-fin base and anal-fin origin; anal fin often short (usually less than 30 rays); **caudal fin always deeply forked. Scales cycloid** (smooth to touch), but often shed easily; **no lateral line. Scales without posterior striations**. Great variation occurs in body shape and depth (round bodied to strongly compressed and deep), scutes (some or all absent along abdomen, but a few or a complete series of prepelvic scutes occasionally present), mouth shape (lower jaw prominent to mouth fully inferior in the gizzard shads), supramaxillae (1 or both absent), teeth (absent in some, canines in others), scales (deciduous in some, minute in others). **Colour:** typically dark blue or blue-green on dorsum and silvery on sides; with variable darker markings including spot on side of body posterior to gill opening (*Brevoortia*), spots along sides (in single or multiple series), spot at dorsal-fin origin, and dark pigmentation on margins of dorsal, anal, and pectoral fins and on caudal-fin tips.

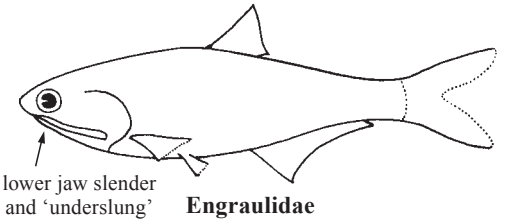


Habitat, biology, and fisheries: Clupeids are typically marine, coastal, and schooling fishes found in all seas from 70°N to about 60°S. Some species tolerate low salinities, sometimes entering fresh water to feed, and the shads (Alosinae) are anadromous, undergoing regular migrations up rivers to spawn, and some species may live permanently in fresh water. Many species feed on small planktonic animals (mainly crustaceans). Clupeids typically form large schools and generally scatter pelagic eggs that hatch planktonic larvae. However, there is wide variation in biology and ecology of clupeids. Some species are partial or full-time filter-feeders, some are predators on fishes (and probably form only loose and small schools as adults), and some produce only 200 eggs or less (pygmy species) or attach their eggs to the substrate. Although usually small fishes (mostly 15 to 25 cm), many species shoal in such numbers that they form the basis of sizeable fisheries. It is mainly the cool water genera that dominate clupeid catches, but multispecies clupeid fisheries in tropical and warm-temperate regions may account for as much as 1/3 of the total fish catch in these areas. Some species are valued as foodfishes, while others are used as bait or as fish meal. The reported catch of clupeid species in the area in 1995 was 663 779 t (chiefly from the USA and Venezuela). The major clupeid fisheries were for *Brevoortia patronus* (about 70% of total clupeid catch), *B. tyrannus* (4%), *Sardinella aurita* (23%) and *Opisthonema oglinum* (1.2%). The clupeid catch was 35% of the total catch of all marine resources in the area.

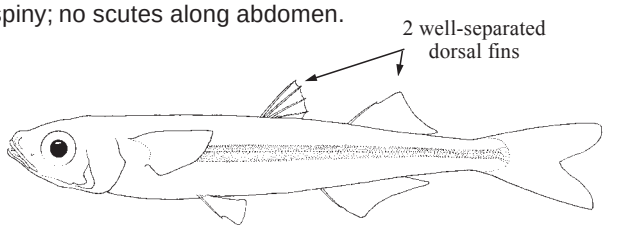
Similar families occurring in the area

Engraulidae: lower jaw slender and 'underslung', snout pig-like, usually pointed.

Atherinidae: 2 well-separated dorsal fins, the first spiny; no scutes along abdomen.

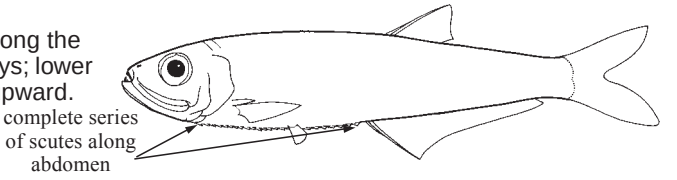


Engraulidae



Atherinidae

Pristigasteridae: complete series of scutes along the abdomen; anal fin long, with at least 30 fin rays; lower jaw projecting, mouth directed more or less upward.



Pristigasteridae

Key to the species of Clupeidae occurring in the area

1a. W-shaped pelvic scute present (Fig. 1); other abdominal scutes absent . . . . . → *2*

1b. W-shaped pelvic scute absent; pelvic scute (and most others) with lateral arms; series of abdominal scutes present, often keeled . . . . . → *6*

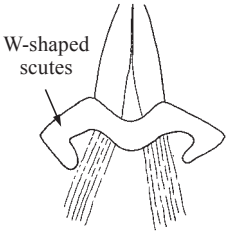


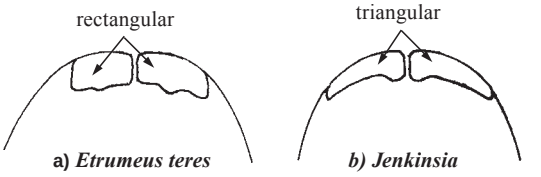
Fig. 1 cross section

2a. Branchiostegal rays 11 to 18; premaxillae rectangular (Fig. 2a) . *Etrumeus teres*

2b. Branchiostegal rays 6 or 7; premaxillae triangular (Fig. 2b) . . *(Jenkinsia)* → *3*

3a. Premaxilla without teeth . . . . *Jenkinsia majua*

3b. Teeth present on premaxilla . . . . . → *4*



a) ***Etrumeus teres*** **b)** ***Jenkinsia***

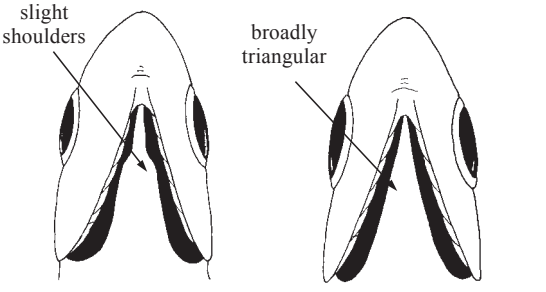
Fig. 2 premaxillae (dorsal view)

4a. Isthmus with slight shoulders anteriorly (Fig. 3a) . . . . . *Jenkinsia lamprotaenia*

4b. Isthmus broadly triangular, pointed anteriorly (Fig. 3b) . . . . . → *5*

5a. Silver lateral band narrowing and fading anteriorly . . . . . *Jenkinsia parvula*

5b. Silver lateral band not narrowing or fading anteriorly . . . . . *Jenkinsia stolifera*



a) ***Jenkinsia lamprotaenia*** **b)** ***Jenkinsia parvula*** **and** ***Jenkinsia stolifera***

Fig. 3 underside of head

6a. Upper jaw with deep median notch (Fig. 4a) . . . . . → *7*
6b. Upper jaw without median notch (Fig. 4b) . . . . . → *18*

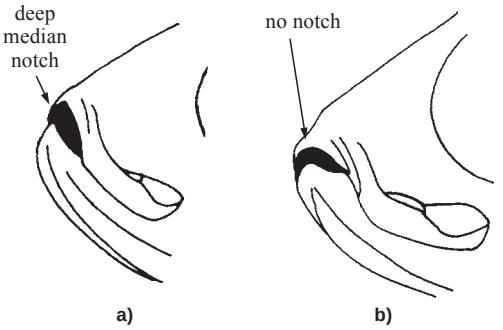


Fig. 4 anteriormost part of head (lateral view)

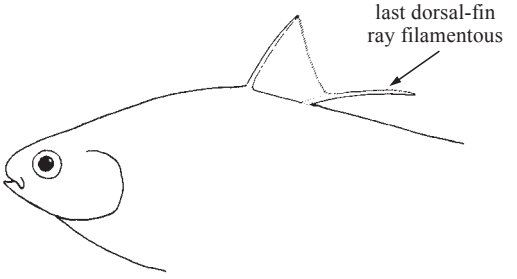


Fig. 5 ***Dorosoma***

7a. Last dorsal-fin ray filamentous (Fig. 5) . . . . . ***(Dorosoma)*** → *8*
7b. Last dorsal-fin ray not filamentous . . . . . → *9*

8a. Mouth subterminal (snout bulbous and fleshy, projecting past upper jaw); anal-fin rays 25 or more; more than 50 (52 to 70) scales in lateral series . . . . . ***Dorosoma cepedianum***
8b. Mouth terminal (snout more pointed and not extending anterior to upper jaw); anal-fin rays 25 or fewer; fewer than 50 (41 to 48) scales in lateral series . . . . . ***Dorosoma petenense***

9a. Modified predorsal scales present on either side of dorsal midline (Fig. 6); other scales deeply overlapping and irregular with posterior margin serrate or pectinate; 6 branched pelvic-fin rays . . . . . ***(Brevoortia)*** → *10*
9b. Predorsal scales along dorsal midline normal, not enlarged and fringed; other scales with smooth posterior margins; 8 branched pelvic-fin rays . . . . . ***(Alosa)*** → *13*

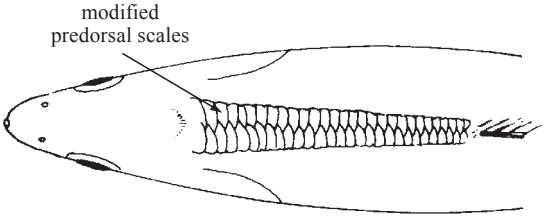


Fig. 6 dorsal view of body

10a. Pelvic fin with oblique and almost straight posterior margin, inner rays markedly shorter than outer rays when fin folded back (Fig. 7a) . . . . . → *11*
10b. Pelvic fin with rounded posterior margin, inner rays equal or nearly equal with outer rays when fin folded back (Fig. 7b) . . . . . → *12*

11a. Scutes 27 to 30 along abdomen; tip of pectoral fin extending to within 1 or 2 scales of pelvic-fin base . . . ***Brevoortia gunteri***
11b. Scutes 30 to 32 along abdomen; tip of pectoral fin extends to within 3 to 5 scales of pelvic-fin base . . . . ***Brevoortia smithi***

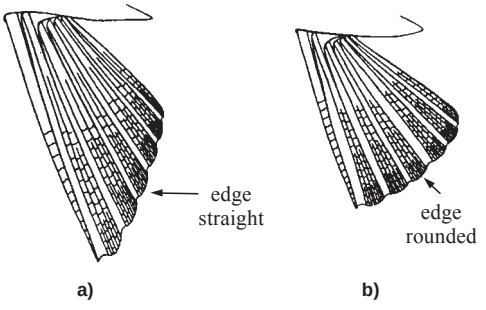


Fig. 7 pelvic fin

12a. Black spot posterior to opercular flap followed by series of spots along flank; Gulf of Mexico . . . . . ***Brevoortia patronus***

12b. Black spot posterior to opercular flap followed by variable number of smaller spots forming up to 6 approximate lines; Atlantic coast of United States . ***Brevoortia tyrannus***

13a. Lower jaw rising steeply within mouth (Fig. 8a) . . . . . → ***14***

13b. Lower jaw not rising steeply within mouth (Fig. 8b). . . . . → ***15***

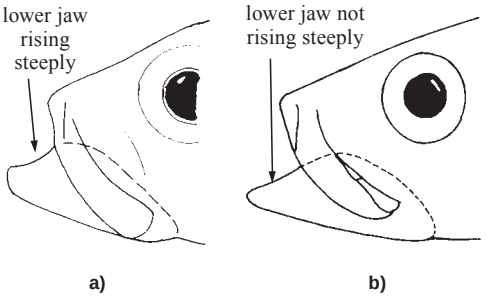


Fig. 8

14a. Peritoneum silvery to pale grey; dorsum greyish green; eye diameter greater than snout length . . . . . ***Alosa pseudoharengus***

14b. Peritoneum sooty or black; dorsum distinctly blue; eye diameter less than snout length . . . . . ***Alosa aestivalis***

15a. Jaw teeth present; gill rakers on lower limb of anterior arch less than 25; lower jaw projecting beyond upper when mouth closed . . . . . → ***16***

15b. Jaw teeth minute or absent in adults; gill rakers on lower limb of anterior arch more than 30; lower jaw not projecting beyond upper when mouth closed . . . . . → ***17***

16a. Dark shoulder spot present; body depth greater than head length . . . . . ***Alosa mediocris***

16b. No dark shoulder spot; body depth less than head length . . . . . ***Alosa chrysochloris***

17a. Gill rakers on lower limb of anterior arch 59 to 73 (Atlantic coast drainages) . . . . ***Alosa sapidissima***

17b. Gill rakers on lower limb of anterior arch 41 to 48 (Gulf of Mexico drainages). . . . . ***Alosa alabamae***

18a. Posterior border of gill opening with 2 fleshy lobes (Fig. 9) . . . . . → ***19***

18b. Posterior border of gill opening evenly rounded . . . . . → ***24***

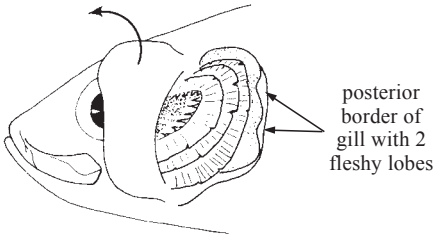


Fig. 9

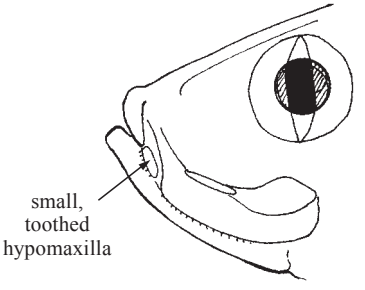


Fig. 10 ***Harengula***

19a. Small, toothed hypomaxilla present between posterior tip of premaxilla and expanded blade of maxilla (Fig. 10). . . . . ***(Harengula)*** → ***20***

19b. No small, toothed hypomaxilla between posterior tip of premaxilla and expanded blade of maxilla . . . . . → ***22***

20a. Black pigment at tip of dorsal fin; tooth plate on tongue (basihyal tooth plate) and tooth plate posterior to it (basibranchial tooth plate) narrow, width 10% of their combined length . . . . . ***Harengula humeralis***

20b. No black pigment at tip of dorsal fin; tooth plate on tongue (basihyal tooth plate) and tooth plate posterior to it (basibranchial tooth plate) broad, width 20 to 33% of their combined length . . . . . → ***21***

21a. Gill rakers 28 to 34 (usually 30 to 32) on lower limb of first arch; pectoral fin 19 to 22% of standard length; pelvic fin inserts closer to insertion of pectoral fin than to origin of anal fin . . . . . ***Harengula clupeola***

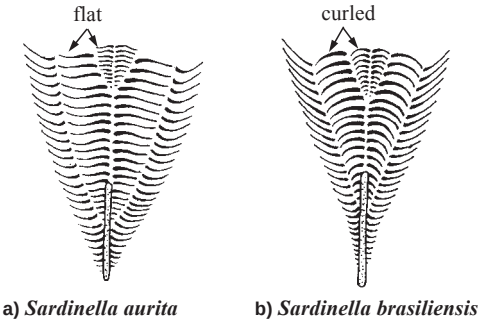
21b. Gill rakers 30 to 40 (usually 32 to 39) on lower limb of first arch; pectoral fin 22 to 25% of standard length; pelvic fin inserts about midway between insertion of pectoral fin and anal-fin origin . . . . . ***Harengula jaguana***

22a. Last dorsal-fin ray filamentous; 7 branched pelvic-fin rays . . . . . ***Opisthonema oglinum***

22b. Last dorsal-fin ray normal; 8 branched pelvic-fin rays . . . . . ***(Sardinella)*** → ***23***

23a. Anterior gill rakers on lower limbs of second and third gill arches lying more or less flat (Fig. 11a) . . . . . ***Sardinella aurita***

23b. Anterior gill rakers on lower limbs of second and third gill arches strongly curled (Fig. 11b) . . . . . ***Sardinella brasiliensis***



a) ***Sardinella aurita*** b) ***Sardinella brasiliensis***

Fig. 11 lower limbs of gill arches

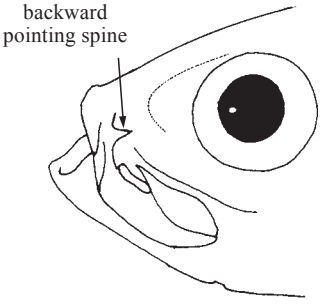


Fig. 12

24a. Upper part of maxilla at about level of eye with sharp, backward pointing spine (Fig. 12) . . . . . ***(Rhinosardinia)*** → ***25***

24b. No sharp, backward pointing spine on upper part of maxilla . . . . . → ***26***

25a. Scales in lateral series 39 to 41; vertebrae 38 to 39 . . . . . ***Rhinosardinia amazonica***

25b. Scales in lateral series 45; vertebrae 43 . . . . . ***Rhinosardinia bahiensis***

26a. Abdomen strongly keeled; bright silver stripe on sides; 7 branched pelvic-fin rays . . . . ***Lile piquitinga***

26b. Abdomen moderately rounded, scutes without prominent keel; no silver stripe on sides; 8 (rarely 7 or 9) branched pelvic-fin rays (southwestern Greenland, Labrador, southward to South Carolina) . . . . . ***Clupea harengus***

List of species occurring in the area

The symbol is given when species accounts are included.

DUSSUMIERIINAE
Etrumeus teres (Dekay, 1842).

SPRATELLOIDINAE
Jenkinsia lamprotaenia (Gosse, 1851).
Jenkinsia majua Whitehead, 1963.
Jenkinsia parvula Cervigón and Velasquez, 1978.
Jenkinsia stolifera (Jordan and Gilbert, 1884).

CLUPEINAE
Clupea harengus Linnaeus, 1758.

Harengula clupeola (Cuvier, 1829).
Harengula humeralis (Cuvier, 1829).
Harengula jaguana Poey, 1865.

Lile piquitinga (Schreiner and Miranda-Ribeiro, 1903).

Opisthonema oglinum (Lesueur, 1818).

Rhinosardinia amazonica (Steindachner, 1879).
Rhinosardinia bahiensis (Steindachner, 1879).

Sardinella aurita Valenciennes, 1847.
Sardinella brasiliensis (Steindachner, 1879) (= *Sardinella janeiro*).

ALOSINAE
Alosa aestivalis (Mitchill, 1814).
Alosa alabamae Jordan and Evermann, 1896.
Alosa chrysochloris (Rafinesque, 1820).
Alosa mediocris (Mitchill, 1814).
Alosa pseudoharengus (Wilson, 1811).
Alosa sapidissima (Wilson, 1811).

Brevoortia gunteri Hildebrand, 1948.
Brevoortia patronus Goode, 1878.
Brevoortia smithi Hildebrand, 1941.
Brevoortia tyrannus (Latrobe, 1802).

DOROSOMATINAE
Dorosoma cepedianum (Lesueur, 1818).
Dorosoma petenense (Günther, 1867).

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Cervigón, F., R. Cipriani, W. Fischer, L. Garibaldi, M. Hendrickx, A.J. Lemus, R. Márquez, J.M. Poutiers, G. Robaina, and B. Rodriguez. 1993. *FAO species identification sheets for fishery purposes. Field guide to the commercial marine and brackish-water resources of the northern coast of southern America*. Rome, FAO, 513 p.

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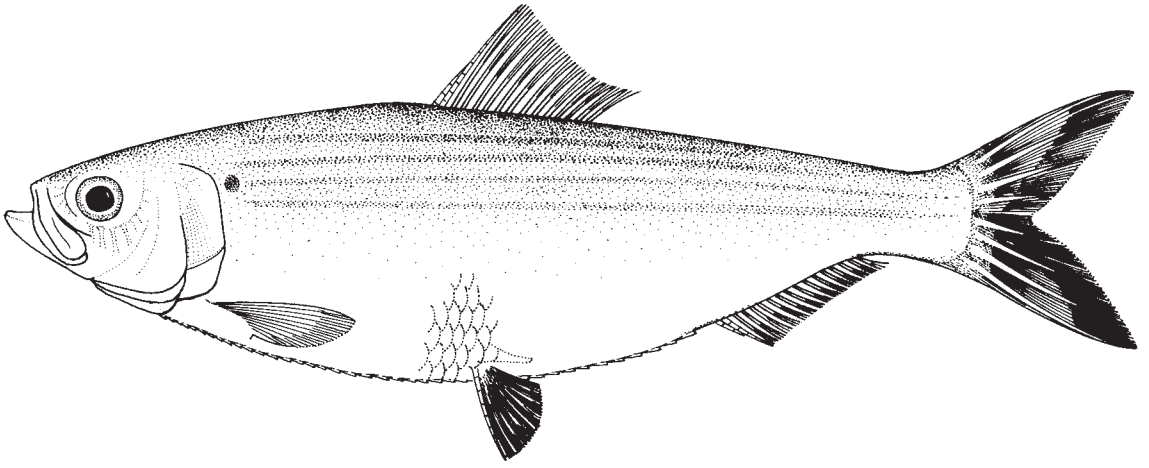
Whitehead, P.J.P. 1973. The clupeoid fishes of the Guianas. *Bull. Br. Mus. Nat. Hist. (Zool.), Suppl.,* 5:1-227.

Whitehead, P.J.P. 1985. FAO species catalogue. Vol. 7. Clupeoid fishes of the world. An annotated and illustrated catalogue of the herrings, sardines, pilchards, sprats, anchovies and wolf-herrings. Part I. Chirocentridae, Clupeidae, and Pristigasteridae. *FAO Fish. Synop*., (125)Vol. 7, Pt.1:303 p.

Alosa aestivalis (Mitchill, 1814) BBH

Frequent synonyms / misidentifications: *Pomolobus aestivalis* (Mitchill, 1814). / *Alosa pseudoharengus* (Wilson, 1811).

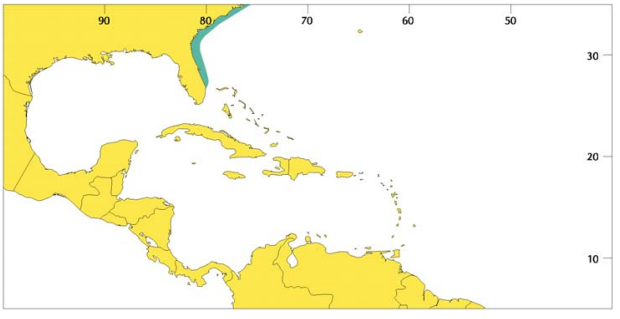
FAO names: En - Blueback shad (AFS: Blueback herring); **Fr** - Alose d'été du Canada; **Sp** - Sábalo del Canadá.



Diagnostic characters: Body fusiform, moderately compressed; abdomen with scutes forming distinct keel. **Upper jaw with distinct median notch; lower jaw rising steeply within mouth; minute teeth present at front of jaws** (but disappearing with age); no teeth on vomer. **Eye diameter less than snout length. Gill rakers slender, 41 to 51 on lower limb of anterior gill arch** (fewer in fishes less than 10 cm standard length). Dorsal fin slightly anterior to centre point of body; anal fin short and situated well posterior to vertical through posterior base of dorsal fin; 8 branched pelvic-fin rays, pelvic-fin origin about at vertical through centre point of dorsal-fin base. **Colour: dorsum blue**, sometimes with more or less definite dusky lines in adults, shading to silver on sides; dark spot on shoulder (often absent in fishes less than 10 cm standard length); **peritoneum dark**; fins slightly yellow to green in life.

Size: Maximum about 38 cm standard length, commonly to 30 cm standard length.

Habitat, biology, and fisheries: Coastal, pelagic, euryhaline. Anadromous, adults migrate inshore and ascend rivers to spawn in fresh water or in slightly brackish pools with an outlet to the sea. Possibly overwintering near bottom and out from coast, approaching shore in late spring. Spawns in brackish or fresh waters of rivers, having arrived in coastal waters a month or so later than *A. pseudoharengus* (Chesapeake Bay in April), later farther north, apparently when water temperatures are above 22°C; young probably returning to salt water at the end of their first summer. Minimum age at maturity 3 years Estimated fecundity 30 000 to 400 000 eggs/female. Eggs pelagic, semi-demersal, yellowish, semi-transparent, 0.87 to 1.11 mm. Often forms large schools. Vertical migrator; feeds on planktonic animals (i.e., copepods), small fishes, and shrimps. Probably not distinguished from *A. pseudoharengus* in northern part of the range, but catches in southern parts of its range are negligible. Caught with pound nets, weirs, seines, gill nets, fyke nets, and occasionally with otter trawls. Marketed mostly fresh and salted, and used as a baitfish in crustacean fisheries.

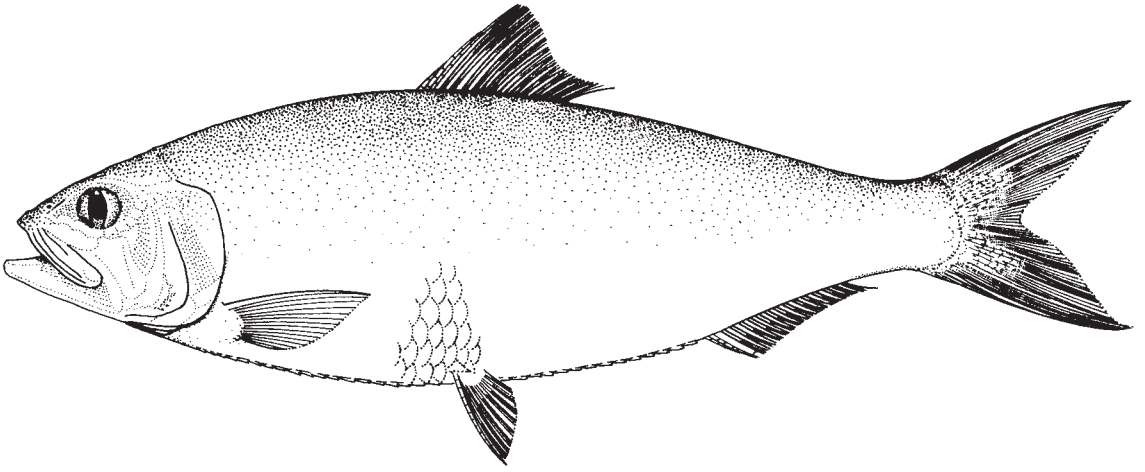


Distribution: Western north Atlantic (east coast of Florida from St. Johns River northward to Cape Breton, Nova Scotia). Uncertain if landlocked in Great Lakes.

Alosa alabamae Jordan and Evermann, 1896 CUA

Frequent synonyms / misidentifications: None / None.

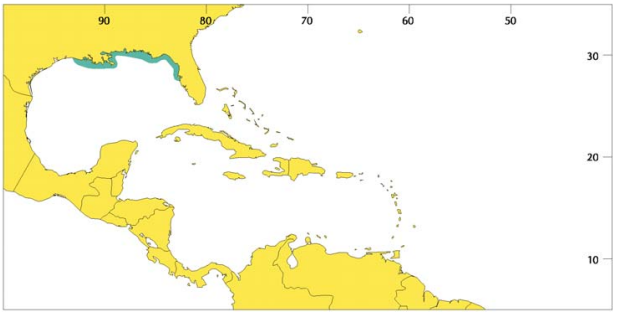
FAO names: En - Alabama shad; **Fr** - Alose de l'Alabama; **Sp** - Sábalo de Alabama.



Diagnostic characters: Body fusiform, moderately compressed, body depth increasing somewhat with size; abdomen with distinct keel. **Upper jaw with distinct median notch; lower jaw not rising steeply within mouth; no teeth in jaws**; no teeth on vomer. **Gill rakers slender, 41 to 48 on lower limb of anterior gill arch** (fewer in fishes less than 30 cm standard length). Dorsal fin placed slightly anterior to centre point of body; anal fin short and placed well posterior to vertical through posterior dorsal-fin base; 8 branched pelvic-fin rays, pelvic-fin origin at vertical through middle region of dorsal-fin base. **Colour:** dorsum bluish grey, with dark streaks along scale rows; shading to silver on sides, **vague dark shoulder spot behind upper operculum**; fins hyaline.

Size: Maximum 51 cm standard length, commonly to 45 cm standard length.

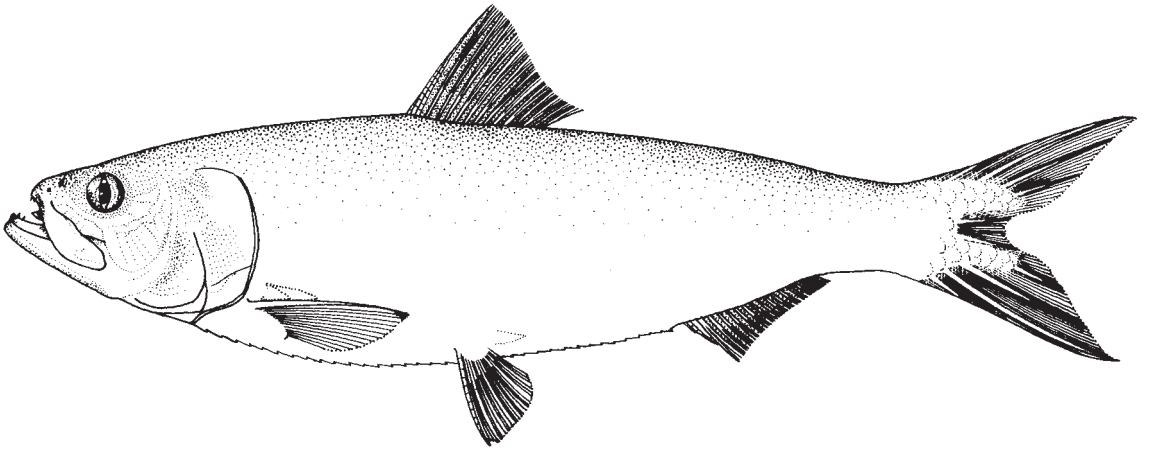
Habitat, biology, and fisheries: Euryhaline, anadromous, ascending rivers and streams to breed in winter and spring (January through April), young returning to salt water (at 50 to 100 mm) at end of their first summer. Actual spawning occurs at 18 to 22°C over coarse sand and gravel sediments swept by moderate currents. Adults apparently not feeding during spawning run. Annual fecundity ranging from 100 000 to 250 000 eggs/female. Spawning adults primarily age-2, some age-1 fish also capable of spawning. Longevity 3 to 6 years Adults probably feed mainly on small fish; juveniles feeding on smaller invertebrates. Principally caught in rivers during spawning migrations. Separate statistics not reported for this species. Caught with seines. Marketed mostly fresh, but populations declining throughout range.



Distribution: Eastern Gulf of Mexico drainages, from Suwannee River, Florida, to Mississippi River; also in rivers from Iowa to Arkansas. Presently rare throughout much of former range in larger rivers tributary to Gulf of Mexico.

Alosa chrysochloris (Rafinesque, 1820)

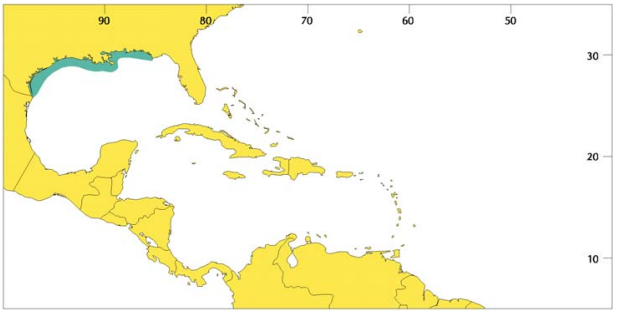
Frequent synonyms / misidentifications: *Pomolobus chrysochloris* (Rafinesque, 1820) / None.
FAO names: En - Skipjack shad (AFS: Skipjack herring); **Fr** - Alose dorée; **Sp** - Sábalo del Golfo.



Diagnostic characters: Body fusiform, moderately compressed, body depth increasing somewhat with size; **body depth less than head length**; scutes on abdomen forming a distinct keel. **Upper jaw with distinct median notch; lower jaw not rising steeply within mouth; teeth present at front of jaws**; no teeth on vomer. **Gill rakers slender, 20 to 24 on lower limb of anterior gill arch**, not increasing in number in larger fishes. Dorsal fin placed just anterior to vertical through body midpoint; anal fin short and placed well posterior to vertical through posterior dorsal-fin base; 8 branched pelvic-fin rays, pelvic-fin origin inserted about at vertical through centre of dorsal-fin base. **Colour:** dorsum deep blue-green, changing abruptly to light green that shades to white on abdomen; **no dark spot on shoulder**; fins pale or yellow, caudal-fin tips dusky.

Size: Maximum 50 cm standard length; commonly to 45 cm standard length.

Habitat, biology, and fisheries: Coastal waters, entering brackish and fresh waters, but perhaps not strictly anadromous, although strongly migratory within rivers (both upstream and downstream), mostly in fast-flowing water where they are renowned for leaping (hence the common name). Large numbers of adults congregate in swift-flowing areas below dams in late March and early April, presumably to spawn. Adults feed mainly on small fishes, while juveniles prey on insects. Adults serve as hosts to glochidial larvae of the economically valuable pearly mussel (*Fusconaia ebena*) of the Mississippi River basin. Principally caught in rivers. Separate statistics not reported; present commercial importance negligible. Caught mainly with seines; also on hook-and-line as a sport fish. Not commonly found in markets; not highly valued as a foodfish, being bony and not especially well flavoured.

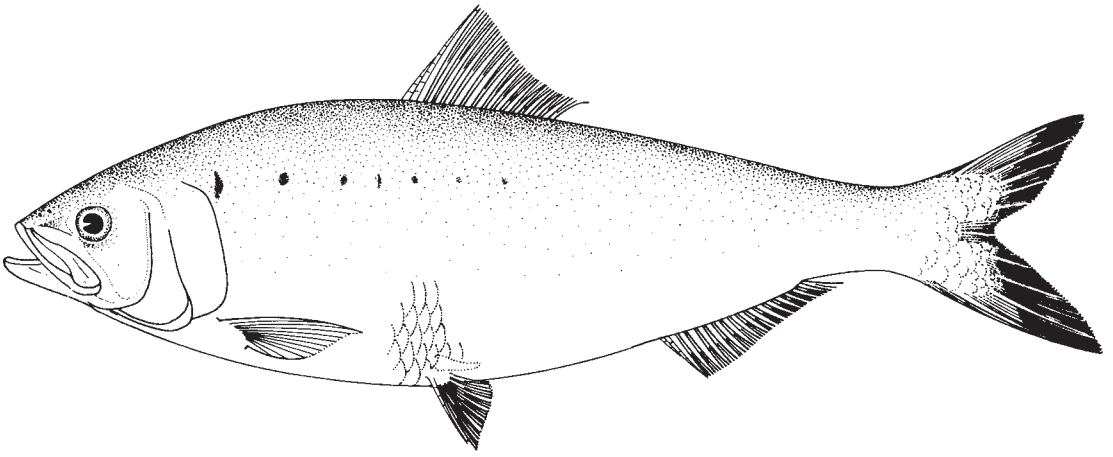


Distribution: Gulf of Mexico (Corpus Christi, Texas, eastward to Pensacola, Florida); also in rivers (e.g., Mississippi and Ohio Rivers to Minnesota, Wisconsin, and Pennsylvania).

Alosa sapidissima (Wilson, 1811) SHA

Frequent synonyms / misidentifications: None / None.

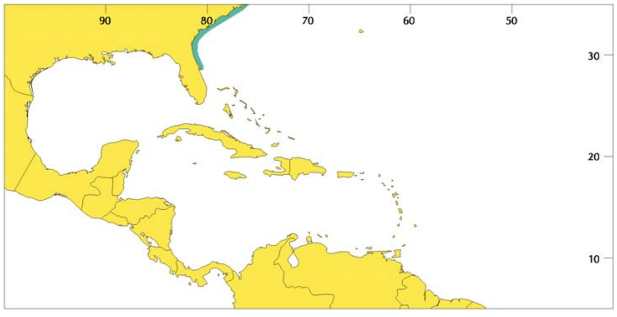
FAO names: En - American shad; **Fr** - Alose savoureuse; **Sp** - Sábalo americano.



Diagnostic characters: Body fusiform, moderately compressed, body depth moderately variable and increasing with size; scutes on abdomen forming distinct keel. **Upper jaw with distinct median notch; lower jaw not rising steeply within mouth; teeth absent in jaws** (minute in juveniles to 15 cm standard length); no teeth on vomer. **Gill rakers slender and numerous, 59 to 71 on lower limb of anterior gill arch** (fewer in young). Dorsal fin placed slightly anterior to centre point of body; anal fin short and placed well posterior to vertical through posterior dorsal-fin base; 8 branched pelvic-fin rays, pelvic-fin origin at vertical through about centre point of dorsal-fin base. **Colour:** dorsum bluish green with metallic luster, gradually shading to silver on sides; **dark spot on shoulder, sometimes followed by several more spots, or even a second row, along sides**; fins pale green, caudal tips sometimes dusky.

Size: Maximum 60 cm standard length, commonly to 50 cm standard length.

Habitat, biology, and fisheries: Coastal, pelagic, euryhaline, entering brackish and fresh waters; in the sea, to depths of about 100 m. Schooling; anadromous, strongly migratory; ascending rivers (up to 500 km upriver) to spawn; appears off Florida coast as early as November, off Carolina coast in February and March, and further north in April, May, or June, depending on water temperature (peak runs at about 18.5°C); spent fish die or return to the sea shortly after spawning; young fry descend in autumn. Spawns at 5 years, sometimes 4, apparently in their home rivers, on sandy or pebbly substrate in the evening. Semelparous (die after spawning) south of Cape Hatteras, North Carolina; increasingly iteroparous (individuals survive and return to sea) north of this region. Estimated fecundity 600 000 eggs/female. Eggs transparent, pink, or amber, semi-buoyant, 2.5 to 3.5 mm (fertilized). Vertical migrator; follows movement of prey; primarily plankton feeders; takes mainly copepods and mysids, also algae, fish eggs, and occasionally small fishes (e.g., smelt, sand lance); no feeding during migration up rivers; juveniles feed on copepods and insect larvae in rivers. Historically of moderate importance to fisheries, chiefly in rivers of North America. Principally caught in rivers, especially northward of the area. Caught mainly with pound nets, gill nets, and seines, but also with fyke nets, otter trawls, purse seines, traps, and dip nets; also caught in rivers as a sportfish with hook-and-line, using flies or small artificial lures. Marketed fresh, consumed fresh or smoked; the roe is particularly esteemed.

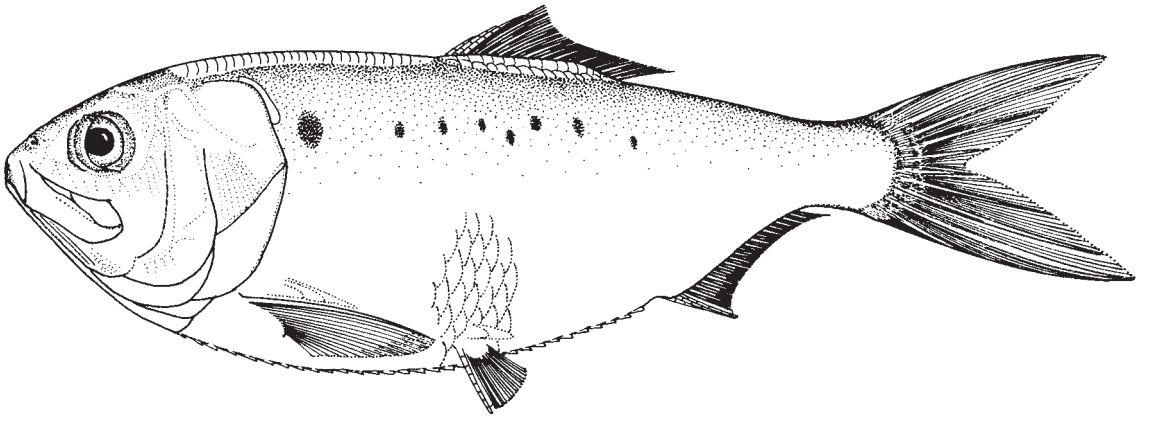


Distribution: Western North Atlantic (central Florida northward to Gulf of St. Lawrence and Nova Scotia); also in rivers and streams. Introductions in Gulf of Mexico appear to have failed, but attempts on the Pacific coasts of North America and Russia succeeded; Pacific distribution from Baja, California north to British Colombia, also Kamchatka.

Brevoortia patronus Goode, 1878 MHG

Frequent synonyms / misidentifications: None / None.

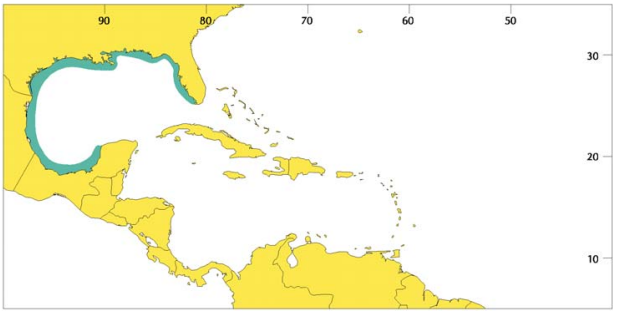
FAO names: En - Gulf menhaden; **Fr** - Menhaden écailleux; **Sp** - Lacha escamuda.



Diagnostic characters: Body compressed, fairly deep, head moderately large; abdomen with 29 to 31 scutes forming distinct keel; **double line of modified predorsal scales**; copious body mucus. **Upper jaw with distinct median notch**, no teeth. Gill rakers very fine and numerous. Dorsal-fin origin at about midpoint of body; anal fin fairly short, beginning slightly posterior to vertical through dorsal-fin base; **6 branched pelvic-fin rays, posterior margin of pelvic fin rounded, inner rays about as long as outer rays**; pelvic-fin base at vertical through anterior dorsal-fin base. **Scales in lateral series 42 to 48, large**, those on dorsum and above anal-fin base only slightly smaller and more irregular than rest; **exposed part narrow, their posterior edges pectinated with sharp points**. **Colour:** dorsum bluish grey, sides brassy green; **large dark spot on side posterior to gill cover, often followed by series (rarely 2) of smaller spots** (either round or vertically elongate); fins yellow-green, a dusky margin on caudal fin.

Size: Maximum 27 cm standard length, commonly to 20 cm standard length.

Habitat, biology, and fisheries: Marine, pelagic, usually in shallow waters, but caught down to at least 60 m; forms very large schools. In Mississippi delta region adults begin to migrate offshore in October and remain in deeper waters throughout winter. Spawns from October to March from near shore to about 97 km offshore, at depths of 2 to 111 m; multiple spawns per season; nursery areas in estuaries. Estimated batch fecundity 37 000 to 151 000 eggs/female. Eggs opaque, 1.04 to 1.30 mm. Mature at age 1 (greater than 14 cm fork length). Eggs hatch at sea; larvae are carried to estuaries by ocean currents where they develop into juveniles. Juveniles migrate offshore during winter and move back to coastal waters the following spring as age-1 adults. Filter-feeds on plankton at the surface, but probably also feeds at or near the bottom. Probably contributes the major part of the Gulf of Mexico menhaden catches. Commercial catches are mostly in salinities of 5 to 24‰, but also in fully salt water and up to 60‰ in the hypersaline Laguna Madre, Texas, and down to 0.1‰ in Grand Lake, Louisiana. Fished throughout its range, but especially off Louisiana (USA); fishing season mid-April to mid-October. The most important fishery resource in the area in terms of total landings with 492 and 649 thousand t landed annually between 1996 and 2000 which accounted for between 29 and 39% of total reported landings. Caught with purse seines, gill nets, also with trawls. Marketed fresh, salted, and canned, the flesh not being generally esteemed (very oily and bony); chiefly used as a source of fish oil, also as fish meal.

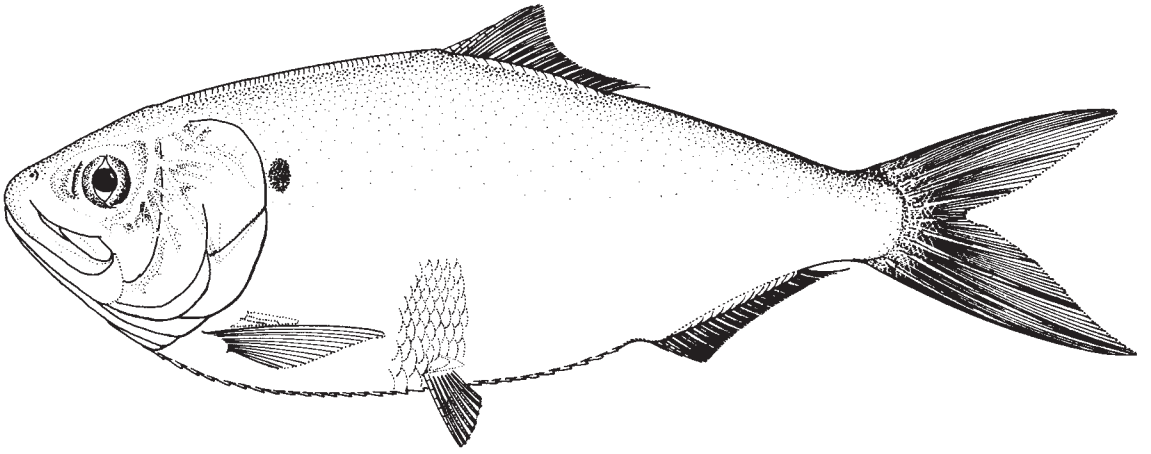


Distribution: Gulf of Mexico (Florida Bay to Gulf of Campeche, Mexico).

Brevoortia smithi Hildebrand, 1941 MHT

Frequent synonyms / misidentifications: None / None.

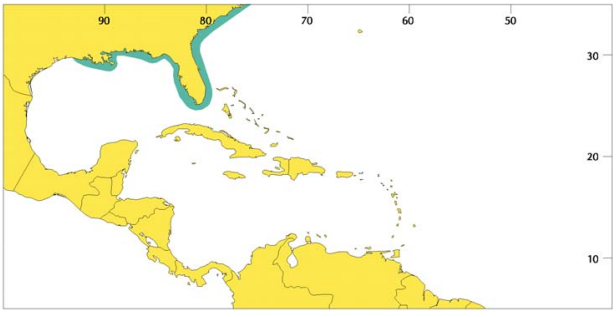
FAO names: En - Yellowfin menhaden; **Fr** - Menhaden jaune; **Sp** - Lacha amarilla.



Diagnostic characters: Body compressed, fairly deep, head quite large; **abdomen with 30 to 32 scutes** forming a distinct keel; **double line of modified predorsal scales**; little body mucus. **Upper jaw with distinct median notch**, no teeth. Gill rakers very fine and numerous. Dorsal fin at about midpoint of body; anal fin fairly short, anal-fin origin slightly posterior to vertical through posterior dorsal-fin base; **tip of pectoral fin extending to within 3 to 5 scales of pelvic-fin base; 6 branched pelvic-fin rays; posterior margin of pelvic fin oblique and almost straight, inner and middle rays markedly shorter than outer rays**; pelvic-fin base at or anterior to vertical through dorsal-fin origin. **Scales in lateral series 54 to 80 (usually about 60 to 70), small** and numerous, those on dorsum and above anal fin markedly smaller than rest; **exposed part narrow, their posterior edges pectinate with blunt points. Colour:** dorsum green-blue, sides silvery; **large dark spot on side posterior to gill cover, but not followed by series of smaller spots; fins golden yellow.**

Size: Maximum 33 cm standard length, commonly to 25 cm standard length.

Habitat, biology, and fisheries: Marine, pelagic, inshore, especially in bays and estuaries, also entering brackish and fresh waters; shoaling where common. Spawning and nursery areas not known in the Gulf; spawns in winter (eggs and larvae in plankton beginning in November), February and March in the Indian River (Atlantic coast of Florida). Eggs 1.21 to 1.48 mm in diameter. Filter-feeds on plankton at the surface. Not of much importance to fisheries; separate statistics not reported for this species; frequently caught with other *Brevoortia* species. Caught with drag nets and seines. Marketed mainly fresh, its flesh claimed to be more palatable and less oily than that of *B. tyrannus*.

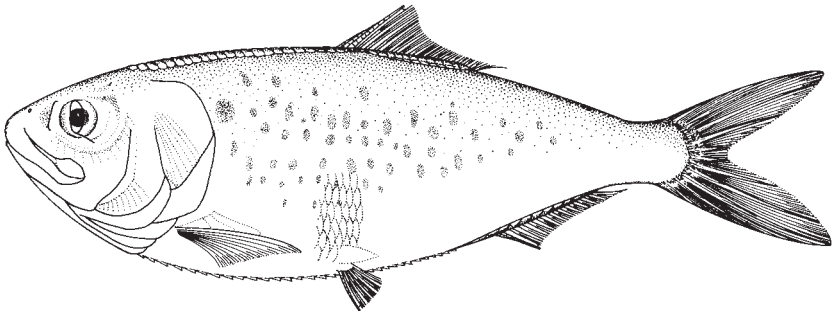


Distribution: Atlantic coast (Beaufort, North Carolina, to Indian River, Florida); Gulf of Mexico (Florida Bay to Louisiana, with a possible break between Biscayne Bay and Florida Bay).

Brevoortia tyrannus (Latrobe, 1802) MHA

Frequent synonyms / misidentifications: None / None.

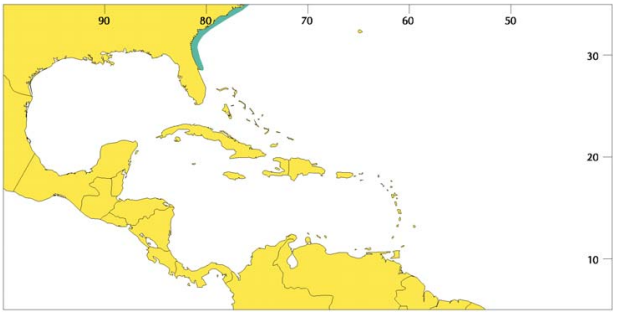
FAO names: En - Atlantic menhaden; **Fr** - Menhaden tyran; **Sp** - Lacha tirana.



Diagnostic characters: Body compressed, fairly deep, head rather large; abdominal scutes 30 to 35, forming distinct keel; **double line of modified predorsal scales**; copious body mucus. **Upper jaw with distinct median notch**, no teeth. Gill rakers very fine and numerous. Dorsal fin at about midpoint of body; anal fin fairly short, its origin located slightly posterior to vertical through posterior dorsal-fin base; **6 branched pelvic-fin rays; posterior margin of pelvic fin rounded, length of inner rays equal or nearly equal to outer rays**; pelvic-fin base at vertical through anterior portion of dorsal fin. Scales **in lateral series 40 to 58 (usually about 45 to 52), those on dorsum above anal-fin base and at base of caudal fin much smaller and irregularly placed**; exposed part narrow, **their posterior edges pectinate with sharp points. Colour:** dorsum dark green-blue, sides brassy green; **large dark spot on side posterior to gill cover, usually followed by variable number of smaller dark spots lying in one or more (up to 6) approximate horizontal lines**; fins yellow to brassy, sometimes with dusky spots.

Size: Maximum 50 cm standard length, commonly to 35 cm standard length (northern range), 20 cm standard length (southern range).

Habitat, biology, and fisheries: Marine, pelagic, usually in shallow waters, both adults and juveniles forming very large and compact schools at the surface; school sizes vary greatly from year to year; schools comprised of similar-sized individuals. Inshore in summer; adults migrate into deeper water in winter in the northern part of range, but less offshore migration occurs in the south. North/south migrations (spring and summer versus autumn) occur, as also short-term migrations in and out of bays and inlets depending on tides, season, and weather. Tolerates wide range of salinities, from almost fresh to full-strength sea water. Spawning season apparently limited by high temperatures (20.5°C maximum monthly mean); spring spawners (April, May) in Cape Cod and Long Island waters, autumn spawners (October, November) from Long Island to North Carolina (plus some spawning June to August), probably winter spawners off Florida (December to March). Determinate, multiple spawners; spawn over broad geographic and temporal ranges. Minimum size at maturity about 180 mm. Estimated fecundity 48 000 eggs (180 mm fork length) to over 500 000 eggs (360 mm fork length). Eggs buoyant, spherical, transparent, 1.3 to 1.9 mm; egg size positively correlated with female size. Recruitment success depends heavily on transport to nearshore areas by water currents. Nursery areas are in estuaries. Feeds by filtering phyto- and zooplankton (diatoms, copepods, euphausiids); as individuals increase in size trend in feeding regime changes from predominately herbivorous to more omnivorous diet. The most important of Atlantic coast menhadens to fisheries; majority of fishing landings occur outside the area. Reported catch within the area for 1995 was 27 314 t (USA only). Great fluctuations occur in abundance, however. Caught commercially with purse seines, although some are taken in long haul seines and in pound nets, and minor quantities with ordinary seines, drag nets and gill nets. Marketed fresh, salted, canned and smoked in limited amounts, the flesh not being generally esteemed (very oily and bony); chiefly used as a source of fish oil, also as fish meal and fertilizer and used as bait in some crustacean fisheries.

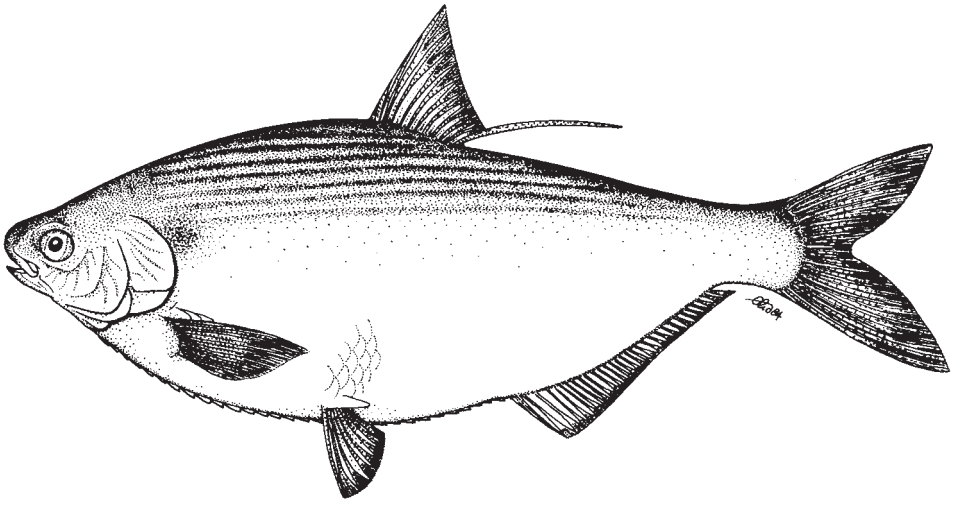


Distribution: Atlantic coast (Jupiter Inlet, Florida, northward to Nova Scotia).

Dorosoma cepedianum (Lesueur, 1818) SHG

Frequent synonyms / misidentifications: None / None.

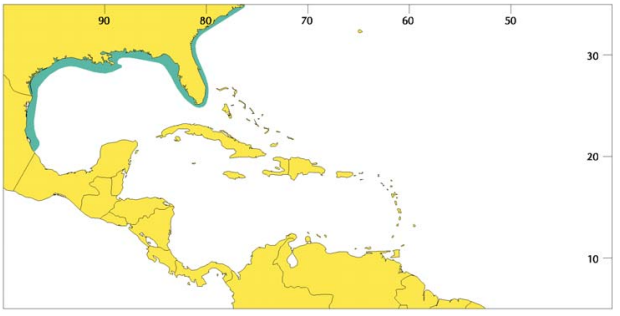
FAO names: En - American gizzard shad (AFS: Gizzard shad); **Fr** - Alose noyer; **Sp** - Sábalo molleja.



Diagnostic characters: Body moderately compressed and deep, body depth about 30 to 40% of standard length; abdomen with 17 to 20 prepelvic and 10 to 14 postpelvic scutes forming a distinct keel. **Mouth small, subterminal. Snout bulbous and fleshy, projecting past upper jaw.** Lower jaw short, about 9 to 12% of standard length. Gill rakers fine and very numerous, over 400 on complete anterior arch in large fishes. **Dorsal fin slightly anterior to midpoint of body, its last ray filamentous; anal fin fairly long (considerably longer than head), with 25 to 36 rays**; branched pelvic-fin rays 7 (rarely 6); pelvic-fin base anterior to vertical through dorsal-fin origin. **Scales small, somewhat irregular, 52 to 70 (usually 58 to 65) in lateral series**. **Colour:** dorsum dark blue, grading to silvery on sides and milky white on abdomen, often with brassy or golden reflections from scales; about 6 to 8 dark horizontal stripes along upper sides and large dark spot on side posterior to gill opening; fins dusky, especially at margins.

Size: Maximum 42 cm standard length; commonly to 30 cm standard length.

Habitat, biology, and fisheries: Inhabits mainly fresh waters, found in large rivers, reservoirs, lakes, swamps, temporary floodwater pools, and estuaries; larger fishes tolerating salinities up to 41.3‰. In brackish water populations, young remain in fresh water until reaching about 70 mm total length. Herbivorous, filter-feeding on microscopic plants (at least in fresh water); food is strained by the numerous fine gill rakers, then presumably transferred in a mucus stream in the pharyngeal pouches, concentrated in some way, then everted as a bolus into the pharynx. Spawns in fresh water from mid-March to August in ponds, lakes, and large rivers, usually near surface depths (0.3 to 1.6 m) but sometimes as deep as 15 m; daylight spawning typical, but nighttime spawning observed in Alabama; eggs adhesive and demersal; experience heavy post-spawning mortality. Fecundity 22 400 to 543 900 ova. Prone to large-scale, unexpected die-offs in late summer. Separate statistics not reported for this species. Frequently caught in brackish bays, estuaries, and rivers, mainly with seines. Valued as a forage for various game fishes, not esteemed as food, but sometimes used as fertilizer and harvested for its oil, utilized as a supplementary food for pigs or cattle.

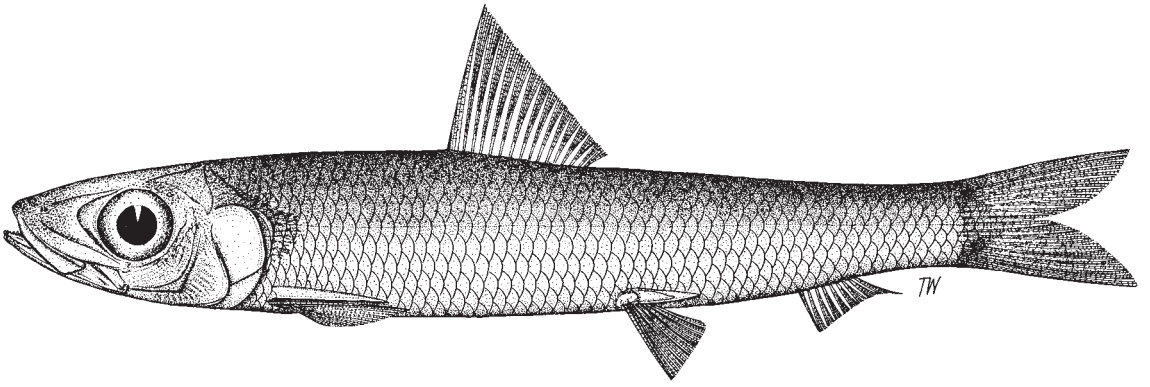


Distribution: Atlantic coast (New York to Florida) and Gulf of Mexico, southward to central Mexico; also Atlantic and Gulf of Mexico drainages of North and Central America, southward to the Mississippi river drainage and smaller rivers affluent to the Gulf of Mexico southward to the Río Pánuco, Mexico.

Etrumeus teres (Dekay, 1842) RRH

Frequent synonyms / misidentifications: *Etrumeus sardina* (Mitchill, 1814) / None.

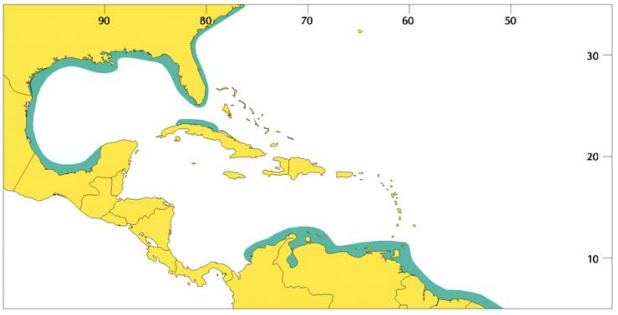
FAO names: En - Redeye round herring (AFS: Round herring); **Fr** - Shadine ronde; **Sp** - Sardineta canalera.



Diagnostic characters: Body elongate, cylindrical; abdomen rounded, without pre- and postpelvic scutes; presence of plate-like W-shaped pelvic scute. Premaxillae rectangular (not triangular) giving distinctive appearance to mouth; **branchiostegal rays numerous (14 to 15)**. Dorsal-fin origin just anterior to centre point of body; anal-fin base very short (10 to 13 rays), well posterior to vertical through posterior dorsal-fin base; pelvic-fin origin posterior to vertical through posterior dorsal-fin base. **Colour:** dorsum olive green, sides and abdomen silvery.

Size: Maximum 25 cm standard length; commonly to 18 cm standard length.

Habitat, biology, and fisheries: Marine, pelagic, rarely taken inshore, usually in deep waters along continental shelf and slope; in southern areas does not occur in nearshore or estuarine habitats; in southern Caribbean Sea, the majority of round herring landings come from depths greater than 60 m. Diurnal vertical migrators; surface waters at night, 9 to 37 m off the bottom during day. Seasonal shift in depth distribution may also occur with fish moving offshore (56 to 183 m) during summer and autumn and inshore during winter and spring. Schooling species, often in dense mixed schools. Spawning occurs at night along the inner continental shelf, December through May in Gulf of Mexico, peak activity January through February. Estimated fecundity 7 446 to 19 699 eggs (based on 8 females 130 to 165 mm standard length captured in eastern Gulf of Mexico), equivalent to 150 to 428 eggs/g. Fertilized eggs 1.17 to 1.37 mm in diameter. Feeds mainly on zooplankton. Sparse in catches in this area, but larger catches are made farther north. Separate statistics not reported for this species. Caught mainly with boat seines and purse seines; taken mainly as bycatch in the industrial trawl fishery for shrimps. Marketed fresh, probably also reduced to fish meal together with other clupeid fishes.

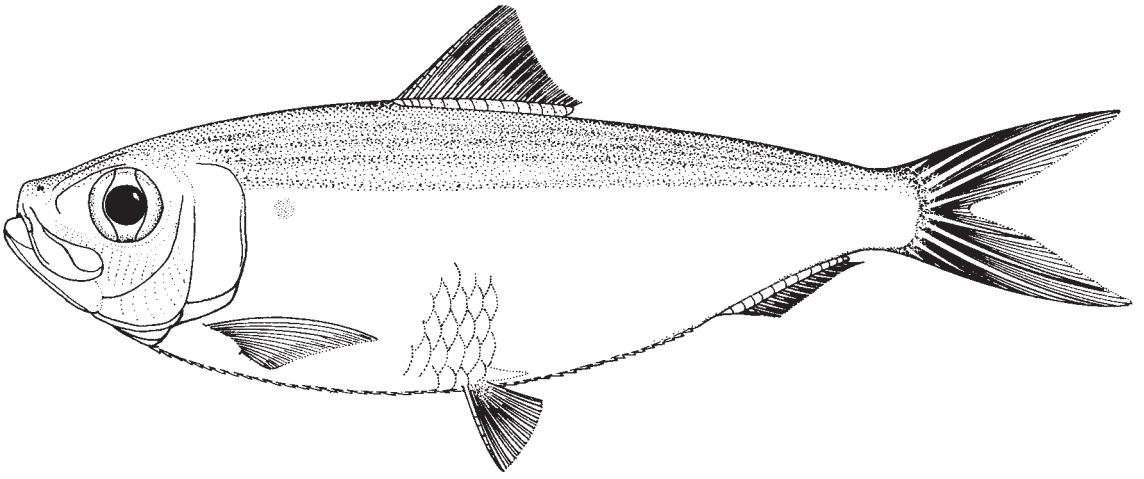


Distribution: Recorded from northern Florida, northern and eastern coasts of Gulf of Mexico, Cuba, Colombia, Venezuela, Trinidad, French Guiana, possibly more widely distributed; northward to Bay of Fundy. Elsewhere, recorded in the eastern Pacific and Indo-Pacific.

Harengula clupeola (Cuvier, 1829) HCC

Frequent synonyms / misidentifications: *Harengula macrophthalma* (Ranzani, 1842) / *Harengula jaguana* Poey, 1865.

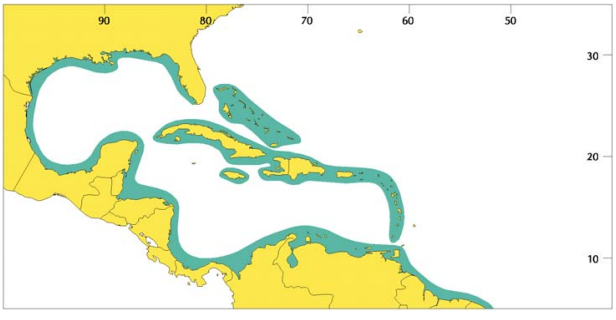
FAO names: En - False herring (AFS: False pilchard); **Fr** - Harengule écailleux; **Sp** - Sardineta escamuda.



Diagnostic characters: Body fusiform, moderately compressed, **body depth usually less than 32% standard length (in specimens 3.5 to 11.6 cm)**; abdomen with 29 to 32 scutes forming a distinct keel. **Toothed hypomaxilla present**; posterior border of gill opening with 2 fleshy outgrowths; gill rakers fine, usually 28 to 34 on lower limb of anterior gill arch; **fairly narrow tooth plates extending back from tongue**. Dorsal fin slightly anterior to centre point of body; **7 branched pelvic-fin rays**, pelvic-fin origin at about vertical through middle of dorsal fin; anal fin short and placed well behind vertical through posterior dorsal fin; **pectoral fin short (19 to 22% standard length); pelvic fin inserts nearer to insertion of pectoral fin than to origin of anal fin. Scales strongly attached, not easily lost. Colour:** dorsum and upper sides blue-green, with faint longitudinal streaks; lower sides and abdomen silvery; **faint dark spot on side posterior to opercular margin**; fins hyaline, but caudal tips and margin often dusky.

Size: Maximum 17 cm standard length; commonly to 9 cm standard length.

Habitat, biology, and fisheries: Pelagic, in coastal waters, estuaries, and lagoons; tolerates considerable changes in salinity. Occurs in turbid waters along the mainland coast as well as in clear waters of insular coral reef habitats. Schools of small individuals are often found along sandy beaches. Nocturnal predator; feeds on zooplankton, almost exclusively on copepods. Multiple spawnings per season; approximate diameters for oocytes entering vitellogenesis and pre-ovulatory hydration were 140 μm and 580 μm, respectively. Caught where it occurs, with no major fishing grounds. Separate statistics not reported for this species, but combined *Harengula* catches for 1995 were 1 117 t (Cuba: 1 045 t; Dominican Republic: 72 t). Caught mainly with purse seines and beach seines. Marketed mostly fresh, but flesh not of high quality (unpleasant odor); probably also reduced to fish meal together with other clupeid fishes.

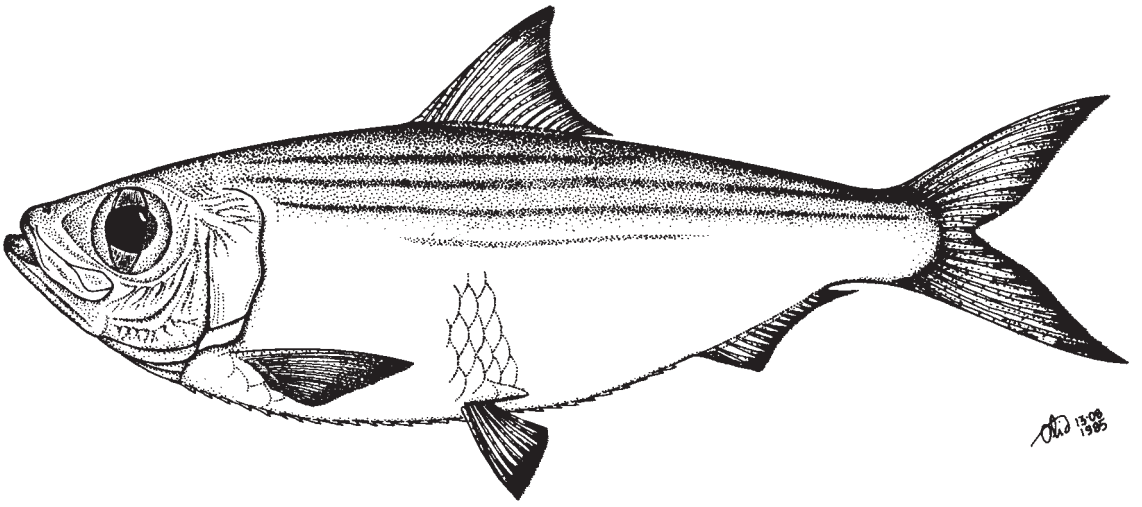


Distribution: Gulf of Mexico, southeastern Florida (not north Florida), Bahamas, entire Caribbean and West Indies, southward to Brazil.

Harengula humeralis (Cuvier, 1829) HCU

Frequent synonyms / misidentifications: *Harengula maculosa* Valenciennes, 1847; *Alosa apicalis* Müller and Troschel, 1847; *Harengula sardina* Poey, 1860 / None.

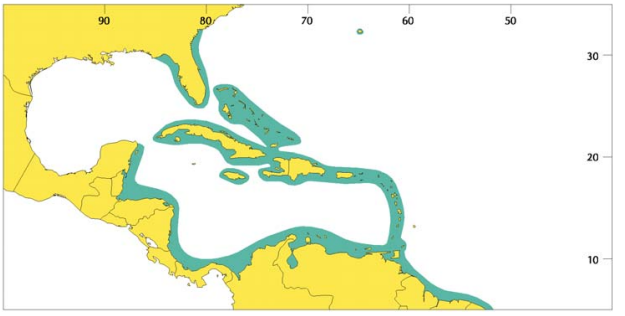
FAO names: En - Redear herring; **Fr** - Harengule camomille; **Sp** - Sardineta manzanillera.



Diagnostic characters: Body fusiform, moderately compressed; abdomen with 25 to 29 scutes forming a distinct keel. **Tooth plate on tongue and tooth plate behind it (basihyal and basibranchial tooth plates) very narrow, their width about 10 times in combined length, the basihyal tooth plate not bulging in front**. Lower gill rakers usually 27 to 31. Dorsal fin placed slightly anterior to body midpoint; anal fin placed well posterior to vertical through posterior dorsal-fin base; 7 branched pelvic-fin rays, pelvic-fin origin inserted about at vertical through middle of dorsal-fin base. **Scales thin, loosely attached, easily lost. Colour: an orange spot on opercular margin**; 3 to 4 narrow, yellowish orange, lateral stripes; **tips of anterior dorsal-fin rays dark.**

Size: Maximum 22 cm standard length, commonly to 12 cm standard length.

Habitat, biology, and fisheries: Marine, coastal, pelagic; in clear coastal waters of coral-reef habitats. It may occur in large, dense schools in the vicinity of sand beaches, mainly over seagrass beds of *Thalassia*. Nocturnal predator; feeds on copepods, larvae and juveniles of decapods, fishes, and stomatopods. Caught with beach nets. Separate statistics not reported for this species, but combined *Harengula* catches for 1995 were 1 117 t (Cuba: 1 045 t; Dominican Republic: 72 t). Usually not actively fished, since the flesh may occasionally be deadly poisonous, but utilized as bait or in the preparation of fish feeds in aquaculture.



Distribution: Bermuda, Florida, Bahamas; Cuba, Lesser Antilles, Trinidad; Yucatán to Colombia, Venezuela, French Guiana; no records from Brazil.

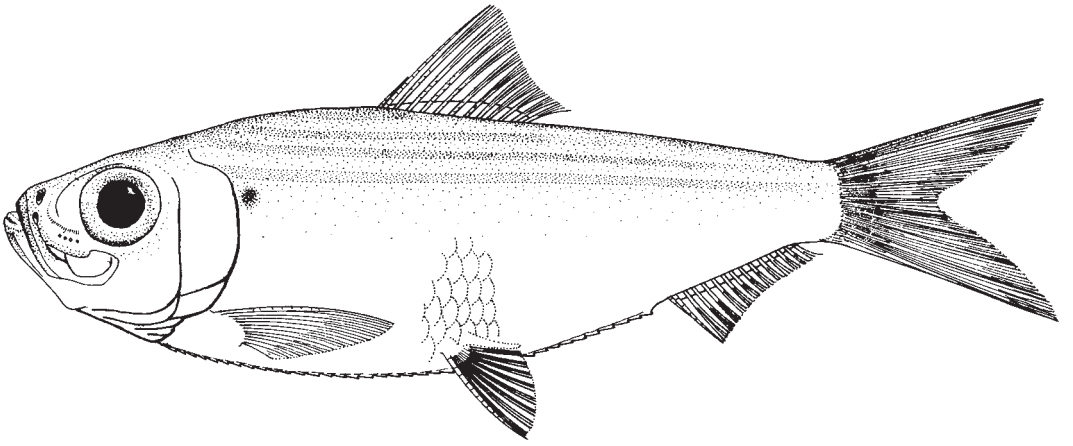
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Harengula jaguana Poey, 1865 HCG

Frequent synonyms / misidentifications: *Harengula pensacolae* Goode and Bean, 1879; *Harengula majorina* Storey, 1938 / *Harengula clupeola* (Cuvier, 1829).

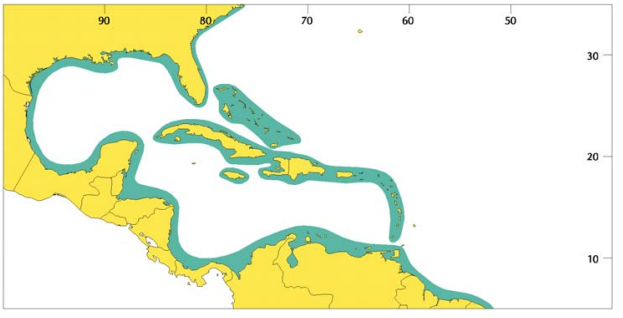
FAO names: En - Scaled herring (AFS: Scaled sardine); **Fr** - Harengule jagane; **Sp** - Sardineta jaguana.



Diagnostic characters: Body fusiform, moderately deep, compressed, **body depth usually 34% or more of standard length (over 40% standard length in large individuals)**, and greater than head length. Abdomen with 28 to 31 scutes forming a distinct keel. **Toothed hypomaxilla present**; posterior border of gill opening with 2 fleshy outgrowths; gill rakers fine, 30 to 40 (usually 32 to 39) on lower limb of first arch; **broad tooth plates with distinct 'shoulders' extending back from tongue**. Dorsal fin placed slightly anterior to centre point of body; anal fin short and placed well posterior to vertical through posterior dorsal-fin base; **pectoral fin long, 22.0 to 24.5% standard length; 7 branched pelvic-fin rays, pelvic-fin origin about midway between insertion of pectoral fin and origin of anal fin. Colour:** dorsum and upper sides blue-black, with faint lateral streaks; lower sides and abdomen silvery; dark spot on side posterior to gill cover, faint or conspicuous; **fins hyaline**, but tips of caudal fin often dusky.

Size: Maximum 22 cm standard length; commonly to 12 cm standard length.

Habitat, biology, and fisheries: Pelagic and demersal in coastal waters over sand and mud bottoms, often near estuaries and sometimes in hypersaline lagoons; abundant in nearshore estuaries and bays during spring to autumn; abundant in the Gulf of Mexico and common but apparently not abundant outside the Orinoco delta. Juveniles were collected in Guanabara Bay, Brazil, in May with average lengths of 29 to 44 mm standard length and migrated out of the bay by December or March at approximate size of first maturity (78 to 85 mm). Spawns at night from January to September, peak activity from April to August, dependent on location; some evidence of intermittent or spasmodic spawning. Most mature at age-1 (80 to 130 mm), all by age-2; size at first maturity 78 to 85 mm standard length. Estimated fecundity 5 563 to 52 753 eggs (based on 22 females, 85 to 163 mm standard length); relative fecundity 323 to 807 eggs/g; 3 modes of oocytes, 2 of which are spawned during one spawning season. Eggs pelagic, transparent, spherical; 1.55 to 1.85 mm. Caught where it occurs, with no major fishery; a small bait fishery exists in south Florida. Separate statistics not reported for this species, but combined *Harengula* catches for 1995 were 1 117 t (Cuba: 1 045 t; Dominican Republic: 72 t). Caught with beach seines, purse seines, and as bycatch in the industrial trawl fishery for shrimps. Marketed fresh; canned in Cuba and Venezuela.

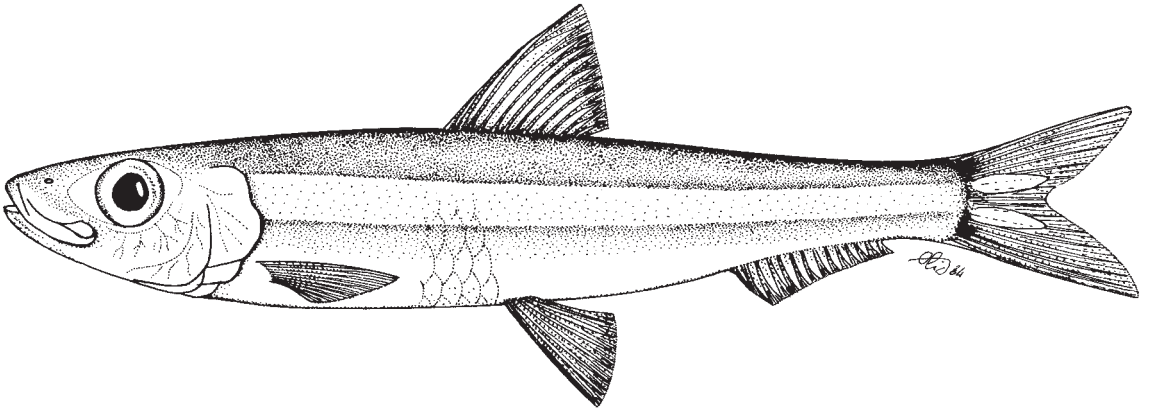


Distribution: Probably throughout the area, northward to New Jersey and southward to southern Brazil. Variations in body depth, eye size, etc., of individuals collected throughout this range suggest that more systematic work is needed on this taxon.

Jenkinsia lamprotaenia (Gosse, 1851) CJL

Frequent synonyms / misidentifications: *Jenkinsia viridis* (Bean, 1912) / None.

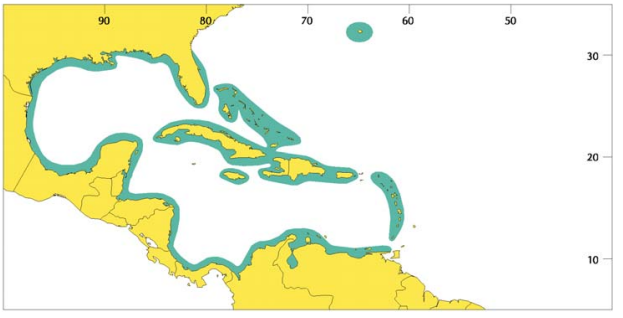
FAO names: En - Dwarf round herring (AFS: Dwarf herring); **Fr** - Shadine pisquette; **Sp** - Sardineta canalerita.



Diagnostic characters: Body elongate, slightly compressed; **abdomen rounded, without scutes** (except for plate-like, W-shaped pelvic scute). **Premaxilla toothed**; branchiostegal rays few (5 or 6). **Isthmus slender, but with slight shoulders anteriorly**. Dorsal-fin origin at about midpoint of body; anal-fin base short, posterior to vertical through midpoint of dorsal-fin base; **pectoral-fin rays 13 or 14. Colour: dorsum olive-green; adults with broad lateral silver stripe (width equalling up to 1/2 eye diameter and not narrowing anteriorly).**

Size: Maximum 7 cm standard length; commonly to 5 cm standard length.

Habitat, biology, and fisheries: Forms large schools near surface or shallow water off sandy beaches and rocky areas. In the Virgin Islands, predictably aggregate in shallow (less than 2 m) inshore locations in daytime during a portion of the lunar month (around full moon); these aggregations are hypothesized to be prespawning shoals seeking refuge in shallow water during daylight. Exhibit a daily, crepuscular pattern of inshore (at dawn) and offshore (dusk) movements. Presumably spawn offshore in deeper, open water, at or beyond the mouth of bays, around the full moon. May spawn monthly. Often extremely abundant. Feeds on zooplankton. No special fishery, but caught with other clupeoids. Separate statistics not reported for this species. Caught mainly with beach and boat seines. Readily attracted by light. No value as a foodfish; used for bait and chum and probably also reduced to fish meal together with other clupeoid fishes.

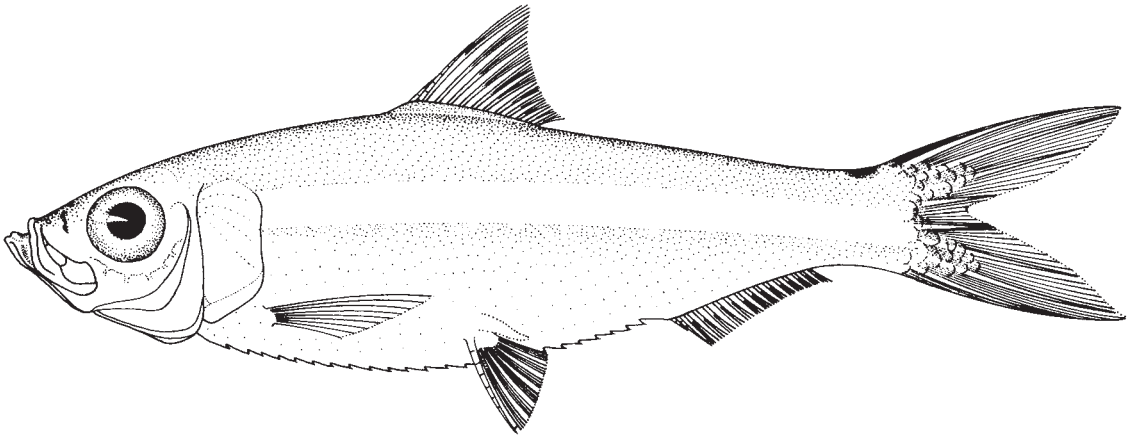


Distribution: Probably occurs throughout central and southern parts of area, also Bermuda (recorded as *viridis*), but only doubtfully from North and South Carolina and nothing farther north; not recorded farther south than Tobago.

Lile piquitinga (Schreiner and Miranda-Ribeiro, 1903) LCP

Frequent synonyms / misidentifications: None / None.

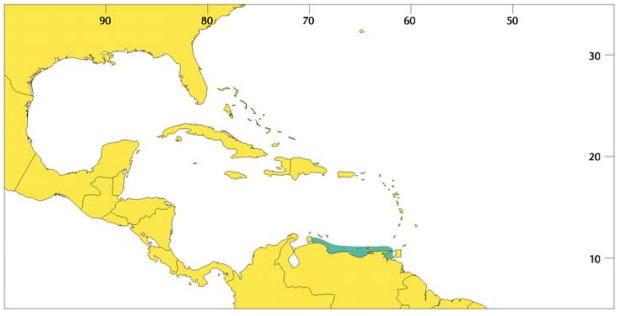
FAO names: En - Atlantic piquitinga; **Fr** - Harengule piquitinge; **Sp** - Sardineta piquitinga.



Diagnostic characters: Body fusiform, slightly compressed; abdomen with scutes forming a distinct keel. **No hypomaxilla; posterior border of gill opening evenly rounded**, without fleshy lobes. Dorsal fin placed slightly anterior to centre point of body; anal fin short and placed well posterior to vertical through posterior dorsal-fin base; **7 branched pelvic-fin rays**, pelvic-fin origin inserted at about vertical through middle of dorsal-fin base. **Colour:** dorsum blue-green, sides lighter, with very distinct silver stripe from gill opening to caudal-fin base, equalling about 3/4 eye diameter in width; dark spot on dorsum at caudal-fin base; fins hyaline.

Size: Maximum 12 cm standard length; commonly to 6 cm standard length.

Habitat, biology, and fisheries: Pelagic, inshore waters; protected coastal waters, over muddy bottoms, also in estuaries and hypersaline lagoons; very abundant in mangrove-lined lagoons and beaches, especially south of Margarita Island. Caught with beach and boat seines and with cast nets. Probably little used for food, but mainly for bait. No separate statistics reported for this species. Contributes to clupeoid catches in western Venezuela only.

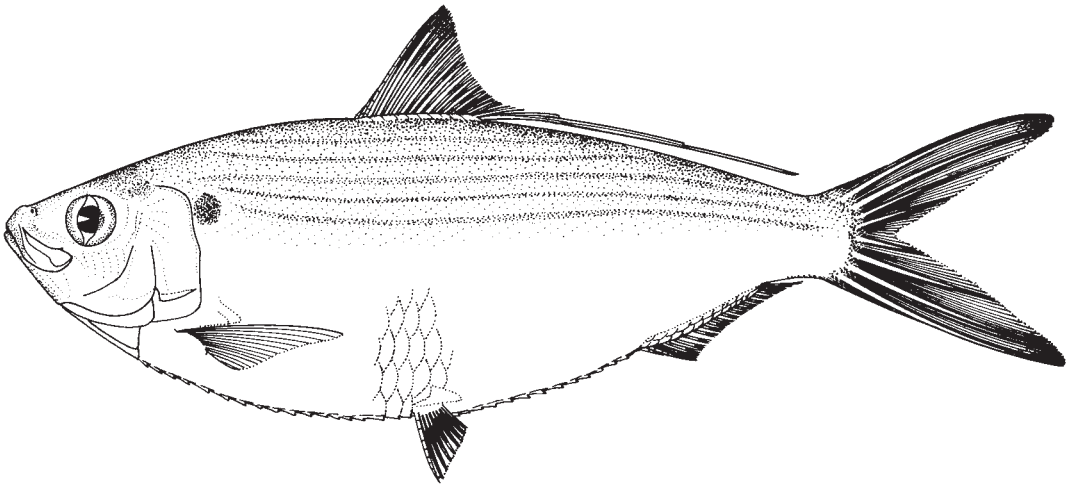


Distribution: Venezuela (Nueva Esparta), and commonly off northeastern Brazil; may well occur in the intervening area.

Opisthonema oglinum (Lesueur, 1818) THA

Frequent synonyms / misidentifications: *Opisthonema captivai* Rivas, 1972 / None.

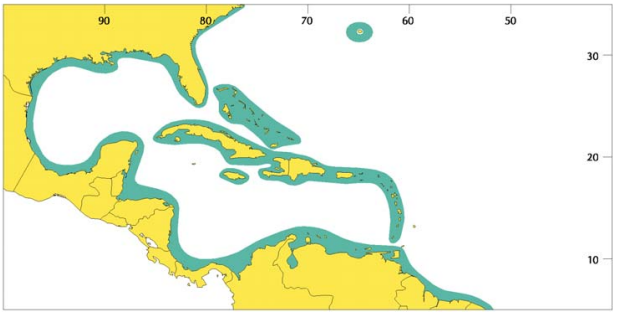
FAO names: En - Atlantic thread herring; **Fr** - Chardin fil; **Sp** - Machuelo hebra atlántico.



Diagnostic characters: Body fusiform, moderately compressed; abdomen with 32 to 36 scutes forming a distinct keel. **No hypomaxilla**; gill rakers fine and numerous, increasing with size of fish up to 12 cm standard length, then stable at 28 to 46 gill rakers. Posterior margin of gill chamber with 2 fleshy lobes. **Dorsal fin slightly anterior to centre point of body**, **its last ray filamentous**; anal fin short and placed well posterior to vertical through posterior base of dorsal fin; **7 branched pelvic-fin rays,** pelvic-fin origin inserted at point about at vertical through middle of dorsal-fin base. **Colour:** dorsum and upper sides blue-green, sometimes with dark horizontal lines, lower sides and abdomen silvery; dark spot on side posterior to gill cover, about equal in size to diameter of pupil (followed in some specimens by one or more irregular lines of smaller spots); margin of dorsal fin and its filament dusky; caudal fin with black tips.

Size: Maximum 38 cm standard length, commonly to 20 cm standard length.

Habitat, biology, and fisheries: Pelagic, coastal, migratory, often forming compact surface schools (but solitary individuals reported); schools from southeastern United States migrate south during autumn and winter when temperatures fall below 20°C, presumably to overwinter. Prefers temperatures above 17°C and below 29°C; salinity 32 to 34‰, probably does not enter low salinity waters. Spawning period May and June off North Carolina, February to September (peak April to August) in eastern Gulf of Mexico, possibly March to July off Venezuela. Recruitment occurs throughout the year, with maximum in summer. Females mature at 135 to 169 mm fork length. Estimated fecundity 13 638 to 67 888 eggs; relative fecundity 471 to 746 eggs/g. Eggs pelagic, 1.08 to 1.31 mm. Adults feed on small fishes, crabs, and shrimps; juveniles on planktonic organisms. Predominately taken in artisanal and industrial fisheries. Caught throughout the area, targeted off Costa Rica, and Venezuela, the continental margins of the Caribbean, the Gulf of Mexico, and near the islands of Cuba, Hispaniola, Puerto Rico, Jamaica, and Trinidad, also off coasts of Ecuador and Peru. This species represents a relatively important fishery resource in some regions. The total reported catch in 1995 was 7 737 t (Venezuela: 307 t; USA: 5 056 t; Cuba: 2 005 t; Dominican Republic: 369 t). Caught with beach seines, purse seines, and cast nets, sometimes gill nets and as bycatch in the trawl fishery for shrimps. Marketed fresh, frozen, salted, and as bait; also of growing importance in fish meal and fish oil industry; minor quantities for human consumption, occasionally canned as 'sardine'; processed into pet food.

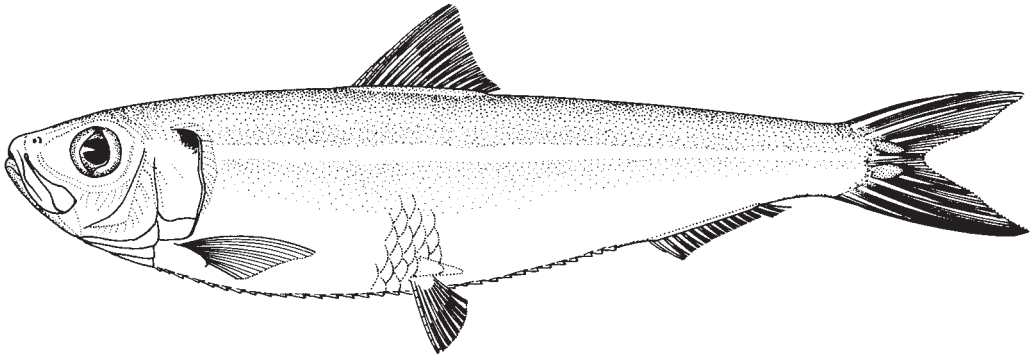


Distribution: Western Atlantic (Gulf of Maine, Bermuda, throughout Gulf of Mexico, Caribbean and West Indies, southward to Santa Caterina, Brazil). Also off coasts of Ecuador and Peru.

Sardinella aurita Valenciennes, 1847 SAA

Frequent synonyms / misidentifications: *Sardinella anchovia* Valenciennes, 1847 / None.

FAO names: En - Round sardinella (AFS: Spanish sardine); **Fr** - Allache; **Sp** - Alacha.



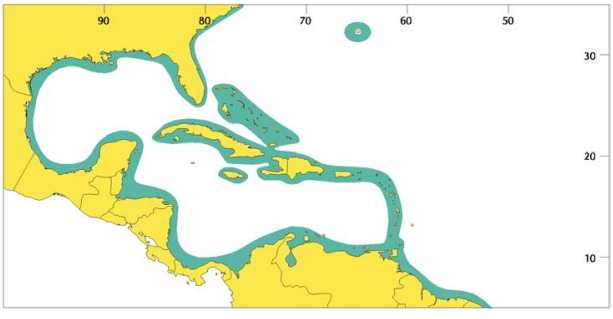
Diagnostic characters: Body elongate, usually subcylindrical, but sometimes slightly compressed; **abdomen rounded, with scutes, but without prominent keel**. **Top of head with 8 to 10 longitudinal frontoparietal striae on each side**; **no hypomaxilla**; **posterior border of gill opening with 2 fleshy outgrowths**; gill rakers fine and numerous (more than 80), increasing with size of fish, **anterior rakers on lower limbs of second and third gill arches lying more or less flat**. Dorsal fin placed slightly anterior to centre point of body; anal fin short and placed well posterior to vertical through posterior dorsal-fin base; **8 branched pelvic-fin rays**, pelvic-fin inserted at vertical through anterior dorsal-fin base. **Colour:** dorsum dark blue, sides silvery; fins hyaline; with faint golden midlateral stripe, preceded by faint golden spot on sides posterior to gill opening; distinct black spot at posterior border of gill cover.

Size: Maximum 30 cm standard length, commonly to 25 cm standard length.

Habitat, biology, and fisheries: Coastal, pelagic, preferring clear saline water with a minimum temperature of 24°C; from inshore and near surface to edge of continental shelf and down to 350 m (West Africa), or perhaps even deeper. Possible inshore/offshore migration (Florida); off Venezuela, adults live permanently on shelf and migrate along shelf. Schooling and strongly migratory, often rising to surface at night and dispersing; surface and demersal schools usually associated with upwellings and increased concentrations of zooplankton. Diurnal migrator. Breeds perhaps at all times of the year, but with distinct peaks; spawning period off Venezuela extending from November to June, chiefly December to April, with peak in January and February; perhaps mid-June to end of September off North America; September to February in the Gulf of Mexico. Minimum length at sexual maturity about 130 mm fork length; sexually mature between ages 2 and 3. Estimated batch fecundity 21 240 to 146 729 eggs (based on females 146 to 188 mm fork length). Eggs pelagic, spherical, 1.03 to 1.25 mm. Feeds mainly on zooplankton, especially copepods, but some phytoplankton (especially by juveniles). A foodfish of major commercial importance. Caught throughout the area, but main fishing grounds are off Venezuela (Gulf of Cariaco, Araya Peninsula, and Margarita Island). Total reported catch within the area for 1995 was 154 988 t. Caught with beach seines and purse seines; small quantities are occasionally taken with bottom trawls. Marketed fresh or canned (Venezuela); also widely used as a bait fish.

Distribution: Western Atlantic (Cape Cod to Argentina); elsewhere, eastern Atlantic and Mediterranean.

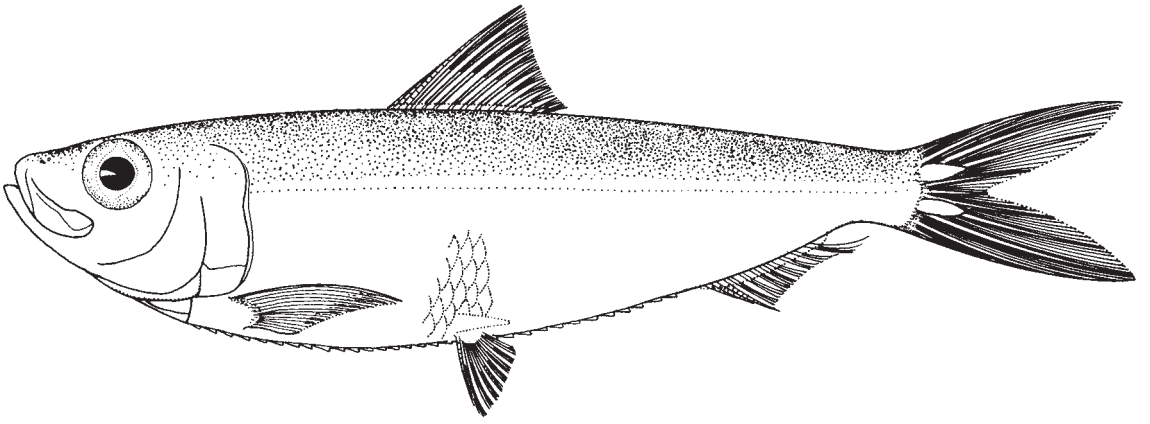
Remarks: Separation of *S. aurita* from *S. brasiliensis* based on gill raker shape is tentative. *Sardinella brasiliensis* may be a junior synonym of *S. aurita*. Purported differences in gill raker morphology between these 2 nominal species need to be confirmed. Mitochondrial DNA haplotype frequencies of western Atlantic *Sardinella* populations of both nominal species indicate separation of genetic populations rather than species differences. More study is needed to evaluate the morphological and genetic differences between and among these populations in order to determine their taxonomic status.



Sardinella brasiliensis (Steindachner, 1879) BSR

Frequent synonyms / misidentifications: None / *Sardinella aurita* Valenciennes, 1847.

FAO names: En - Brazilian sardinella (AFS: Orangespot sardine); **Fr** - Sardinelle de Brésil; **Sp** - Sardinela del Brasil.



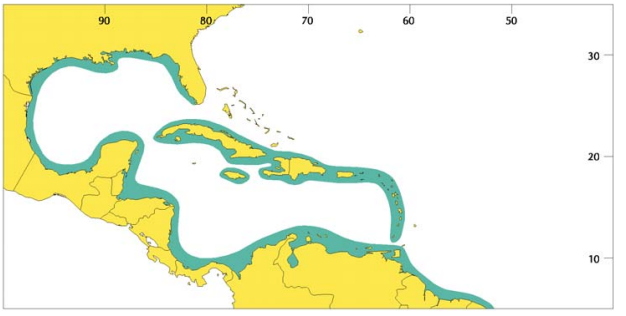
Diagnostic characters: Body elongate, slightly compressed; **abdomen rounded, with scutes, but without prominent keel. Top of head with 8 to 10 longitudinal frontoparietal striae on each side; no hypomaxilla**; posterior border of gill opening with 2 fleshy outgrowths; gill rakers fine and numerous, increasing with size of fish, **anterior rakers on lower limbs of second and third gill arches very strongly curled**. Dorsal fin placed slightly anterior to centre point of body; anal fin short and placed well posterior to vertical through posterior dorsal-fin base; **8 branched pelvic-fin rays**, pelvic-fin origin inserted about at vertical through middle of dorsal-fin base. **Colour:** dorsum dark blue, sides silvery, the 2 areas separated by a thin golden stripe; fins hyaline.

Size: Maximum 25 cm standard length; commonly to 20 cm standard length.

Habitat, biology and fisheries: Coastal, pelagic, often forming compact schools. Caught with *Sardinella aurita* and probably not often distinguished from it. Peak spawning in summer, particularly January and February. Average size at sexual maturity ca. 17 cm; average fecundity 23 000 eggs/female. Separate statistics within the area not reported for this species; possibly included in data for *Sardinella aurita*. Caught with beach seines and purse seines. Marketed fresh and canned, and widely used as bait. Probably marketed as *S. aurita*.

Distribution: Western Atlantic (Gulf of Mexico, Caribbean, West Indies, southward to Brazil and northern Uruguay). Identifications not always reliable; almost certainly less abundant than *Sardinella aurita*; probably not found north of Florida, but southward replacing *S. aurita* and dominating catches from Espirito Santo (Brazil) to Uruguay.

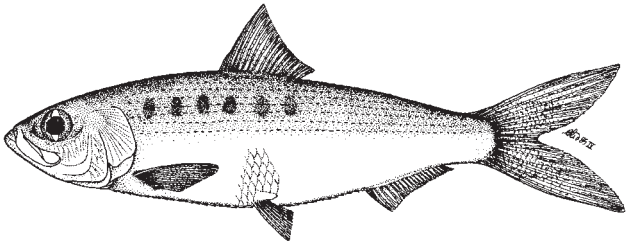
Remarks: See remarks under *Sardinella aurita*. This species is currently recognized as *Sardinella janeiro* (Eigenmann, 1894) by some authors.

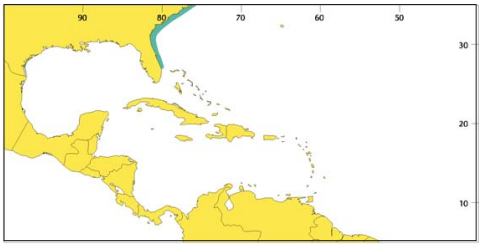


Alosa mediocris (Mitchill, 1814) SHH

En - Hickory shad; **Fr** - Alose américaine.

Maximum size to 60 cm standard length, commonly to 40 cm standard length. Coastal and tidal fresh waters; euryhaline, entering brackish and fresh water, anadromous. Most of adult life spent in sea. Spawns in tidal fresh water (Patuxent River, Chesapeake Bay in May-June; Virginia rivers and southern part of range in February-May). Sexually mature at 3 to 5 years. Estimated fecundity 43 000 to 348 000 eggs/female. Feeds on small fishes, also squids, small crabs, and other crustaceans, as well as fish eggs. Of minor importance to fisheries. Caught with seines, pound nets, and in lesser quantities in gill and fyke nets. Western North Atlantic (Maine southward to the St. Johns River, Florida); also in rivers.

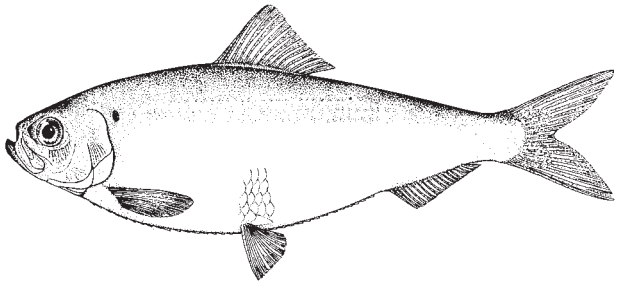


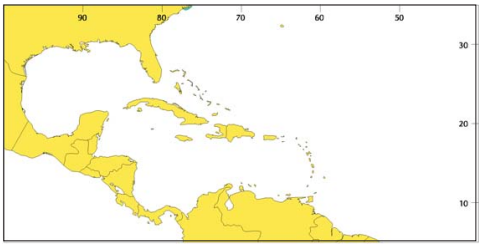


Alosa pseudoharengus (Wilson, 1811) ALE

En - Alewife; **Fr** - Gaspareau; **Sp** - Pinchagua.

Maximum size to 40 cm standard length, commonly to 30 cm standard length. Euryhaline, entering brackish and fresh waters, anadromous, schooling. Undertakes seasonal migrations, possibly in conjunction with changing patterns of water temperature; generally inshore and northward during spring from overwintering areas. Adults migrate up rivers and even small streams, spawning in lakes and quiet stretches of rivers; landlocked populations also ascend affluent rivers and streams; juveniles descend in summer and autumn, or even as late as November or December. Spawns in March in the Chesapeake Bay area, late April or May in Maine and in Canada. Estimated fecundity 60 000 to 467 000 eggs/female. Eggs semi-demersal, pink, 0.80 to 1.27 mm. Light levels play major role in daily behaviour; light sensitive; tend to be found in water column rather than at surface during daylight hours. May undertake vertical migrations corresponding with diel movements of zooplankton. Primarily particulate-feeding planktivore, consuming wide variety of zooplankton (euphausiids, copepods, amphipods, mysids, ostracods); with increasing size, diet switches from micro- to macrozooplankton; adults feed on shrimps and small fishes, juveniles on diatoms, copepods, and ostracods. Probably not always distinguished from *A. aestivalis*. Taken in a variety of gears in inshore waters and also in trawls offshore. In the 1970s and 1980s, this species contributed the largest landings of North American shads, but more recent catches have been considerably less. Marketed fresh, salted, frozen, and smoked. Western North Atlantic (Gulf of St. Lawrence and Nova Scotia southward to North Carolina); also in streams and rivers; introduced and now landlocked in Lake Ontario and in lakes Erie, Huron, Michigan, and Superior; also in lakes Seneca and Cayuga, New York.

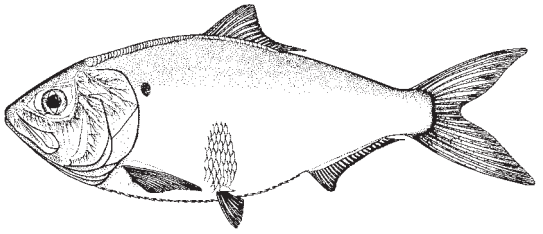


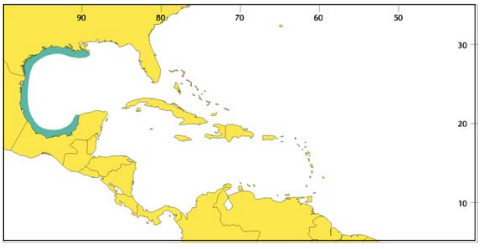


Brevoortia gunteri Hildebrand, 1948

En - Finescale menhaden.

Maximum size to 27 cm standard length. Marine, pelagic, schooling in inshore waters, including bays (possibly euryhaline). Spawns near shore and in bays in winter and early spring. Feeds on plankton. Of local importance to fisheries, but not separated from *Brevoortia patronus*. Gulf of Mexico (Chandeleur Sound, Louisiana, to Gulf of Campeche, Mexico), but no certain records from the Caribbean.



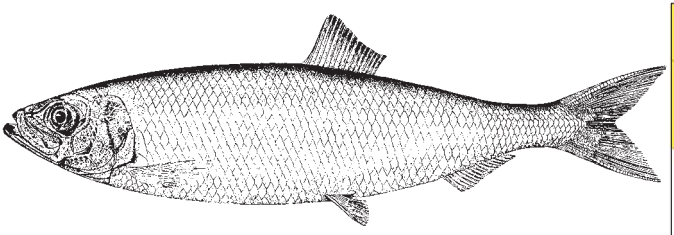


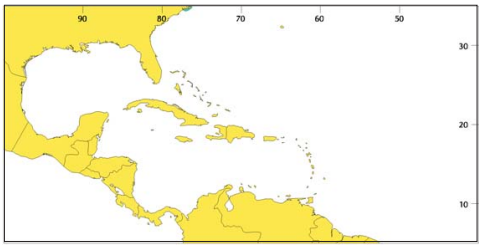
Clupea harengus Linnaeus, 1758

HER

En - Atlantic herring; **Fr** - Hareng de l'Atlantique; **Sp** - Arenque del Atlántico.

To 40 cm standard length, usually 20 to 25 cm. Coastal, pelagic down to 200 m, schooling, with complex feeding and spawning migrations. Feeds on small planktonic copepods in the first year, and thereafter mainly copepods, but also hyperid amphipods, euphausids, mysid shrimps, small fishes, arrow-worms, ctenophores, and pteropods. Major interest to fisheries in North Atlantic but only marginal in Area 31.



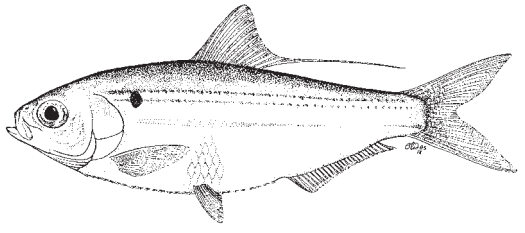


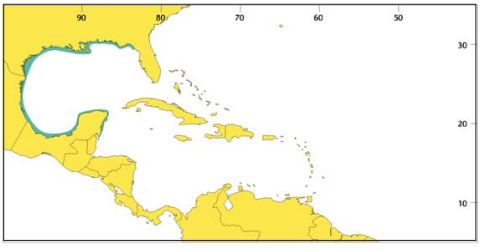
Dorosoma petenense (Günther, 1866)

CDA

En - Threadfin shad.

Maximum size to 18 cm standard length in southern range, but only to about 10 to 12 cm standard length in northern range. Pelagic, often schooling, mainly in fresh water, but adults also found in brackish or saline waters of estuaries and bays (up to 30‰; juveniles to about 15‰). Breeds in spring and again in autumn in open waters near or over plants or other objects; some evidence of synchronized spawning; eggs slightly adhesive. Batch fecundity estimated at 800 to 21 000 ova/female. Age at maturity usually 2 or 3 years, sometimes in autumn of their first year. Size at maturation 75 to 126 mm total length; maximum longevity about 4 years, most fish not exceeding age-2. Chiefly midwater filter-feeders, but not entirely herbivorous since copepods, cladocerans, and even fish fry have been recorded in diets; occasionally feeds benthically; young and adults take same foods; method of food processing presumably similar to that of *Dorosoma cepedianum*. Gulf of Mexico drainages of North and Central America; south to Texas and Florida; rivers around the Gulf to northern Guatemala; also Belize River, Belize; introduced into various systems in several places in USA.

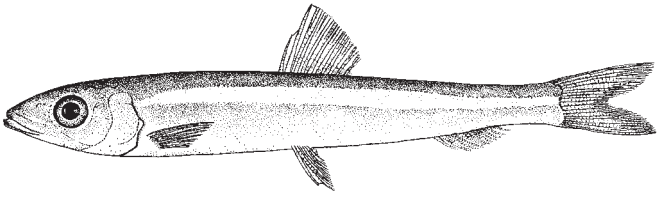


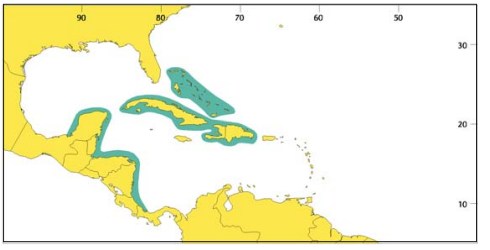


Jenkinsia majua Whitehead, 1963

En - Little-eye round herring.

Maximum size to 6 cm standard length. Marine, pelagic, and usually inshore schooling fishes. Feeds on zooplankton. Separate statistics not recorded for this species; probably of little commercial importance. Western central Atlantic (Gulf of Campeche, Bahamas, northwestern coast of Caribbean).

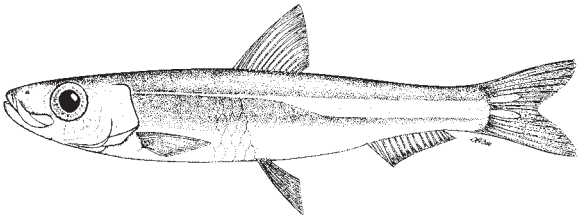


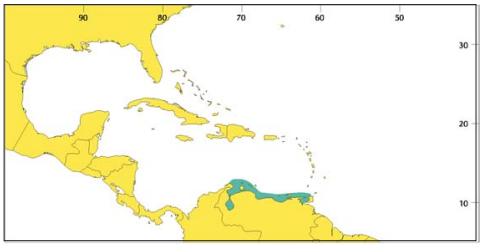


Jenkinsia parvula Cervigón and Velasquez, 1978

En - Shortstriped round herring.

Maximum size to 6 cm standard length. Marine, pelagic, schooling near coral reefs. Feeds on zooplankton. Separate statistics not recorded for this species; probably of little commercial importance. Western central Atlantic (Venezuela).

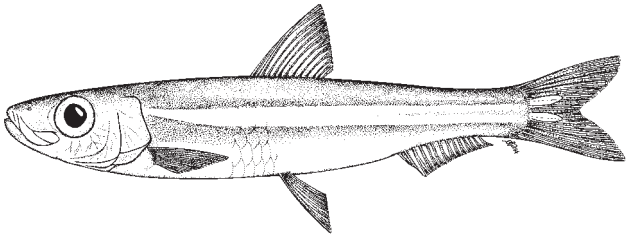


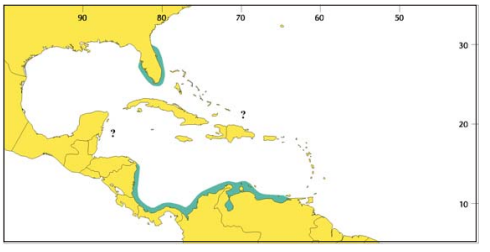


Jenkinsia stolifera (Jordan and Gilbert, 1884) CJS

En - Florida round herring (AFS: Shortband herring).

Maximum size to 7.5 cm total length. Marine, pelagic, and usually inshore schooling fishes. Feeds on zooplankton. Separate statistics not recorded for this species; probably of little commercial importance. Western central Atlantic (Florida, Honduras, Venezuela).

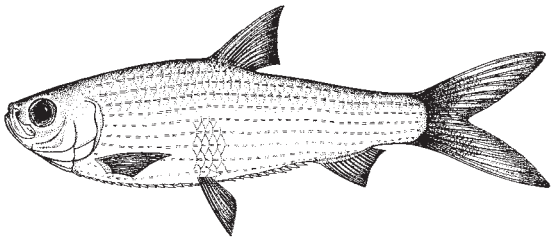


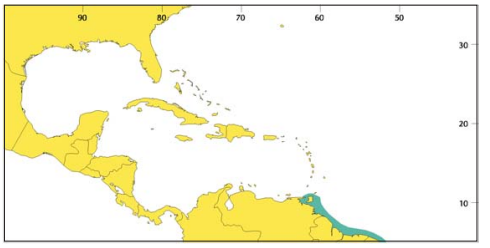


Rhinosardinia amazonica (Steindachner, 1879) RIA

En - Amazon spinejaw sprat (AFS: Shortband herring).

Maximum size to 8 cm standard length, commonly to 5 cm standard length. Fresh waters of rivers, but tolerating brackish water, presumably schooling. Feeds on zooplankton. At present of no interest to fisheries. Western central and South Atlantic (Gulf of Paria, lower reaches of Orinoco, rivers of the Guianas, Amazon at Pará, and northern Brazil, but undoubtedly in other river systems elsewhere in this region).

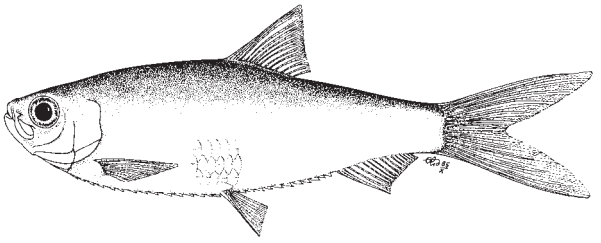


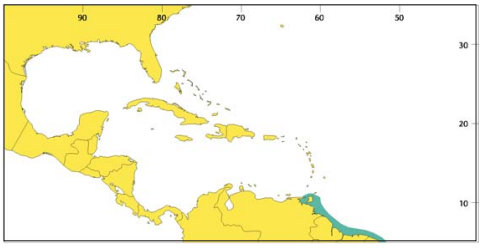


Rhinosardinia bahiensis (Steindachner, 1879)

En - Bahia sprat.

Maximum size to 8 cm standard length. Fresh-water rivers, but probably also tolerating brackish water. Probably of little interest to fisheries. Western central and South Atlantic (lower reaches of Orinoco, Suriname, to Bahia, Brazil).





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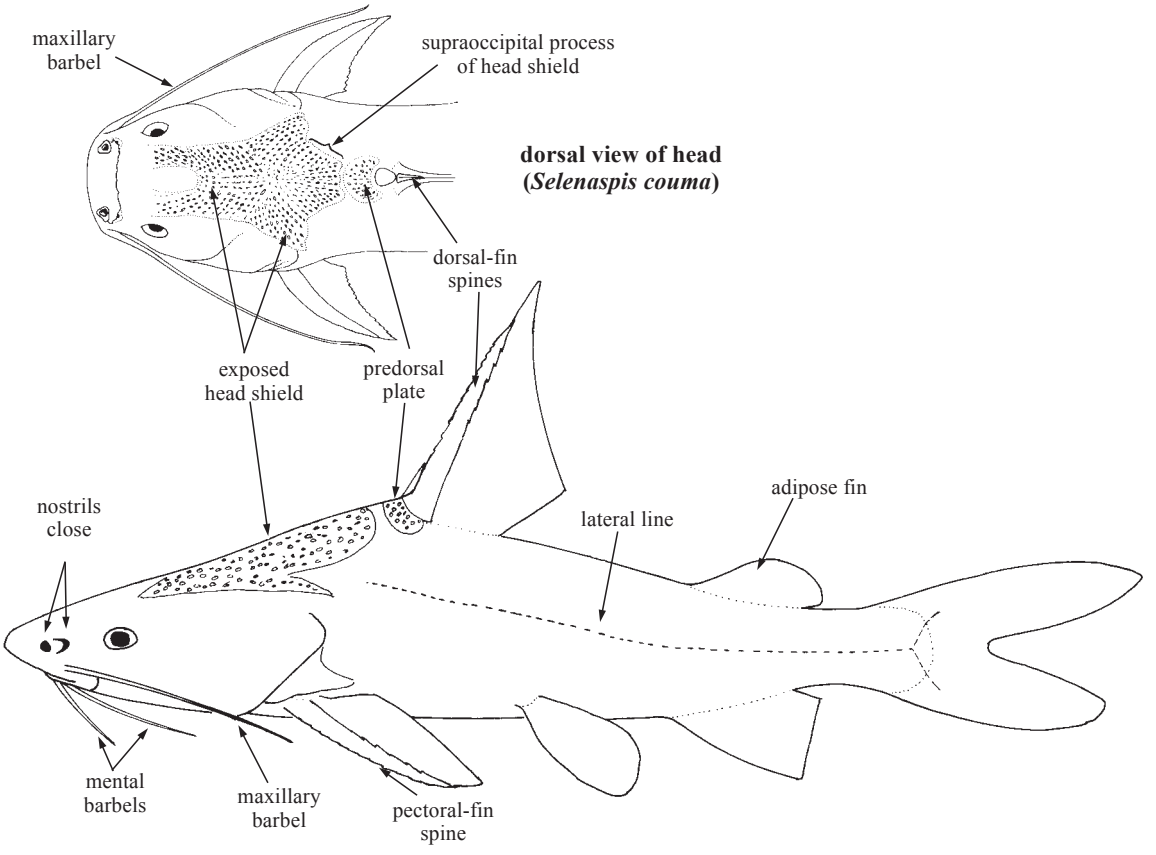
Order SILURIFORMES

ARIIDAE

Sea catfishes

by A. Acero, Universidad Nacional de Colombia, Colombia

Diagnostic characters: Medium- to large-sized fishes. The larger species attain over 1 m. Head large, rounded to depressed. **Head covered by an often rugose bony shield, part of which is well visible beneath the thin skin in most species (nearly obscured by thick skin and muscles in some); the supraoccipital process or posterior portion of this shield extends backward medially to meet the predorsal plate (a separate bone at base of dorsal-fin spines) and its shape is characteristic in many species**. Eye medium-sized to small. Two pairs of nostrils closely approximated on each side**, the posterior pair partly covered by a flap of skin**. Mouth terminal to inferior. Teeth in jaws fine or granular; those on palate (when present) fine, granular, or molar-like, arranged in bands or patches. **Paired maxillary and mental (mandibulary) barbels present, totalling 4 or 6**. Branchiostegal rays 5 to 9. Gill membranes fused with each other and attached to isthmus, with at most a narrow free posterior flap. **Gill rakers present on anterior faces of all arches, total number 7 to 42 on first arch; rakers also present (but completely absent in some species) on posterior faces of first and second arches.** Dorsal fin short, with a long, more or less serrated spine preceded by a very short one and followed by 7 soft rays. **A fleshy adipose fin always present opposite the anal fin**. Anal fin with 14 to 37 soft rays**. Caudal fin deeply forked, with 13 branched rays (6 in upper and 7 in lower lobe)**. Pectoral fins low-set, with a more or less serrated spine and 8 to 13 soft rays. **Pelvic fins with 6 soft rays, the inner rays variously modified in the female at maturity. Scales absent**. Lateral line complete, branching posteriorly onto upper and lower lobes of caudal fin. **Lapillus otolith enlarged. Swimbladder physostomous, oval, and sac-like with a posterior chamber in certain species. Colour:** usually greyish blue, dark grey, yellow, or brown, sometimes with black patches, or in some species with a silvery lateral stripe; paler to white below.

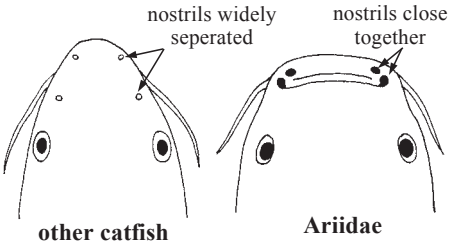


Habitat, biology, and fisheries: Sea catfishes occur in marine, brackish, and fresh waters of warm-temperate and tropical regions. The marine representatives are mostly confined to the coastlines of the continent and continental islands such as Trinidad (only a single species has been reported from Cuba, for example). They may be locally abundant in the turbid waters of certain habitats, particularly large river estuaries and mangrove-lined lagoons. A few species may reach depths of 100 m or deeper. Sea catfishes' diets range from omnivorous, including detritus, to strongly carnivorous, including large bony fishes and crustaceans. Reproduction is highly specialized: the males incubate the eggs and vitelline young in their mouths. The sea catfishes include several species of high economic value. FAO statistics report landings ranging from 14 885 to 26 630 t from 1995 to 1999. They are captured with a variety of gear, including bottom trawls, longlines, seines, cast nets, traps, and hook-and-line. The flesh is usually of good quality, but the sharp and serrated dorsal- and pectoral-fin spines can inflict painful wounds.

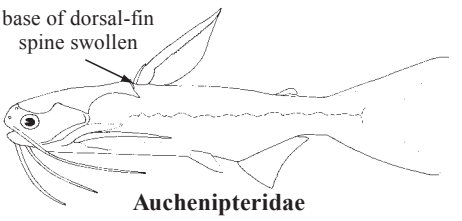
Remarks: This family is often listed as Tachysuridae and sometimes Bagreidae in the literature. The intrafamiliar systematics of the sea catfishes is still unresolved, particularly with respect to the species included in the genus *Arius*. Therefore the usage of generic names is provisional.

Similar families occurring in the area

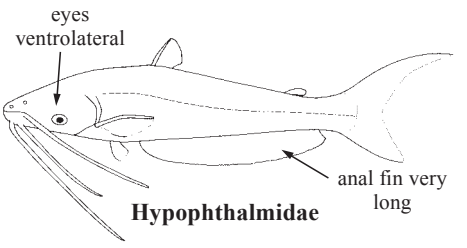
The sea catfishes can be easily separated from all other non-catfish families present in the area by the combination of the following characters: head covered by a bony shield, 4 or 6 mouth barbels, 1 large and serrated spine in both dorsal and pectoral fins. All other catfish families: anterior and posterior nostrils widely separated, posterior nostrils not covered by a flap of skin (except in Loricariidae); branched caudal-fin rays fewer or more than 13.



Auchenipteridae (*Pseudauchenipterus nodosus* only): postcleithral process spine-like, slender, and about half as long as pectoral-fin spine (subtriangular, generally shorter than 1/4 of pectoral-fin spine in Ariidae); pelvic-fin soft rays 8 (6 in Ariidae); frontal bones (on roof of skull) and base of dorsal-fin spine swollen or nodular in large adults and half-grown individuals (among Ariidae, frontal bones only swollen in *Bagre marinus* and base of dorsal-fin spine swollen only in young individuals of *Arius parkeri*).



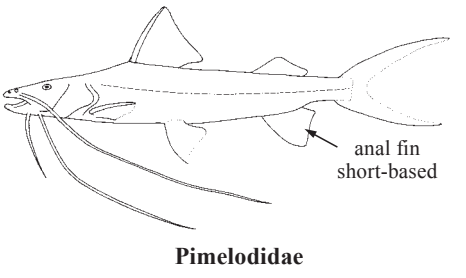
Hypophthalmidae (*Hypophthalmus edentatus* only): eyes ventrolateral in position; dorsal- and pectoral-fin spines flexible; anal fin very long with more than 60 soft rays, originating below or slightly before dorsal fin (moderately short, with 37 or fewer soft rays in Ariidae).

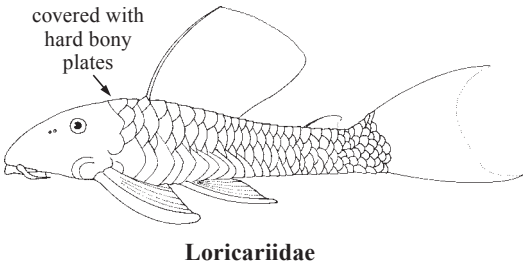


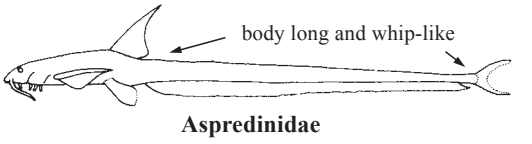
Pimelodidae (*Brachyplatystoma* species and *Pimelodus blochii*): anal fin usually shorter, with 12 to 15 soft rays.

Aspredinidae: head and anterior body depressed, posterior body long and whip-like; eyes minute; gill openings reduced to tiny slits; adipose fin absent; anal fin very long, with 50 to 60 soft rays.

Loricariidae: body covered with hard bony plates (body covered with thick skin in Ariidae).







Key to the genera and species of Ariidae in the area

1a. Only 2 pairs of barbels, one of which is mental (Fig. 1); maxillary barbels and filaments of dorsal- and pectoral-fin spines appearing as long, flattened ribbons . . . . . → *2*

1b. Three pairs of barbels, 1 pair maxillary and 2 pairs mental, all round in cross-section (Fig. 2) . . . . . → *3*

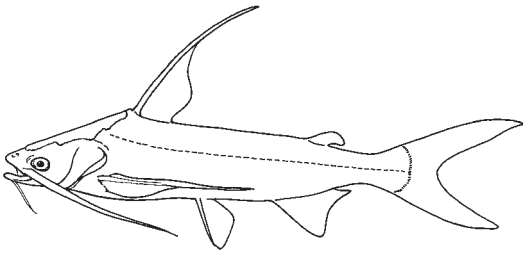


Fig. 1 ***Bagre***

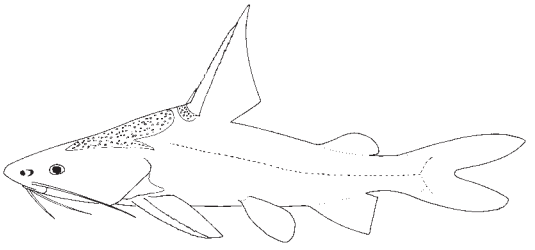


Fig. 2 ***Arius***

2a. Anal fin comparatively short, with 22 to 28 soft rays (Fig. 3) . . . . . ***Bagre marinus***

2b. Anal fin comparatively long, with 29 to 37 soft rays (Fig. 4) . . . . . ***Bagre bagre***

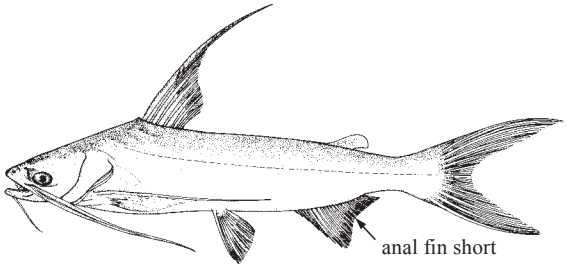


Fig. 3 ***Bagre marinus***

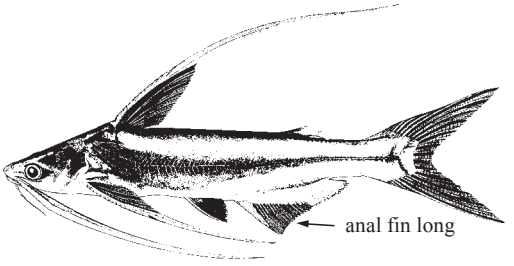


Fig. 4 ***Bagre bagre***

3a. A furrow, partially covered by a flap of skin, extending across snout, connecting posterior nostrils . . . . . → *4*

3b. No fleshy furrow extending between nostrils . . . . . → *6*

4a. Snout short, mouth terminal or nearly so; supraoccipital process slightly keeled (Fig. 5); teeth on palate in a narrow transverse band (Fig. 6a); pectoral-fin soft rays 11 or 12 . . . . . ***Selenaspis passany***

4b. Snout comparatively long, mouth inferior; teeth on palate in adults in a U-shaped patch (Fig. 6b, c); supraoccipital process from rounded above to slightly keeled; pectoral-fin soft rays usually 10 or 11 . . . . . → *5*

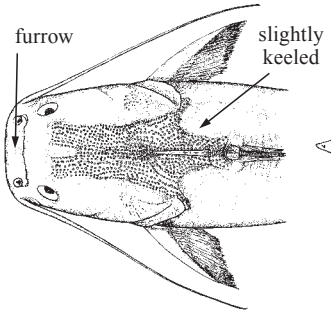
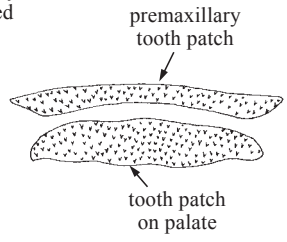
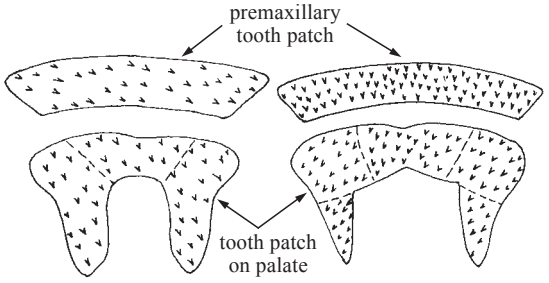


Fig. 5 ***Selenaspis passany*** **dorsal view of head**



a) ***Selenaspis passany***



b) ***Selenaspis herzbergii*** **c)** ***Selenaspis couma***

Fig. 6 teeth

5a. Supraoccipital process slightly keeled; total anterior gill rakers on second arch 19 to 26, usually 21 to 23 (Fig. 7) . . . . . ***Selenaspis herzbergii***

5b. Supraoccipital process rounded above, without a keel; total anterior gill rakers on second arch 17 to 21, usually 19 or 20 (Fig. 8) . . . . . ***Selenaspis couma***

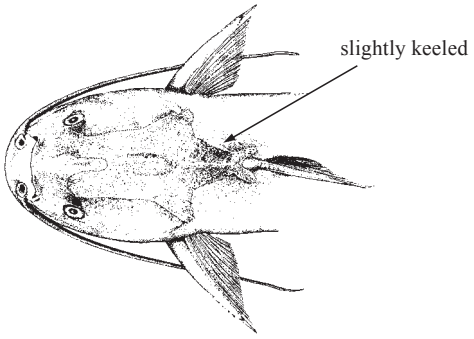


Fig. 7 *Selenaspis herzbergii*
dorsal view of head

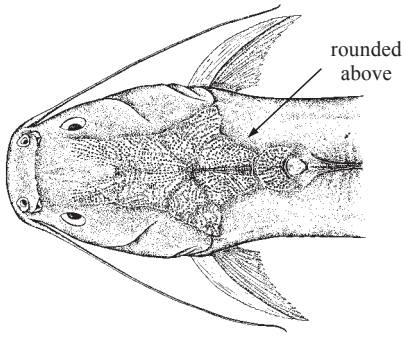


Fig. 8 *Selenaspis couma*
dorsal view of head

6a. No longitudinal fleshy groove in median depression of head (Fig. 9); no gill rakers on rear surfaces of first 2 gill arches . . . . . → ***7***

6b. A longitudinal fleshy groove in median depression of head variously developed or absent (Fig. 10); gill rakers present on rear surfaces of first 2 gill arches (minute and few in *Ariopsis*) . . . . . → ***12***

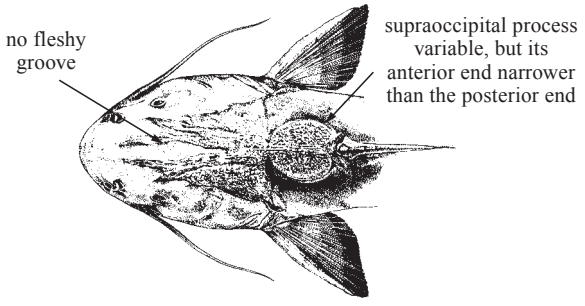


Fig. 9 *Arius grandicassis*
dorsal view of head

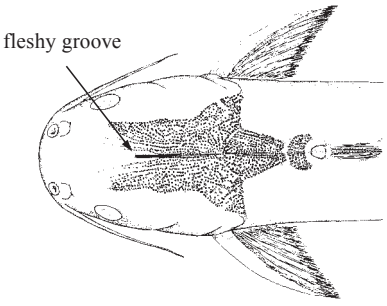


Fig. 10 *Ariopsis bonillai*
dorsal view of head

7a. Predorsal plate chevron-shaped or crescent-shaped, much shorter than supraoccipital process (Fig. 11) . . . . . → ***8***

7b. Predorsal plate enlarged, variously shield-shaped, its length more than 1/2 of supraoccipital process (Fig. 12) . . . . . → ***10***

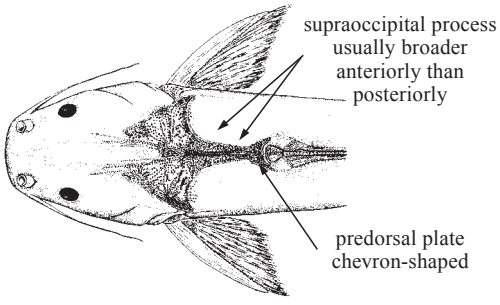


Fig. 11 *Arius phrygiatus*
dorsal view of head

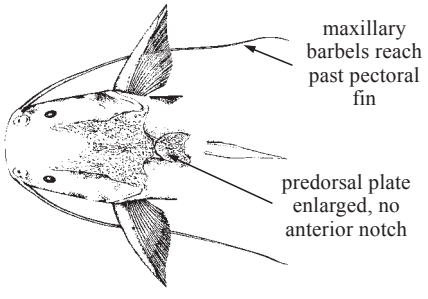


Fig. 12 *Arius parkeri*
dorsal view of head

8a. Supraoccipital process usually narrower at base than distally, with near parallel sides, or the sides variously expanded distally into a large rounded plate (Fig. 9) . . . . . ***Arius grandicassis***

8b. Supraoccipital process broader at base than distally, the sides converging posteriorly to meet the predorsal plate (Fig. 11, 13) . . . . . → ***9***

9a. Total anterior gill rakers on first arch 12 to 15; total anterior gill rakers on second arch 13 to 16; number of vertebrae free from Weberian complex 46 or 47 (Fig. 11) . . . . . ***Arius phrygiatus***

9b. Total anterior gill rakers on first arch 14 to 17; total anterior gill rakers on second arch 16 to 20; number of vertebrae free from Weberian complex 48 to 51 (Fig. 13) . . . . . ***Arius rugispinis***

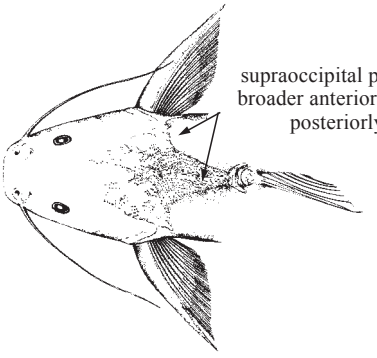


Fig. 13 ***Arius rugispinis***
dorsal view of head

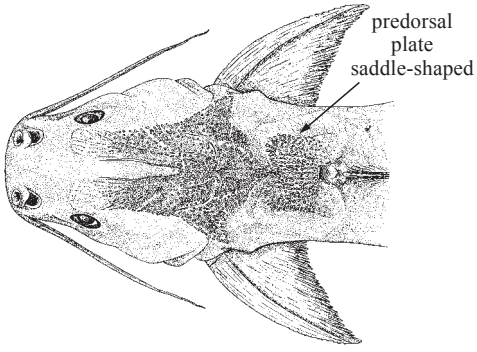


Fig. 14 ***Arius quadriscutis***
dorsal view of head

10a. Predorsal plate saddle-shaped, shallowly notched anteriorly, overlapping the supraoccipital process, its median portion rugose, its sides smooth; total anterior gill rakers on first arch 11 to 14; maxillary barbels extending only to pectoral fin (Fig. 14) . . . . . ***Arius quadriscutis***

10b. Predorsal plate notched anteriorly or without anterior notch; total anterior gill rakers on first arch 15 to 18 . . . . . → ***11***

11a. Predorsal plate large, shield-shaped, without anterior notch, uniformly rugose; maxillary barbels reaching anal fin in young, becoming shorter with age (Fig. 12) . . . . . ***Arius parkeri***

11b. Predorsal plate notched anteriorly, enclosing the tip of the narrow supraoccipital process; maxillary barbels extending only to pectoral fin (Fig. 15) . . . . . ***Arius proops***

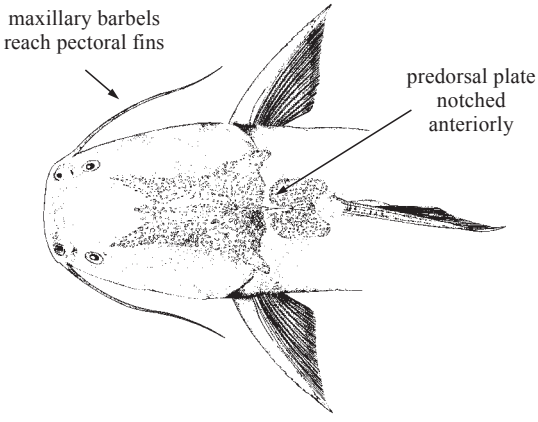


Fig. 15 ***Arius proops***

12a. No teeth on palate; gill rakers well developed and uniformly distributed along rear surfaces of first 2 gill arches . . . . . ***Potamarius***

12b. Teeth on palate present; gill rakers on rear surfaces of first 2 arches tiny or well developed . . . . . → ***13***

13a. Teeth on palate small, villiform, arranged in 2 patches on each side (2 small rounded median patches and 2 larger obovate lateral patches) (Fig. 16); gill rakers on rear surfaces of first 2 arches tiny, usually 3 to 5 in number and confined to upper limb of each arch . . . . . → ***14***

13b. Teeth on palate molariform in most species, arranged in a small patch on each side (Fig. 17); gill rakers well developed and uniformly distributed along rear surfaces of first gill arches . . . . . ***Cathorops***

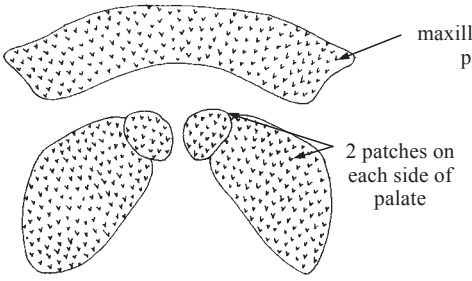


Fig. 16 tooth patches on roof of mouth of *Ariopsis felis*

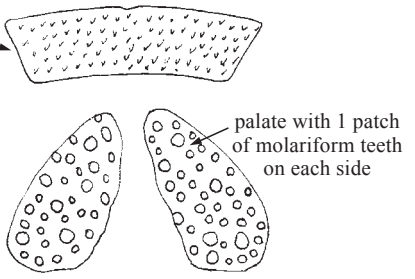


Fig. 17 tooth patches on roof of mouth of *Cathorops fissus*

14a. Fleshy groove in median depression of head long, extending forward to opposite rear halves of eyes (Fig. 18); total anterior gill rakers on first arch 13 to 16; anterior gill rakers (total number) on second arch 13 to 17; number of vertebrae free from Weberian complex 46 to 48; range northward of Yucatán . . . . . ***Ariopsis felis***

14b. Fleshy groove in median depression of head short, not reaching to eyes (Fig. 10,19); anterior gill rakers (total number) on first arch 16 to 20; total anterior gill rakers on second arch 18 to 24; number of vertebrae free from Weberian complex 43 to 47 . . . . . → ***15***

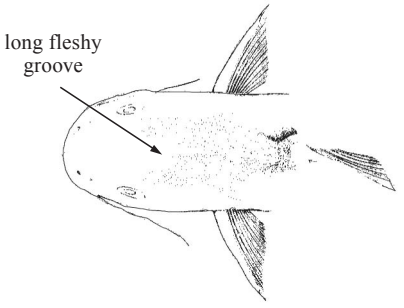


Fig. 18 *Ariopsis felis* dorsal view of head

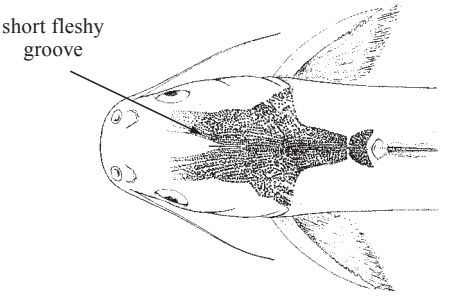


Fig. 19 *Ariopsis assimilis* dorsal view of head

15a. Longitudinal fleshy groove in median depression of head very short, not extending forward as far as eyes (Fig. 19); total anterior gill rakers on first arch 16 to 18; anterior gill rakers (total number) on second arch 18 to 22; number of vertebrae free from Weberian complex 43 to 46; range from Yucatán to Panama . . . . . ***Ariopsis assimilis***

15b. Longitudinal fleshy groove in median depression of head moderate in length, not quite reaching to opposite eyes (Fig. 10); anterior gill rakers (total number) on first arch 17 to 20; total anterior gill rakers on second arch 19 to 24; number of vertebrae free from Weberian complex 45 to 47; range Colombia and Venezuela . . . . . ***Ariopsis bonillai***

List of species occurring in the area

The symbol is given when species accounts are included.

Ariopsis assimilis (Günther, 1864).
Ariopsis bonillai (Miles, 1945).
Ariopsis felis (Linnaeus, 1766).

Arius grandicassis Valenciennes, 1840.
Arius parkeri (Traill, 1832).
Arius phrygiatus Valenciennes, 1840.
Arius proops (Valenciennes, 1840).
Arius quadriscutis Valenciennes 1840.
Arius rugispinis Valenciennes, 1840.

Bagre bagre (Linnaeus, 1766).
Bagre marinus (Mitchill, 1815).

Cathorops aguadulce (Meek, 1904).
Cathorops arenatus (Valenciennes, 1840).
Cathorops melanopus (Günther, 1864).
Cathorops pleurops (Boulenger, 1897).
Cathorops spixii (Agassiz, 1829).

Potamarius izabalensis Hubbs and Miller, 1960.
Potamarius nelsoni (Evermann and Goldsborough, 1902).

Selenaspis couma (Valenciennes, 1840).
Selenaspis herzbergii (Bloch, 1794).
Selenaspis passany (Valenciennes, 1840).

References

Cervigón, F. 1991. *Los peces marinos de Venezuela*. Second edition. Vol 1. Caracas, Fund. Cient., Los Roques, 425 p.

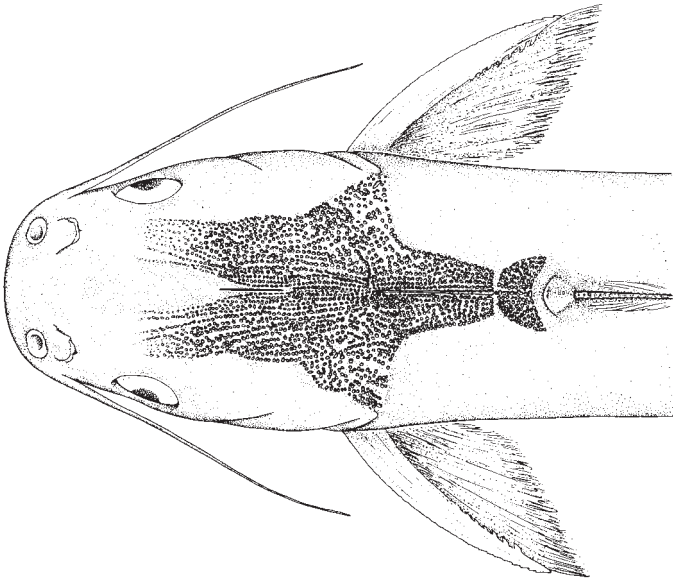
Cervigón, F., R. Cipriani, W. Fischer, L. Garibaldi, M. Hendrickx, A.J. Lemus, R. Márquez, J.M. Poutiers, G. Robaina, and B. Rodríguez. 1993. *FAO species identification sheets for fishery purposes. Field guide to the commercial marine and brackish-water resources of the northern coast of southern America*. Rome, FAO, 513 p.

McEachran, J.D. and J.D. Fechhelm. 1998. *Fishes of the Gulf of Mexico*. Vol. 1. Austin, University of Texas Press, 1 112 p.

Ariopsis assimilis (Günther, 1864) OSA

Frequent synonyms / misidentifications: *Arius assimilis* Günther, 1864; *Galeichthys assimilis* (Günther, 1864) / None.

FAO names: En - Mayan sea catfish; **Fr** - Mâchoiron maya; **Sp** - Bagre maya.

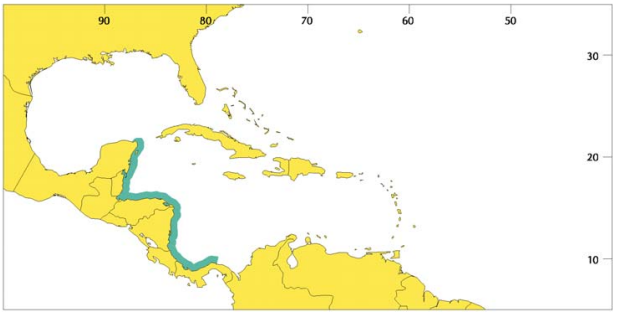


Diagnostic characters: Head rounded, only slightly flattened above; exposed head shield well visible, **very rugose, extending anteriorly to opposite eyes, its supraoccipital process broad at base, narrow and truncated posteriorly, with a very slight median keel; predorsal plate moderately long, rugose and subshield-shaped; a very short narrow fleshy groove in median depression of head falling well short of eyes**. Snout rounded transversely. Mouth inferior. Teeth on palate villiform or granular, in 2 pairs of patches, the small anterior patches contiguous with the outer large elliptical posterior ones, patches in anterior pair narrowly separated from one another. Three pairs of barbels (1 maxillary and 2 mental) around mouth, the maxillary barbels just reaching to pectoral fins. **A few tiny gill rakers on rear surfaces of first 2 arches, chiefly confined to the upper limb; total number of anterior gill rakers on first arch 16 to 18; total number of anterior gill rakers on second arch 18 to 22.** Dorsal fin with a strong, serrated, erectile spine. A well-developed adipose fin present. Pectoral fins with a strong, serrated, erectile spine; soft rays in pectoral fins usually 10. **Number of vertebrae free from Weberian complex 43 to 46. Colour:** medium yellowish brown above, lighter below.

Size: Maximum about 35 cm; common to 25 cm.

Habitat, biology, and fisheries: Found primarily in fresh water, but also in turbid brackish waters over muddy bottoms in river estuaries and lakes. Separate statistics are not reported for this species; caught mainly with gill nets (sometimes considered a nuisance because of the spines), seines, and on hook-and-line.

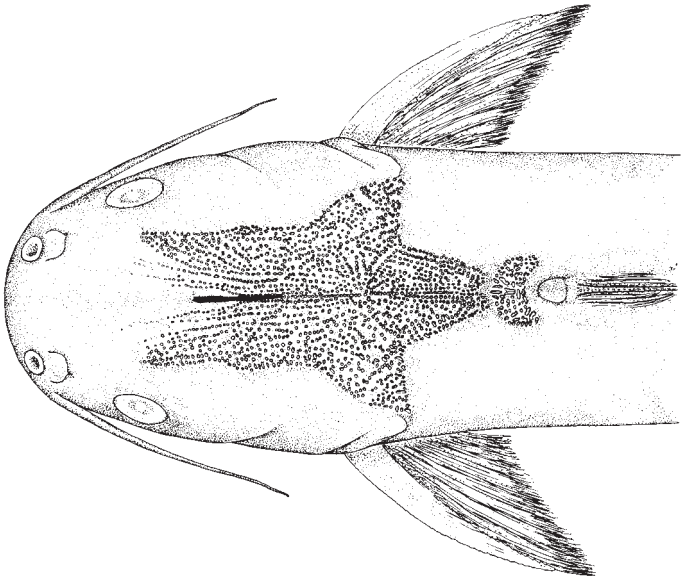
Distribution: Caribbean coast of Central America from Yucatán (Mexico) to Panama.



Ariopsis bonillai (Miles, 1945)

Frequent synonyms / misidentifications: *Arius bonillai* (Miles, 1945); *Galeichthys bonillai* Miles, 1945 / None.

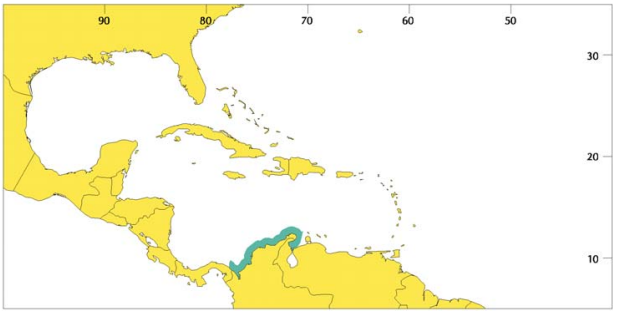
FAO names: En - New Granada sea catfish; **Fr** - Mâchoiron requin; **Sp** - Bagre cabezón.



Diagnostic characters: Head rounded, only slightly flattened above; exposed head shield well visible**, very rugose, extending anteriorly to opposite eyes, its supraoccipital process broad at base, narrow and truncated posteriorly, with a slight median keel; predorsal plate moderately large, crescent-shaped but truncated anteriorly; a rather short fleshy groove in median depression of head not quite reaching eyes**. Snout rounded transversely. Mouth inferior. Teeth on palate villiform or granular, in 2 pairs of patches, the small anterior patch on each side contiguous with the outer large elliptical posterior one; patches in anterior pair narrowly separated from one another. Three pairs of barbels (1 maxillary and 2 mental) around mouth, the maxillary barbels reaching to pectoral fins. **A few tiny gill rakers on rear surfaces of first 2 arches, chiefly confined to upper limb; total number of anterior gill rakers on first arch 17 to 20; anterior gill rakers on second arch 19 to 24**. Dorsal fin with a strong, serrated, erectile spine. A well-developed adipose fin present. Pectoral fins with a strong, serrated, erectile spine; soft rays in pectoral fins 10. **Number of vertebrae free from Weberian complex 45 to 47. Colour:** dark brown to bluish above, whitish below.

Size: Maximum reportedly 80 cm; in the Ciénaga Grande de Santa Marta (Colombia) females reach 46 cm and males reach 38 cm; common to 35 cm.

Habitat, biology, and fisheries: Found in turbid water over muddy bottoms in the lower portions of streams, estuaries, and mangrove-lined lagoons; mostly restricted to fresh and brackish waters. Feeds mainly on crabs; juveniles eat mainly copepods; females produce between 33 to 39 eggs (mean 36); males incubate eggs for 50 to 70 days during the whole year, but mainly between April and July; sexes can be told apart by external morphology at 19 cm. Separate statistics are not reported for this species; caught mainly on hook-and-line and with beach seines; marketed mostly fresh; considered to be tasty; highly appreciated as food.



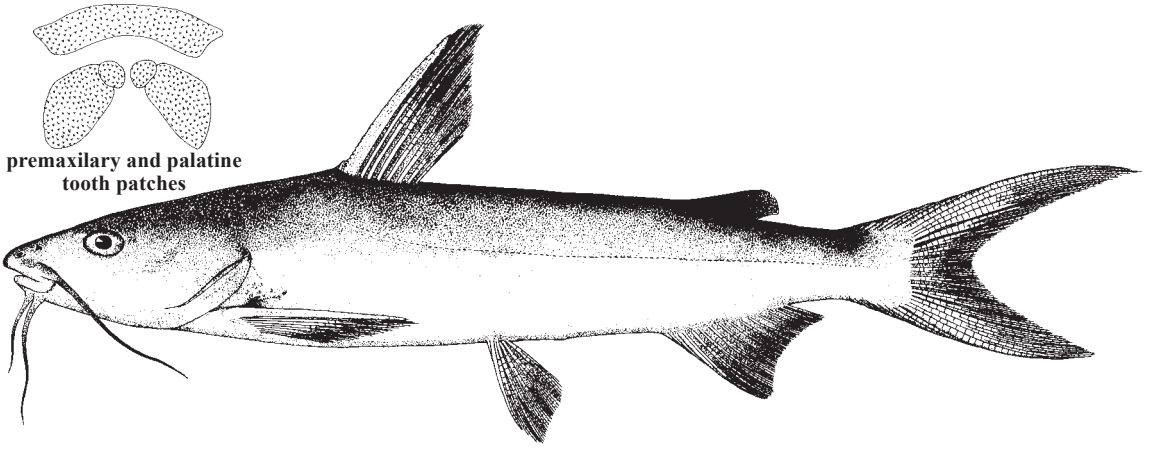
Distribution: Northwestern coast of South America: Colombia and western Venezuela.

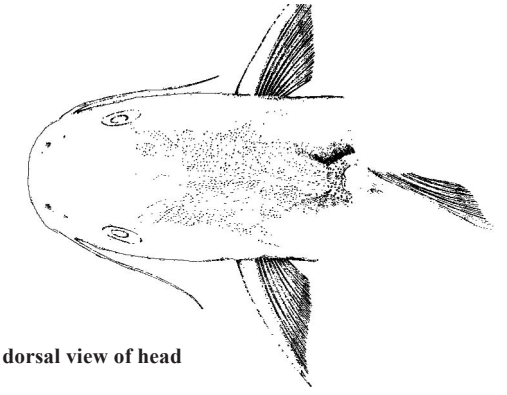
Remarks: Considered endangered by the IUCN due to its endemicity and heavy artisanal fishing pressure.

Ariopsis felis (Linnaeus, 1766) AUF

Frequent synonyms / misidentifications: *Arius felis* (Linnaeus, 1766); *Hexanematichthys felis* (Linnaeus, 1766); *Galeichthys milberti* (Valenciennes, 1840) / None.

FAO names: En - Hardhead sea catfish; **Fr** - Mâchoiron chat (AFS: Cabeza de hueso); **Sp** - Bagre gato.

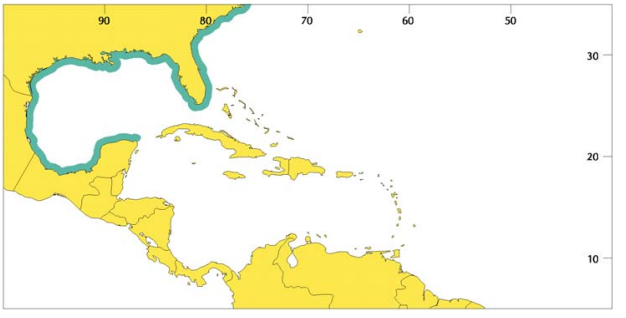




Diagnostic characters: Head rounded, only slightly flattened above; exposed head shield well visible, **very rugose, extending anteriorly to opposite eyes, its supraoccipital process broad at base, narrower and truncated posteriorly, with a slight median keel; predorsal plate crescent-shaped and rugose; a long narrow fleshy groove in median depression of head extending forward to eyes**. Snout moderately long and rounded transversely. Mouth inferior. Teeth on palate villiform or granular, in 2 pairs of patches, the small anterior patches contiguous with the outer large, round to elliptical posterior ones; patches of anterior pair narrowly separated from one another. Three pairs of barbels (1 maxillary and 2 mental) around mouth, the maxillary barbels just reaching to pectoral fins. **A few tiny gill rakers on rear surfaces of first 2 arches, chiefly confined to the upper limb; total number of anterior gill rakers on first arch 13 to 16; anterior gill rakers on second arch 13 to 17**. Dorsal fin with a strong, serrated, erectile spine. A well-developed adipose fin present. Pectoral fins with a strong, serrated, erectile spine; soft rays in pectoral fins usually 10. **Number of vertebrae free from Weberian complex 46 to 48. Colour:** brown to dark brown or dark blue above, shading to whitish below.

Size: Maximum about 70 cm; common to 25 cm.

Habitat, biology, and fisheries: Found in turbid waters over muddy bottoms, chiefly along the coast and in river estuaries; prefers brackish and marine waters, only occasionally entering fresh waters. Feeds mainly on benthic crustaceans; spawning occurs from May to early August in the northern Gulf of Mexico. Separate statistics are not reported for this species; caught mainly with bottom trawls, seines, and on hook-and-line; consumed fresh occasionally, but not highly appreciated.

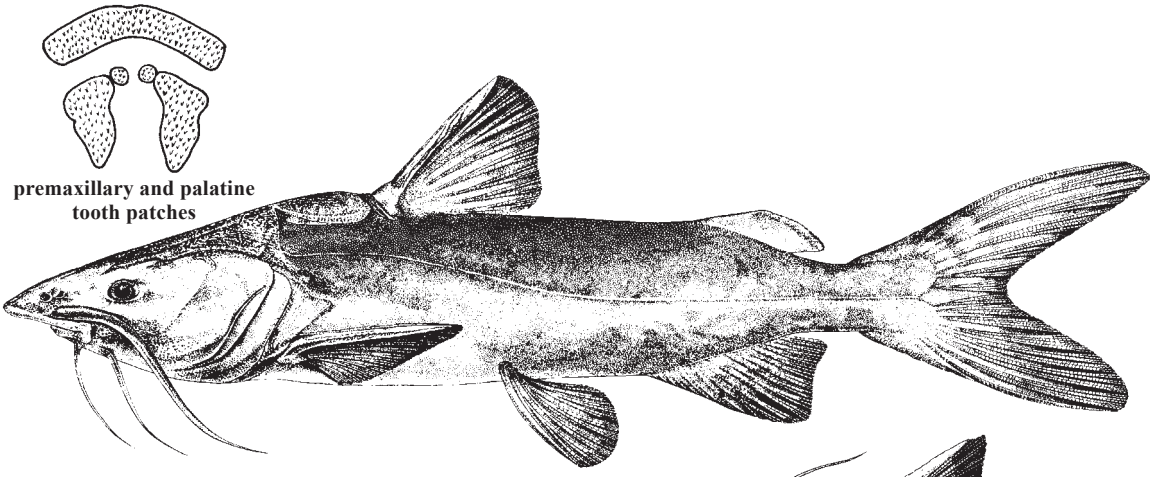


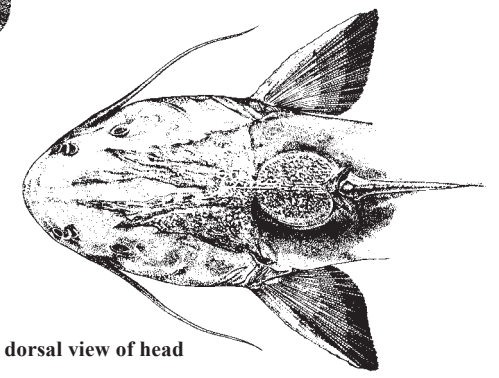
Distribution: Atlantic coast from North Carolina to Florida, and Gulf of Mexico to Yucatán.

Arius grandicassis Valenciennes, 1840

Frequent synonyms / misidentifications: *Arius parmocassis* Valenciennes, 1840; *Arius stricticassis* Valenciennes, 1840; *Notarius grandicassis* (Valenciennes, 1840); *Notarius parmocassis* (Valenciennes, 1840); *Notarius stricticassis* (Valenciennes, 1840); *Arius vandeli* Puyo, 1936 / None.

FAO names: En - Thomas sea catfish; **Fr** - Mâchoiron grondé; **Sp** - Bagre Tomás.





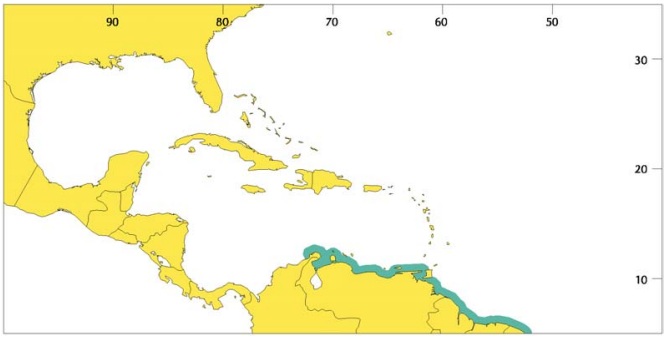
Diagnostic characters: Head rounded with a flat upper surface; exposed head shield well visible, only moderately rugose and extending forward approximately to eyes, **its supraoccipital process long and narrow at base, its sides either parallel or variously expanded and rounded laterally, becoming shield-like, but proximal base usually remains narrow; predorsal plate a short crescent**. Snout very prominent and rounded transversely. Mouth inferior. Teeth on palate villiform in 2 patches on each side, the medial anterior pair small or absent, the outer posterior pair large, long, subtriangular, and widely separated. Three pairs of barbels (1 maxillary and 2 mental) around mouth, the maxillary barbels reaching to pectoral fins. No gill rakers on rear surfaces of first 2 arches; total number of anterior gill rakers on first arch 13 to 17. Dorsal fin with a strong, serrated, erectile spine. A well-developed adipose fin present. Pectoral fins with a strong, serrated, erectile spine; soft rays in pectoral fins 11 or 12. **Colour:** mostly greyish brown or yellowish brown above, lighter below.

Size: Maximum 63 cm; common to 40 cm.

Habitat, biology, and fisheries: Found in shallow coastal waters, to at least 35 m of depth, as well as in turbid estuarine areas. Separate statistics are not reported for this species; caught mainly with seines, and on hook-and-line, also taken as bycatch in the industrial trawl fishery for shrimps; marketed mostly fresh.

Distribution: Northeastern coast of South America from the Guajira Peninsula (Colombia) to Brazil.

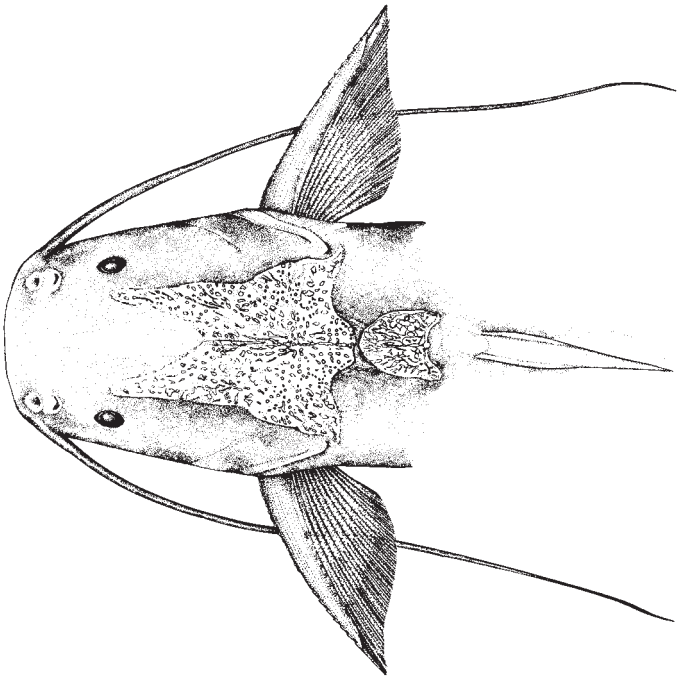
Remarks: The taxonomic status of the nominal species described by Valenciennes and Puyo is still uncertain.

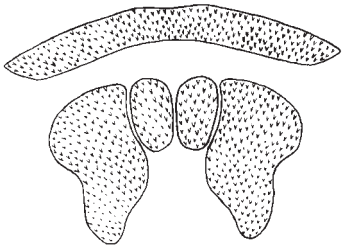


Arius parkeri (Traill, 1832)

Frequent synonyms / misidentifications: *Bagrus albicans* Valenciennes, 1839; *Arius physacanthus* Vaillant, 1899; *Arius bonneti* Puyo, 1936; *Arius clavispinosus* Puyo, 1936; *Arius despaxi* Puyo, 1936; *Arius luniscutis* Puyo, 1936 / *Sciadeichthys emphysetus* Eigenmann, 1912; *Sciadeichthys flavescens* Eigenmann, 1912.

FAO names: En - Gillbacker sea catfish; **Fr** - Mâchoiron jaune; **Sp** - Bagre amarillo.



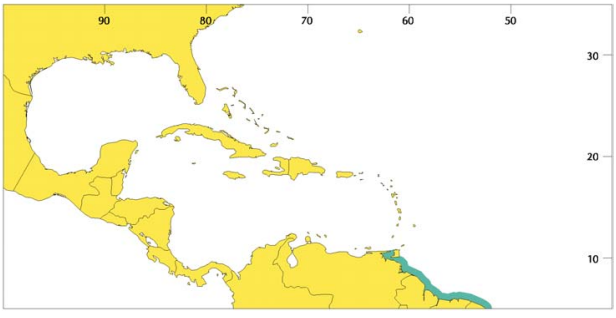


premaxillary and palatine tooth patches

Diagnostic characters: Head flattened above; **exposed head shield well visible, rugose posteriorly but smoother anteriorly extending forward to opposite eyes, its supraoccipital process very short and broad; predorsal plate much longer than the supraoccipital process, shield-shaped, and without anterior notch**. Snout rounded transversely. Mouth moderately inferior. Teeth on palate villiform, forming a U-shaped pattern of 4 closely adjoined patches, the lateral pair largest and prolonged posteriorly. Three pairs of barbels (1 maxillary and 2 mental) around mouth, **the maxillary barbels reaching to middle of anal fin in young individuals, but becoming progressively shorter with age**. No gill rakers on rear surfaces of first 2 arches; **total number of anterior gill rakers on first arch about 15 to 17**. Dorsal fin with a strong, serrated, erectile spine. A well-developed adipose fin present. Pectoral fins with a strong, serrated, erectile spine; soft rays in pectoral fins 11 or 12. **Colour:** yellowish through grey to bluish grey above, shading to white below.

Size: Maximum well over 100 cm; common to 60 cm.

Habitat, biology, and fisheries: Occurs in turbid waters over muddy bottoms in coastal areas, estuaries, and lower parts of rivers. Food items include fishes and crustaceans. Separate statistics are not reported for this species; caught mainly with seines, bottom trawls, Chinese trap nets, hook-and-line, and longlines; an important food fish because of the excellent quality of its flesh; marketed fresh and salted.

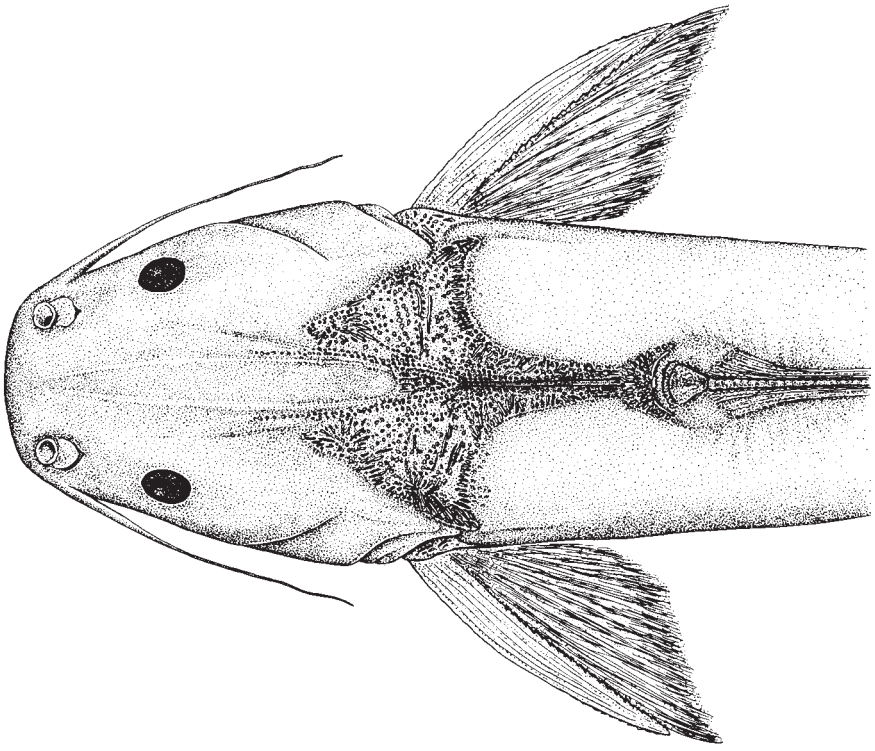


Distribution: Northeastern coast of South America from the Gulf of Paria (Venezuela) to Brazil.

Arius phrygiatus Valenciennes, 1840

Frequent synonyms / misidentifications: None / None.

FAO names: En - Kukwari sea catfish; **Fr** - Mâchoiron kukwari; **Sp** - Bagre mucuro.

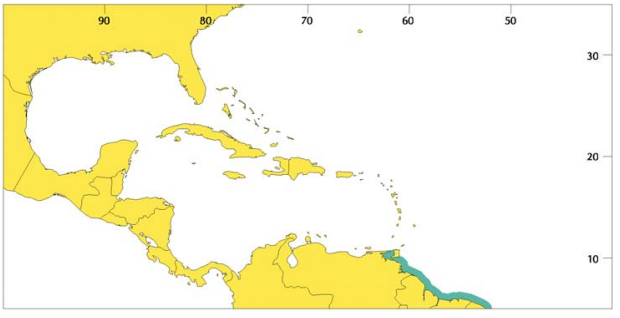


Diagnostic characters: Head broad, flattened above; exposed head shield well visible, **moderately rugose and small, not extending forward to eyes, its supraoccipital process long, narrow, and tapering posteriorly; predorsal plate crescent-shaped**. Snout rounded transversely. Mouth inferior. **Teeth on palate villiform in 2 small rounded to elliptical patches widely separated from each other**. Three pairs of barbels (1 maxillary and 2 mental) around mouth, the maxillary barbels reaching almost to pectoral fins. **No gill rakers on rear surfaces of first 2 arches; total number of anterior gill rakers on first arch 12 to 15; anterior gill rakers on second arch 13 to 16**. Dorsal fin with a strong, serrated, erectile spine. A large well-developed adipose fin. Pectoral fins with a strong, serrated, erectile spine; soft rays in pectoral fins 10 or 11. **Number of vertebrae free from Weberian complex 46 or 47. Colour:** grey to greyish brown above, lighter below. Fins greyish. Caudal fin distally dusky.

Size: Maximum 30 cm; common to 25 cm.

Habitat, biology, and fisheries: Found in fresh waters and in river estuaries. Separate statistics are not reported for this species. Caught mainly with beach seines; marketed mostly fresh, but of negligible commercial importance because of its small average size.

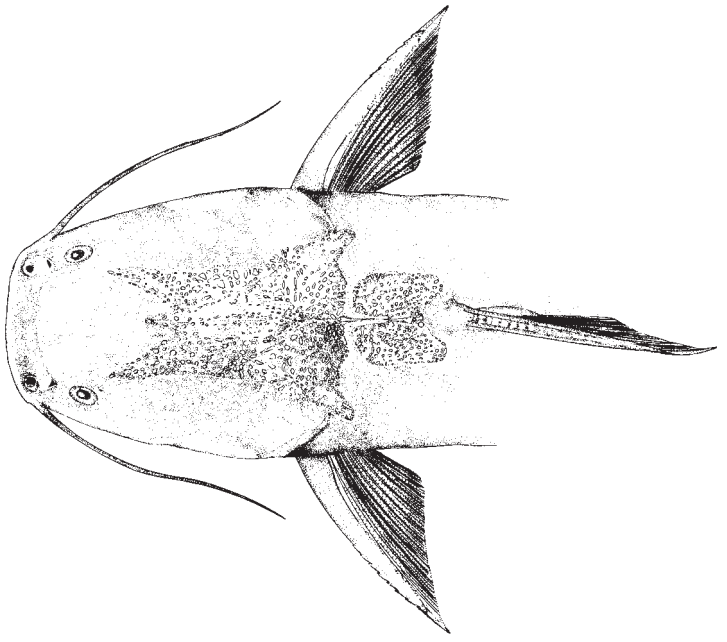
Distribution: Known from the lower reaches of the Orinoco delta (Venezuela) to the mouth of the Amazon River (Brazil).

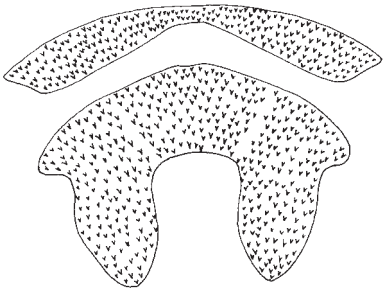


Arius proops (Valenciennes, 1840)

Frequent synonyms / misidentifications: *Sciadeichthys proops* (Valenciennes, 1840) / *Arius albicans* (Valenciennes, 1840).

FAO names: En - Crucifix sea catfish; **Fr** - Mâchoiron crucifix; **Sp** - Bagre piedrero.



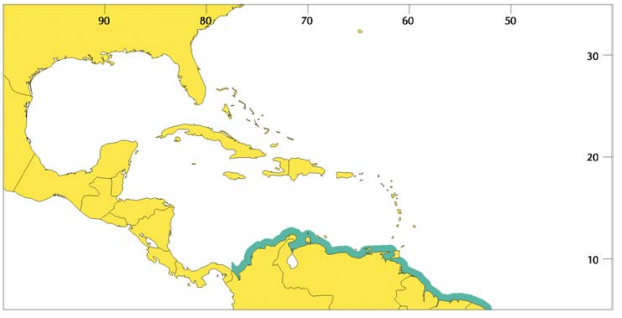


premaxillary and palatine tooth patches

Diagnostic characters: Head more or less flattened above; **exposed head shield very rugose, extending forward approximately to eyes, supraoccipital process short, varying from slender and almost spine-like to squarish and distally spine-like, its point extending into a notch of the shield-shaped predorsal plate** which is very rugose. Snout broadly round transversely. Mouth slightly inferior. Teeth on palate villiform, in a broad, U-shaped patch. Three pairs of barbels (1 maxillary and 2 mental) around mouth, the maxillary barbels reaching to pectoral fins. No gill rakers on rear surfaces of first 2 arches; **total number of anterior gill rakers on first arch 15 to 18**. Dorsal fin with a strong, serrated, erectile spine. A well-developed adipose fin present. Pectoral fins with a strong, serrated, erectile spine; soft rays in pectoral fins usually 11. **Colour:** medium grey, bluish grey, or dark brown to dark blue above, lighter below.

Size: Maximum over 100 cm; common to 60 cm.

Habitat, biology, and fisheries: Predominantly found in brackish water estuaries and lagoons; also occurs from fresh waters to hypersaline shallow lagoons, including marine waters. Females produce 63 to 217 eggs. Separate statistics are not reported for this species; caught mainly with beach seines, Chinese trap nets, and on hook-and-line; marketed mostly fresh; the head of this fish is cleaned of flesh and the skull sold throughout the world as representing the crucifix.



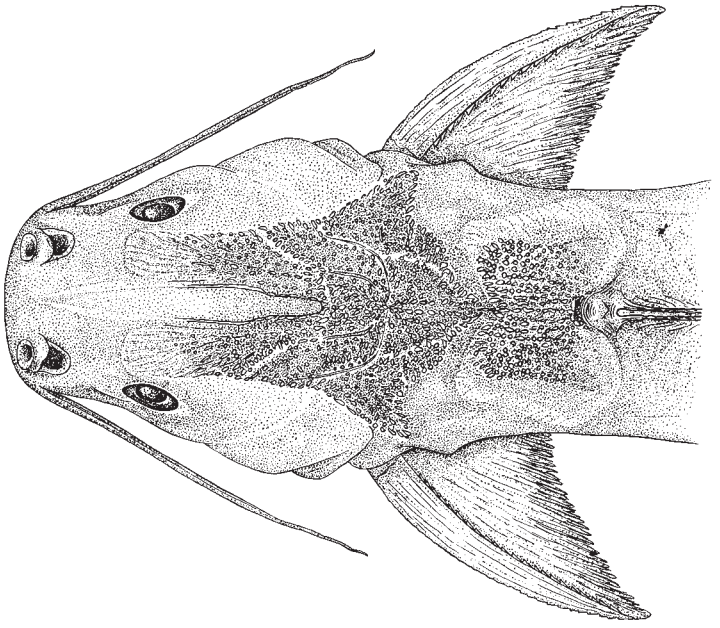
Distribution: Northern coast of South America from Colombia to Brazil.

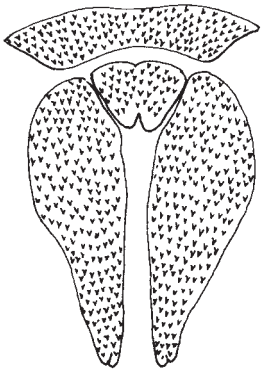
Remarks: Considered vulnerable by Colombian law due to heavy artisanal fishery pressure.

Arius quadriscutis Valenciennes, 1840

Frequent synonyms / misidentifications: None / *Arius parkeri* (not Traill, 1832); *Sciadeichthys parkeri* (not Traill, 1832); *Selenaspis parkeri* (not Traill, 1832).

FAO names: En - Bressou sea catfish; **Fr** - Mâchoiron bressou; **Sp** - Bagre bresú.





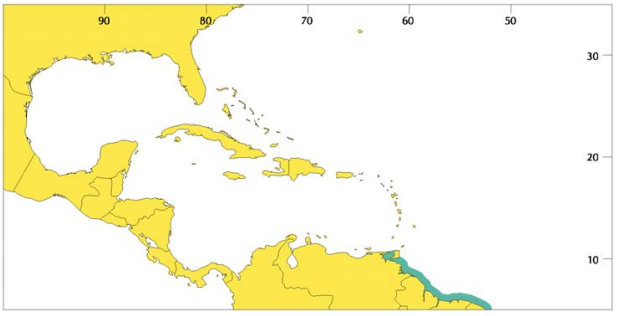
premaxillary and palatine tooth patches

Diagnostic characters: Head arched and slightly flattened above; **exposed head shield clearly visible, very rugose posteriorly, smooth anteriorly, extending forward to opposite eyes, its supraoccipital process short, broad at base, tapering posteriorly to a narrowly rounded tip; predorsal plate large, saddle-shaped, shallowly notched anteriorly, overlapping the supraoccipital process, its central portion rugose, outer portions smooth**. Snout transversely rounded. Mouth inferior. Teeth on palate coarsely granular, forming a long U-shaped pattern of more or less contiguous patches, the posterior extensions of which are only slightly separated. Three pairs of barbels (1 maxillary and 2 mental) around mouth, the maxillary barbels reaching pectoral fins. No gill rakers on rear surfaces of first 2 arches; **total number of anterior gill rakers on first arch 11 to 14**. Dorsal fin with a strong, serrated, erectile spine. A well-developed adipose fin present. Pectoral fins with a strong, serrated, erectile spine; soft rays in pectoral fins usually 11. **Colour:** yellow to dark yellow in life, grey to dark brown in preserved specimens; lighter below.

Size: Maximum 50 cm; common to 30 cm.

Habitat, biology, and fisheries: Chiefly a marine species, living in turbid waters over muddy bottoms in shallow coastal areas; also around estuaries. Food items include bottom-living invertebrates. Separate statistics are not reported for this species; caught mainly with beach seines, and occasionally as bycatch in industrial trawl fisheries for shrimp; marketed mostly fresh and exported frozen.

Distribution: Northeastern coast of South America from eastern Venezuela to Brazil.



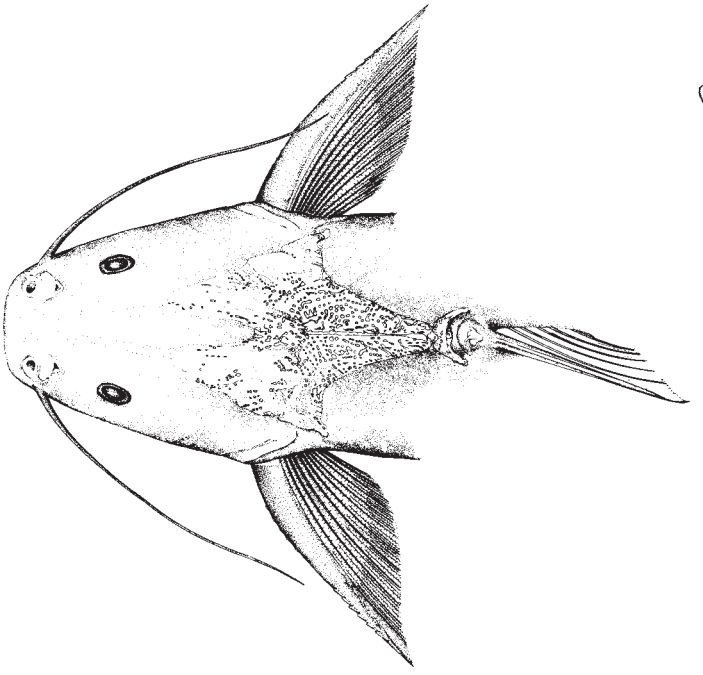
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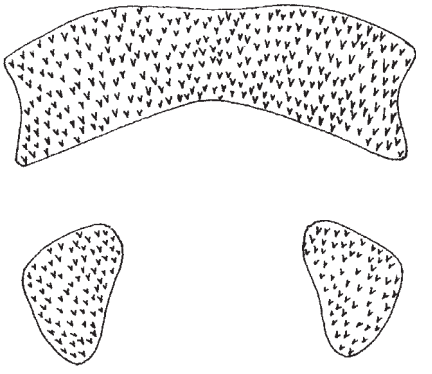
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Arius rugispinis Valenciennes, 1840

Frequent synonyms / misidentifications: *Arius rugispinnis* Valenciennes, 1840; *Hexanematichthys rugispinis* (Valenciennes, 1840); *Tachysurus atroplumbeus* Fowler, 1931 / None.

FAO names: En - Softhead sea catfish; **Fr** - Mâchoiron petit-gueule; **Sp** - Bagre tumbeló.



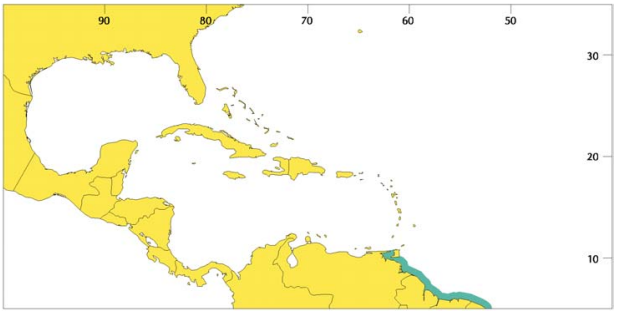


premaxillary and palatine tooth patches

Diagnostic characters: Head flattened above; exposed head shield well visible, **rugose, short, not extending forward to eyes, its supraoccipital process long, moderately narrow, and tapering posteriorly; predorsal plate short, crescent-shaped**. Snout long, rounded transversely. Mouth inferior. **Teeth on palate villiform in 2 small rounded to elliptical patches widely separated from each other**. Three pairs of barbels (1 maxillary and 2 mental) around mouth, the maxillary barbels reaching to pectoral fins. **No gill rakers on rear surfaces of first 2 arches; total number of anterior gill rakers on first arch 14 to 17; anterior gill rakers on second arch 16 to 20**. Dorsal fin with a strong, serrated, erectile spine. A large well-developed adipose fin present. Pectoral fins with a strong, serrated, erectile spine; soft rays in pectoral fins 11 or 12. **Number of vertebrae free from Weberian complex 48 to 51. Colour:** grey to reddish brown above, lighter below.

Size: Maximum 45 cm; common to 30 cm.

Habitat, biology, and fisheries: Found chiefly in turbid waters of estuaries and in coastal waters around river mouths. Feeds heavily on crabs, amphipods, and shrimps; gonads develop at sizes of 12 cm or less; 54 eggs, each 10 mm in a 27 cm female; in eastern Venezuela reproduction seems to occur during the dry season. Separate statistics are not reported for this species; caught mainly with beach seines and Chinese trap nets, occasionally as bycatch in industrial trawl fisheries for shrimp; an important fishery resource, marketed fresh and salted, and exported frozen.

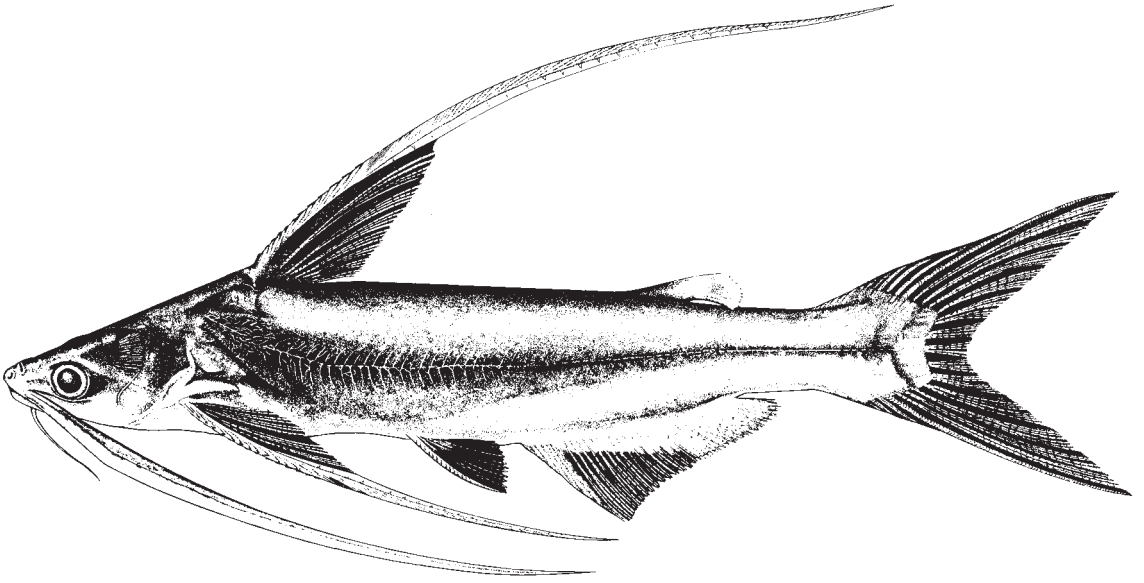


Distribution: From the Gulf of Paria (Venezuela) to the mouth of the Amazon River (Brazil).

Bagre bagre (Linnaeus, 1766) BEB

Frequent synonyms / misidentifications: *Felichthys bagre* (Linnaeus, 1766) / None.

FAO names: En - Coco sea catfish; **Fr** - Mâchoiron coco; **Sp** - Bagre doncella.

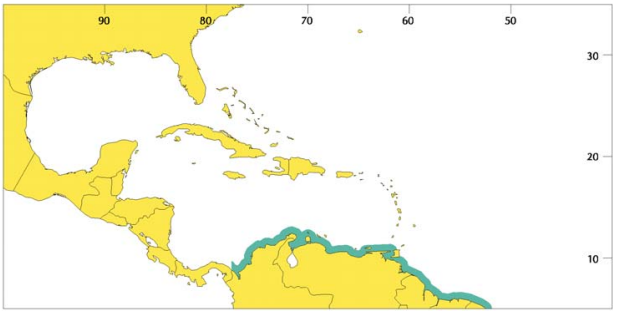


Diagnostic characters: Head arched, little depressed; bony shield on head nearly obscured, its supraoccipital process relatively narrow, tapering slightly backward to meet the crescent-shaped predorsal plate. Snout rounded transversely. Mouth slightly inferior. Teeth on palate in 4 patches, forming a transverse arc, each patch wider than long. **Two pairs (1 maxillary and 1 mental) of barbels around mouth; maxillary barbels and filaments of dorsal- and pectoral-fin spines flattened, ribbon-like, reaching to or beyond anal fin**. Dorsal fin with a serrated, erectile spine. A well-developed adipose fin present. **Anal fin long, with 29 to 37 soft rays**. Pectoral fins with a serrated, erectile spine. **Colour:** silvery grey to bluish grey above, lighter below; a large black spot usually present on anterior anal-fin rays.

Size: Maximum 55 cm; common to 40 cm.

Habitat, biology, and fisheries: An almost entirely marine species, common around river mouths to depths of 50 m, usually less; also entering river estuaries. Feeds on small fishes and invertebrates, such as small crustaceans and polychaetes. Separate statistics are not reported for this species; caught mainly with shore seines, cast nets, traps, and on hook-and-line, also taken as bycatch in industrial trawl fishery for shrimps; marketed mostly fresh.

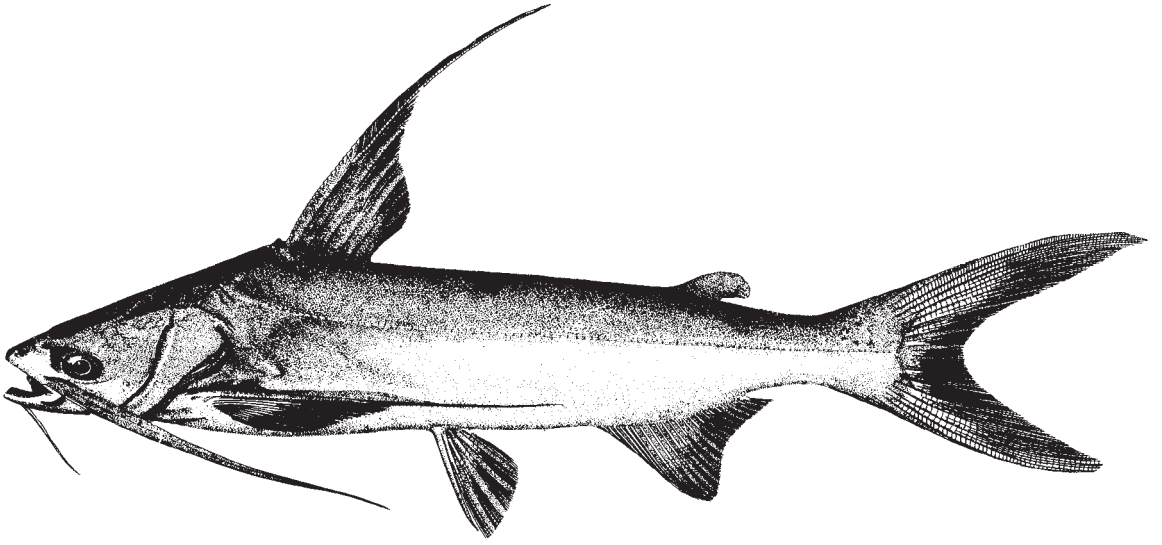
Distribution: From Colombia to Brazil.



Bagre marinus (Mitchill, 1815) BEM

Frequent synonyms / misidentifications: None / *Bagre felis* (Meek and Hildebrand, 1923); *Felichthys felis* Meek and Hildebrand, 1923; *Felichthys marinus* (Mitchill, 1815).

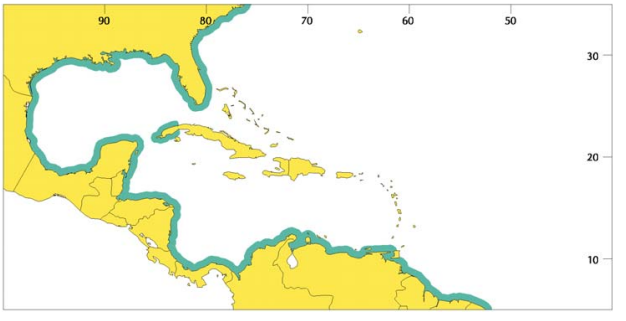
FAO names:En - Gafftopsail sea catfish; **Fr** - Mâchoiron antenne; **Sp** - Bagre cacumo.



Diagnostic characters: Head arched, little depressed; bony shield on head nearly obscured, its supraoccipital process relatively narrow, tapering slightly backward to meet the crescent-shaped predorsal plate. Snout moderately long and rounded transversely. Mouth slightly inferior. Teeth on palate in 4 patches forming a transverse arc, each patch wider than long. **Two pairs (1 maxillary and 1 mental) of barbels around mouth; maxillary barbels and filaments of dorsal- and pectoral-fin spines flattened, ribbon-like, and long, but maxillary barbel not reaching to anal fin.** Dorsal fin with a serrated, erectile spine. A well-developed adipose fin present. **Anal fin short, with 22 to 28 soft rays**. Pectoral fins with a serrated, erectile spine. **Colour:** bluish grey to dark brown above, lighter below.

Size: Maximum reportedly to 100 cm; common to 50 cm.

Habitat, biology, and fisheries: A predominantly marine species found to depths of 50 m, usually less; said to be common in estuaries and in mangrove-lined lagoons of relatively high salinity. Feeds chiefly on small fishes and invertebrates; spawning takes places from May to August in the northern Gulf of Mexico. Separate statistics are not reported for this species; caught mainly with longlines (large specimens), shore seines, cast nets, and on hook-and-line, also taken as bycatch in industrial trawl fisheries for shrimp; marketed mostly fresh.

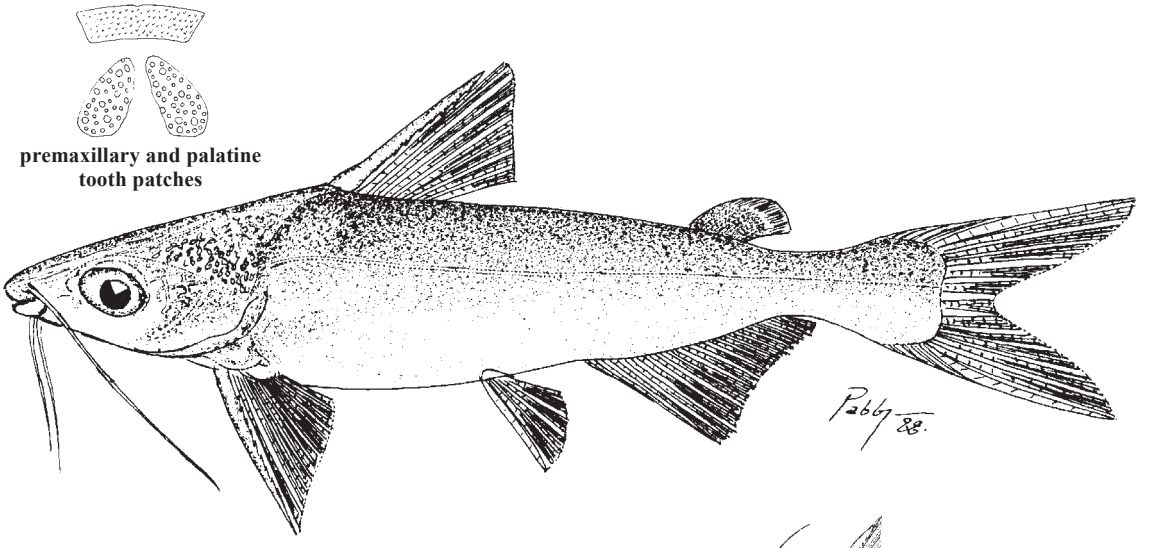


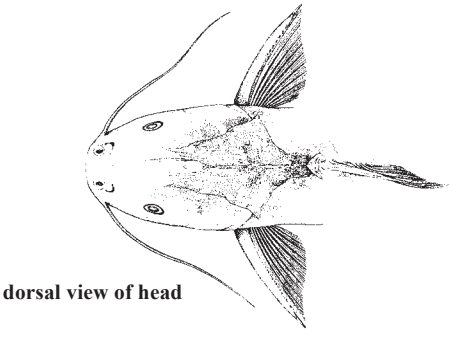
Distribution: Along the American Atlantic coast from Cape Cod to Brazil, including the Gulf of Mexico and the continental coast of the Caribbean Sea; also reported from western Cuba.

Cathorops spixii (Agassiz, 1829)

Frequent synonyms/misidentifications: *Arius spixii* (Agassiz, 1829); *Arius fissus* Valenciennes, 1840 / None.

FAO names: En - Madamango sea catfish; **Fr** - Mâchoiron madamango; **Sp** - Bagre cuinche.

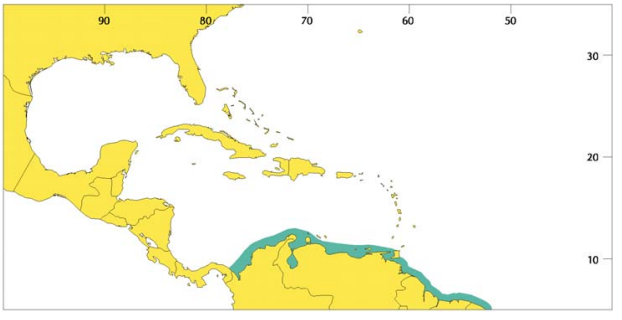




Diagnostic characters: Head rounded, moderately flattened above; exposed head shield well visible, rugose, **not or barely extending anteriorly to opposite rear margin of eyes; its supraoccipital process broad at base, narrow and truncated posteriorly, with a slight median keel; predorsal plate small, crescent-shaped**; usually a shallow fleshy groove in median depression of head extending anteriorly from the rugose head shield, and often a small median pit or short groove on snout. Snout rounded transversely. Mouth inferior. **Teeth on palate mostly molariform, in a single small oblique patch on each side, the patches always separate**. Three pairs of barbels (one maxillary and two mental) around mouth; the maxillary barbels passing the pectoral-fin bases. **Prominent numerous gill rakers regularly spaced on both anterior and posterior surfaces of first two arches**; total number of anterior gill rakers on first arch 17 to 22. Dorsal fin with a strong, serrated, erectile spine. A well-developed adipose fin present. Anal fin with 22 to 25 soft rays. Pectoral fins with a strong, serrated, erectile spine; soft rays in pectoral fin 10. **Colour:** dark brown to bluish black above, much paler to whitish below.

Size: Maximum about 30 cm; common to 20 cm.

Habitat, biology, and fisheries: Occurs in shallow coastal marine waters and brackish estuaries, lagoons, and river mouths. Feeds mainly on invertebrates and small fishes; detritus and filamentous algae have also been found in the stomachs. Separate statistics are not reported for this species. Caught mainly with bottom trawls, shore seines, and on hook-and-line. Although a small species, it may appear in markets for local consumption.

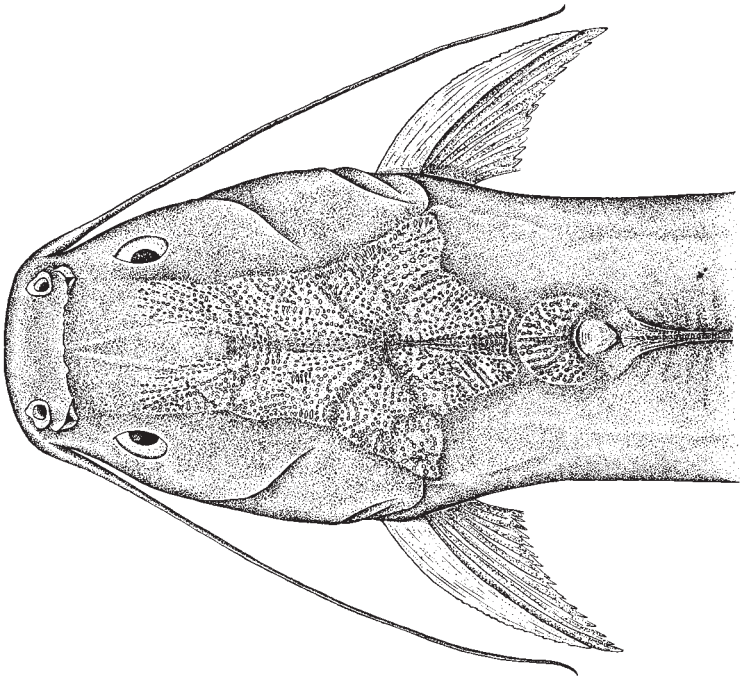


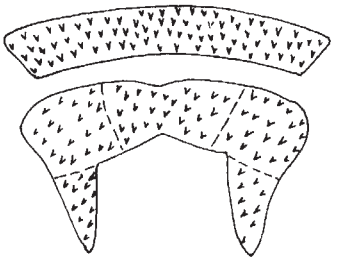
Distribution: From Colombia to Rio de Janeiro, Brazil.

Selenaspis couma (Valenciennes, 1840)

Frequent synonyms / misidentifications: *Arius couma* Valenciennes, 1840; *Sciadeichthys walcrechti* Boeseman, 1954 / *Selenaspis herzbergii* (Bloch, 1794).

FAO names: En - Couma sea catfish; **Fr** - Mâchoiron couma; **Sp** - Bagre cuma.





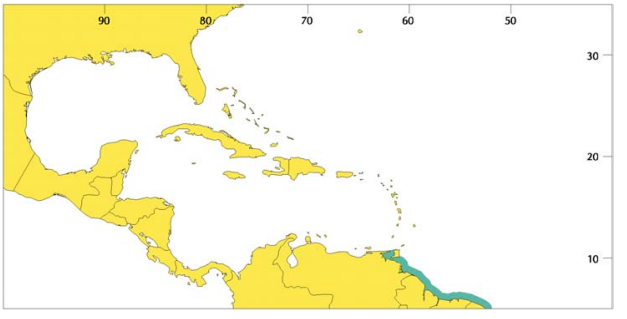
premaxillary and palatine tooth patches

Diagnostic characters: Head rounded and only slightly flattened above; exposed head shield well visible, very rugose and extending forward to opposite eyes, its **supraoccipital process rugose, rounded above, without a definite median keel**, moderately broad at base, tapering and much narrower posteriorly to meet the rugose, **subshield-shaped predorsal plate. Snout broadly rounded transversely; posterior nostrils connected by a narrow furrow partially covered by a flap of skin. Mouth slightly inferior. Teeth villiform and nearly granular, those on palate forming a U-shaped patch, the posterior extensions of which are not evident in young individuals**. Three pairs of barbels (1 maxillary and 2 mental) around mouth, the maxillary barbels reaching to pectoral fins. No gill rakers on rear surfaces of first 2 arches; **total number of anterior gill rakers on second arch 17 to 21**. Dorsal fin with a strong, serrated, erectile spine. A well-developed adipose fin present. Pectoral fins with a strong, serrated, erectile spine; **soft pectoral-fin rays usually 11. Colour:** yellowish grey to dark greyish brown above, whitish below.

Size: Maximum at least 100 cm; common to 50 cm.

Habitat, biology, and fisheries: Confined chiefly to turbid waters in estuaries and the lower parts of rivers. Separate statistics are not reported for this species; caught mainly with shore seines, gill nets, cast nets, trawls, traps, hook-and-line, and longlines; an important food fish, marketed mostly fresh and salted.

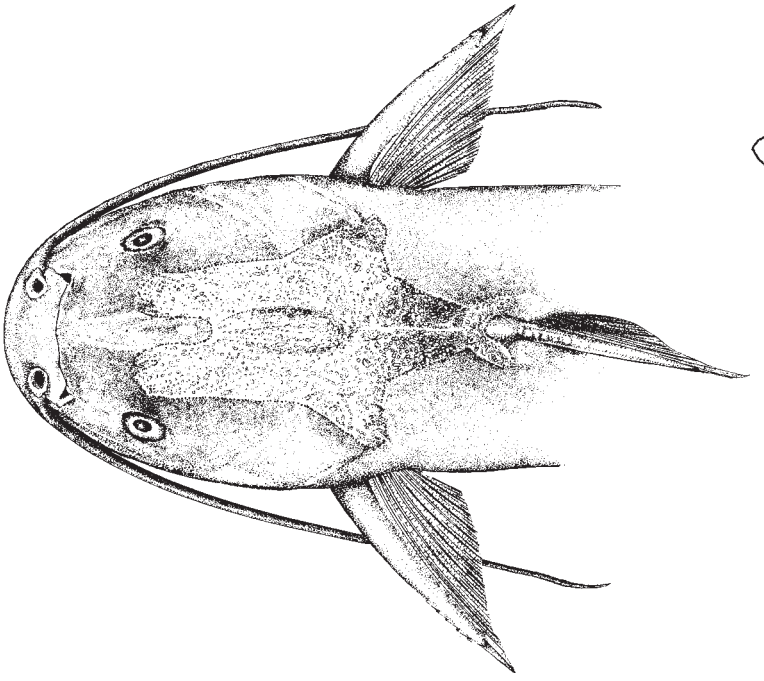
Distribution: From the Gulf of Paria (Venezuela) to the mouth of the Amazon River (Brazil).

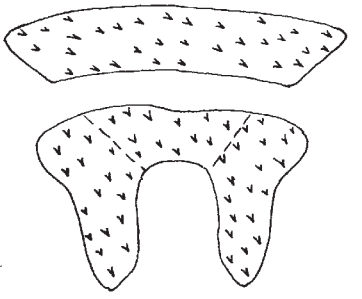


Selenaspis herzbergii (Bloch, 1794) SSZ

Frequent synonyms / misidentifications: *Arius herzbergii* (Bloch, 1794) / None.

FAO names: En - Pemecou sea catfish; **Fr** - Mâchoiron pémécou; **Sp** - Bagre guatero.



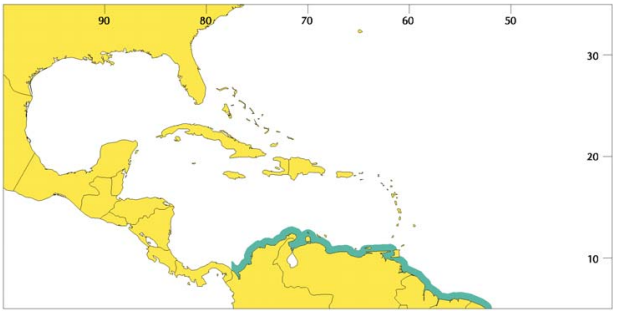


premaxillary and palatine tooth patches

Diagnostic characters: Head rounded and only sligthly flattened above; exposed bony head shield well visible, very rugose and extending forward to opposite eyes, **its supraoccipital process slightly keeled**, moderately broad at base, tapering and much narrower posteriorly to meet the rather short, crescent-shaped predorsal plate. **Snout rounded transversely; posterior nostrils connected by a narrow, shallow furrow or depression partially covered by a flap of skin. Mouth slightly inferior. Teeth villiform and nearly granular, those on palate forming a U-shaped patch**. Three pairs of barbels (1 maxillary and 2 mental) around mouth, the maxillary barbels reaching to slightly beyond pectoral fins. Sometimes a few tiny gill rakers on rear surfaces of first 2 arches, chiefly confined to upper limb of each arch; **total number of anterior gill rakers on second arch 19 to 26**. Dorsal fin with a strong, serrated, erectile spine. A well-developed adipose fin present. Pectoral fins with a strong, serrated, erectile spine; **soft rays in pectoral fins usually 10 or 11. Colour:** grey to dark brown above, whitish below.

Size: Maximum about 55 cm; common to 40 cm.

Habitat, biology, and fisheries: Found commonly in turbid estuaries, mangrove-lined lagoons, and lower parts of rivers; very tolerant of changes in salinity, also occuring in hypersaline waters and occasionally shallow marine waters. Feeds on a large variety of bottom living and pelagic organisms (i.e., fishes, worms, crustaceans) including those found among the roots of mangroves. Separate statistics are not reported for this species; caught mainly with bottom trawls, beach nets, cast nets, seines, and traps; marketed mostly fresh.

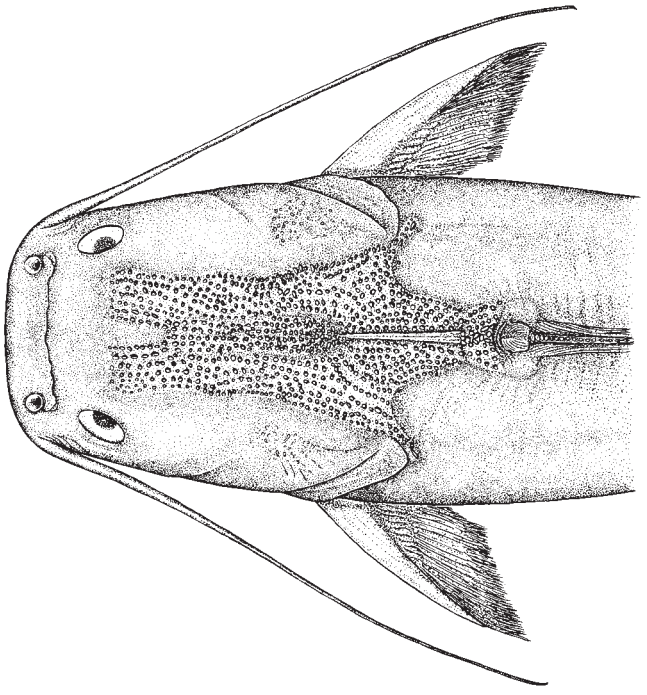


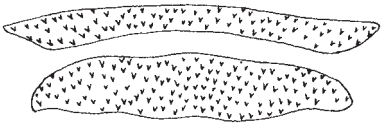
Distribution: Northern coast of South America from Colombia to Brazil.

Selenaspis passany (Valenciennes, 1840)

Frequent synonyms / misidentifications: *Arius passany* (Valenciennes, 1840) / None.

FAO names: En - Passany sea catfish; **Fr** - Mâchoiron passany; **Sp** - Bagre chato.





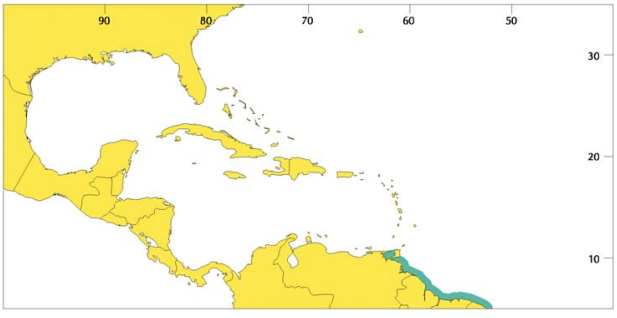
premaxillary and palatine tooth patches

Diagnostic characters: Head flattened above; exposed bony head shield well visible, very rugose, and extending forward to opposite eyes, **its supraoccipital process slightly keeled**, moderately long, broad, and tapering posteriorly to meet the large, rugose predorsal plate. **Snout short and broad, truncated transversely; posterior nostrils connected by a narrow, shallow furrow or depression partially covered by flaps of skin. Mouth terminal, the lower jaw equal to, or slightly longer than, upper jaw**. **Teeth villiform or nearly granulate, those on palate forming a narrow, almost straight, and irregular-edged transverse band**. Three pairs of barbels (1 maxillary and 2 mental) around mouth, the maxillary barbels reaching to pectoral fins. No gill rakers on rear surfaces of first 2 arches; anterior gill rakers (total number) on first arch 19 to 21. Dorsal fin with a strong, serrated, erectile spine. A well-developed adipose fin present. Pectoral fins with a strong, serrated, erectile spine; **soft rays in pectoral fins 11 or 12. Colour:** grey to dark brown or blackish above; lighter below

Size: Maximum over 100 cm; common to 50 cm.

Habitat, biology, and fisheries: Commonly found in coastal waters and river estuaries. Separate statistics are not reported for this species; caught mainly with gill nets, beach seines, hook-and-line, and longlines; marketed fresh and salted.

Distribution: From the Gulf of Paria (Venezuela) to the mouth of the Amazon River (Brazil).



AUCHENIPTERIDAE

Driftwood catfishes

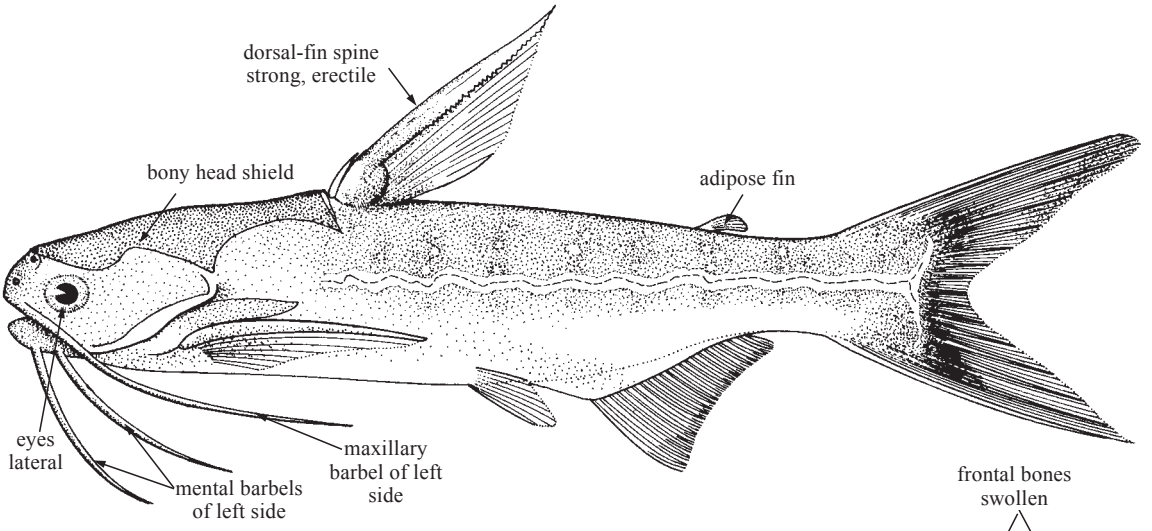
by C.J. Ferraris, Jr., Portland, Oregon, USA (after Taylor and Roberts, 1977)

A single species occurring in the area.

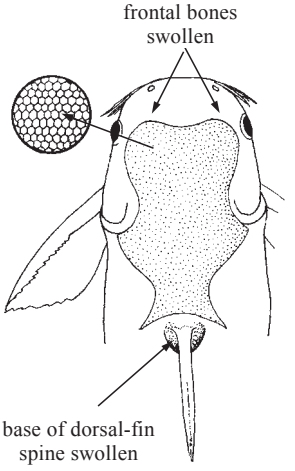
Pseudauchenipterus nodosus (Bloch, 1794)

Frequent synonyms / misidentifications: None / None.

FAO names: En - Cocosoda catfish; **Fr** - Cocosoda kakinette; **Sp** - Bagre patriota.

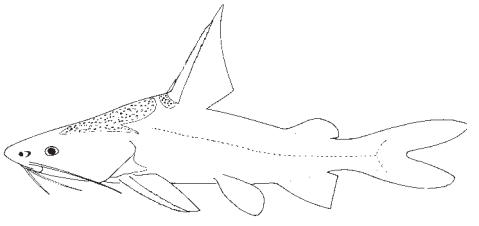


Diagnostic characters: Medium-sized fish, to 30 cm total length; body terete, slightly compressed posteriorly. Head rounded, nearly as broad as long; eyes laterally placed; **snout blunt; anterior and posterior nostrils separated by distance greater than nostril diameter; palate toothless; bony head shield with honeycomb-like pattern; frontal bones swollen in adults and larger juveniles; maxillary barbel not reaching to pectoral-fin spine tip**; 2 pairs of mental barbels, nasal barbel absent. **Dorsal-fin spine strong and serrated, its base swollen in adults**; caudal fin deeply forked. **Colour:** back bluish grey, sides and fins yellow or orange; several vertical rows of small white spots on body; underside of head and belly silvery with a rosy tinge; lateral line blue and conspicuous, edged above and below by an undulating white streak; caudal fin with a dusky posterior margin.



Similar families occurring in the area

Ariidae: dorsal-fin spine not swollen basally; anterior and posterior nostrils close together; lateral line not conspicuous and wavy; dorsal head shield surface smooth or rough, but no honeycomb-like texture; palate with teeth.

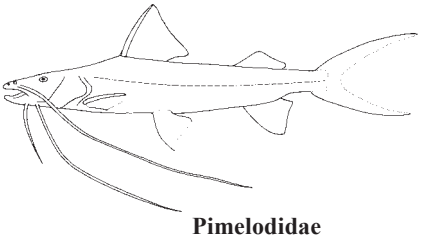


Ariidae

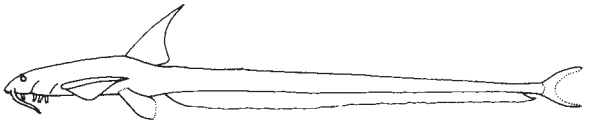
Pimelodidae: maxillary barbel extends past pectoral-fin spine; base of dorsal-fin spine not swollen basally; lateral line not prominant or wavy.

Aspredinidae: body compressed anteriorly, whip-like posteriorly; no adipose fin; eyes minute; anal-fin base long; gill opening restricted.

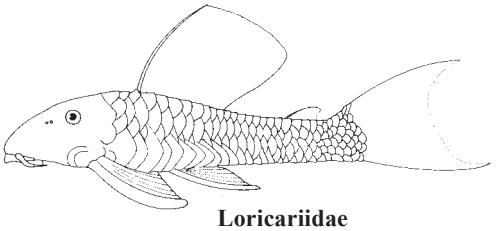
Loricariidae: body covered with bony plates; no barbels on ventral surface of head.



Pimelodidae



Aspredinidae

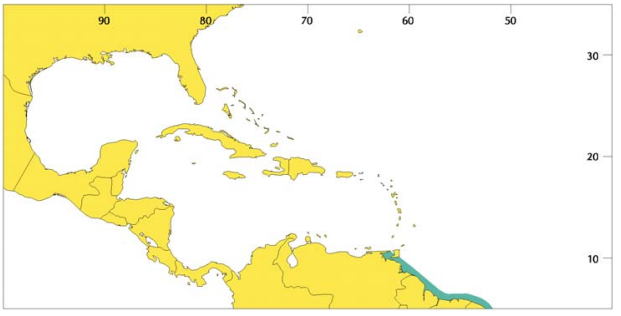


Loricariidae

Size: Maximum: at least to 30 cm total length; commonly to 25 cm.

Habitat, biology, and fisheries: Moderately common over muddy bottoms in brackish river mouths and in freshened sea water, especially during the rainy season. Reproduction takes place in December. Caught mainly in Chinese seines along with *Hypophthalmus* in French Guiana. Marketed mostly fresh; but flesh apparently not highly esteemed; often used for bait.

Distribution: Along the coast from the Gulf of Paria, Venezuela, and Trinidad to northern Brazil.



References

Cervigón, F.R. Cipriani, W. Fischer, L. Garibaldi, M. Hendrickx, A.J. Lemus, R. Marquez, J.M. Poutiers, G. Robiaina, and B. Rodríguez. 1993. *FAO species identification sheets for fishery purposes. Field Guide to the commercial marine and brackish-water resources of the northern coast of southern America*. Rome, FAO, 513 p.

Puyo, J. 1949. *Poissons de la Guyane Française.* Paris, Office de la Recherche Scientifique Outre-Mer, 280 p.

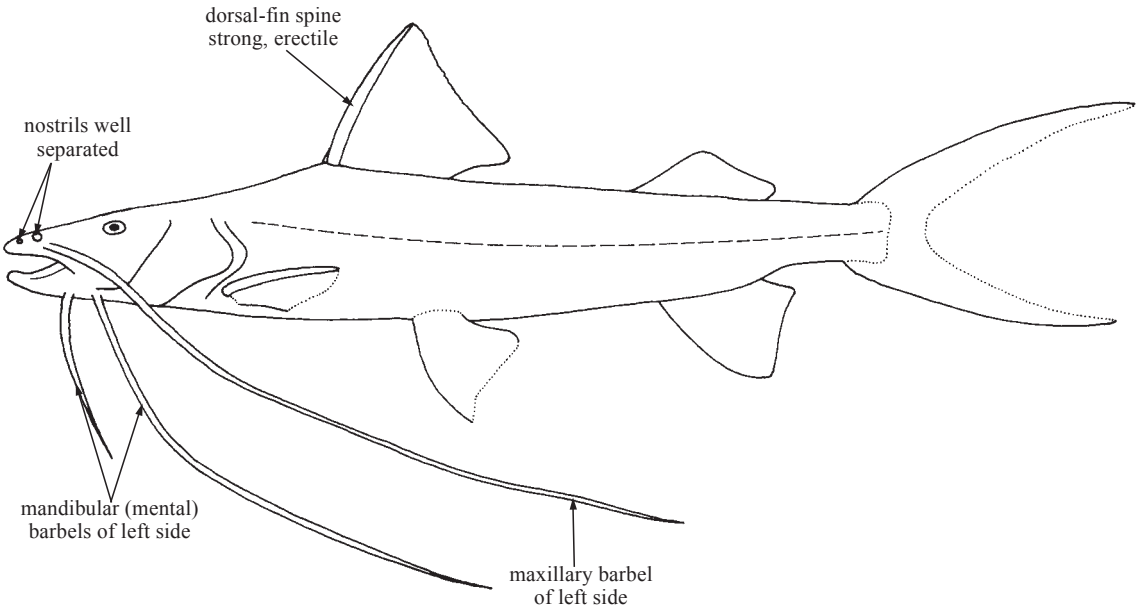
Taylor, W.R. and T.R. Roberts. 1977. *Auchenipteridae.* In FAO Species Identification Sheets. Western Central Atlantic (Fishing Area 31), edited by W. Fischer. Vol. 1. Rome, FAO (unpaginated).

PIMELODIDAE

Long-whiskered catfishes

by C.J. Ferraris, Jr., Portland, Oregon, USA (after Taylor and Roberts, 1977)

Diagnostic characters: Medium to large-sized fishes (to over 200 cm); body elongate. Snout and head rounded to depressed; **anterior and posterior nostrils separated by space greater than nostril diameter, posterior nostril without flap along its anterior margin**. Mouth terminal to inferior. Teeth usually present in jaws and on palate (absent in *Hypophthalmus*). Head covered by strong bony shield which may be visible beneath thin skin. Gill membranes free from isthmus. Maxillary barbel and 2 pairs of mental barbels present, nasal barbel absent. Dorsal-fin base short, consisting of short spine followed by longer, more or less pungent spine which can be locked into erect position and several soft rays. Adipose fin present, variable in size; pectoral fin very low-set, close to ventral profile, with a more or less serrated spine which, like the dorsal spine, can be locked into erect position. Scales absent. Lateral line complete. **Colour:** usually grey-blue, dark grey or dark brown on back and sides, paler to white below; spots, blotches or cross bars present in some species.



Habitat, biology, and fisheries: The Pimelodidae form one of the largest families of catfishes in South America, but most of its representatives are confined to fresh water. The few species regularly occurring in brackish or freshened seawater belong to the genera *Brachyplatystoma*, *Hypophthalmus*, and *Pimelodus*. Juveniles and young adults of *Brachyplatystoma* occur in brackish water along the northeastern coast of South America at the time of fresh water flooding during the rainy season. Both are fished for, and marketed, locally. *Pimelodus blochii* (widely referred to as *Pimelodus clarias*) is often found in estuarine habitats. This moderately small catfish is extensively fished for, and marketed, in the lower reaches of rivers and river mouths throughout northern South America. Species of lookdown catfish (*Hypophthalmus* spp.), which had previously been placed in the family Hypophthalmidae are now considered to be pimelodid catfish (Lundberg et al. 1991, de Pinna 1998). Unlike most pimelodids (which are benthic feeders), the lookdown catfish generally swim in the water column and feed on plankton.

Similar families occurring in the area

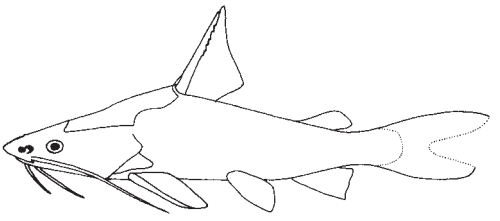
Note: Diagnoses only refer to species found in marine or estuarine environments.

Ariidae: anterior and posterior nostrils close together, posterior nostril partially covered along its anterior margin by a flap.

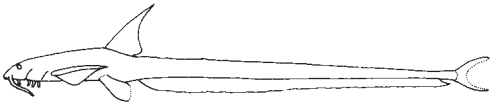
Aspredinidae: head and anterior body depressed, posterior part of body long and whip-like; eyes minute; gill opening reduced to tiny slits in front of pectoral fin; adipose fin absent.

Auchenipteridae (*Pseudauchenipterus nodosus* only): maxillary barbel not extending past pectoral-fin spine; lateral line prominent and wavy, forked on caudal peduncle; base of dorsal-fin spine swollen; head shield with honeycomb texture.

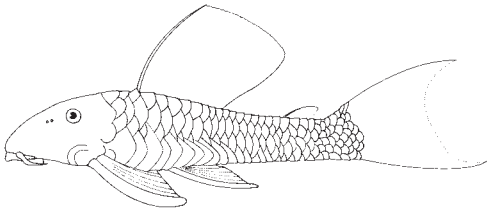
Loricariidae: body covered with hard bony plates; mouth inferior, surrounded by disc-shaped lips.



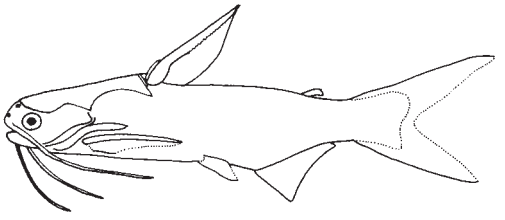
Ariidae



Aspredinidae



Loricariidae



Auchenipteridae

Key to the species of Pimelodidae occurring in the area

1a. Eye ventrolaterally placed; anal-fin base long, more than 1/3 standard length; adipose fin very small; dorsal fin not anterior of anal-fin origin, spine feeble and flexible . . . . . ***Hypophthalmus edentatus***

1b. Eye lateral or dorsolaterally placed; anal-fin base short, not longer than adipose-fin base; dorsal fin completely anterior to anal fin, spine stout . . . . . → ***2***

2a. No teeth on palate; eye large, its diameter contained about twice in snout length . . ***Pimelodus blochii***

2b. Large patches of teeth present on palate; eye small, its diameter contained about 5 times in snout length . . . . . → ***3***

3a. Upper jaw strongly protruding over lower jaw; upper half of body with indistinct round or ovoid spots (visible in preserved as well as in fresh specimens); adipose-fin base equal in length to anal-fin base; gill rakers on first arch 17 to 21. . . . . ***Brachyplatystoma filamentosum***

3b. Upper jaw only slightly protruding over lower jaw; upper half of body without markings; adipose-fin base distinctly longer than anal-fin base; gill rakers on first arch 25 to 31 . . . . . ***Brachyplatystoma vaillantii***

List of species occurring in the area

The symbol is given when species accounts are included.

- *Brachyplatystoma filamentosum* (Lichtenstein, 1819).
- *Brachyplatystoma vaillantii* (Valenciennes, 1840).
- *Hypophthalmus edentatus* (Spix and Agassiz, 1829).
- *Pimelodus blochii* Valenciennes, 1840.

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Cervigón, F., R. Cipriani, W. Fischer, L. Garibaldi, M. Hendrickx, A.J. Lemus, R. Marquez, J.M. Poutiers, G. Robiaina, and B. Rodríguez. 1993. *FAO species identification sheets for fishery purposes. Field Guide to the commercial marine and brackish-water resources of the northern coast of southern America*. Rome, FAO, 513 p.

Lundberg, J.G., F. Mago-Leccia, and P. Nass. 1991. *Exallodontus aguanai*, a new genus and species of Pimelodidae (Pisces: Siluriformes) from deep river channels of South America, and delimitation of the subfamily Pimelodinae. *Proc. Biol. Soc. Wash*., 104(4):840-869.

de Pinna, M.C.C. 1998. Phylogenetic relationships of Neotropical Siluriformes (Teleostei: Ostariophysi): Historical overview and synthesis of hypotheses. In *Phylogeny and classification of Neotropical fishes*, edited by L.R. Malabarba, R.E. Reis, R.P. Vari, Z.M.S. Lucena, and C.A. Lucena. Porto Alegre, Brazil, EDIPURS, 279-330.

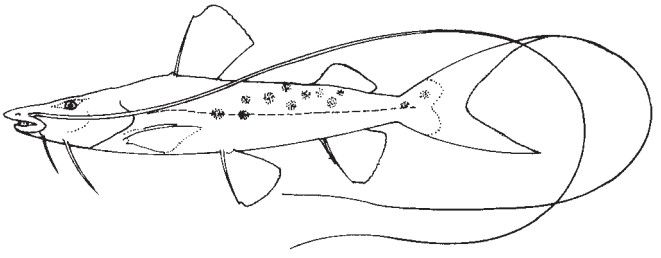
Puyo, J. 1949. *Poissons de la Guyane Française*. Paris, Office de la Recherche Scientifique Outre-Mer. 280 p.

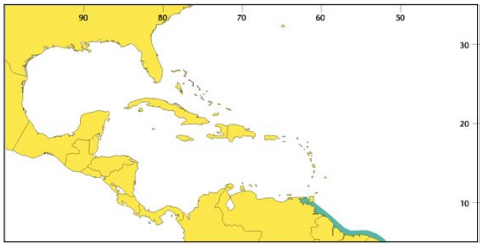
Taylor, W.R. and T.R. Roberts. 1977. Pimelodidae. In *FAO Species Identification Sheets, Western Central Atlantic (Fishing Area 31), Vol. 3*, edited by W. Fischer. Rome, FAO (unpaginated).

Brachyplatystoma filamentosum (Lichtenstein, 1819) BPF

En - Kumakuma; **Fr** - Bagre laulao; **Sp** - Bagre laulau.

Maximum size to over 200 cm total length; commonly to 120 cm. Juveniles and sub-adults occur in river mouths and estuaries from the Gulf of Paria, Venezuela, to northern Brazil. Caught on hook-and-line and in gill nets. Highly prized and marketed fresh.

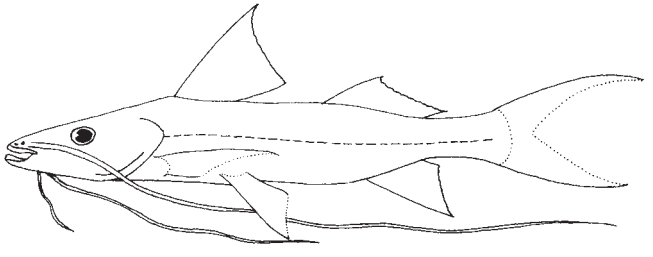


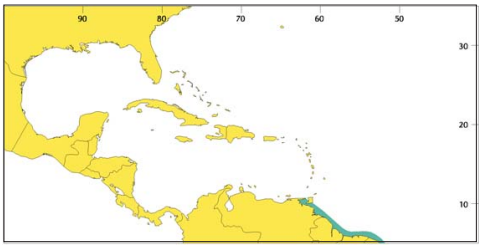


Brachyplatystoma vaillantii (Valenciennes, 1840) BPT

En - Laulao catfish (AFS: Piramutaba); **Fr** - Bagre vaillant; **Sp** - Valentón.

Maximum size to over 150 cm total length; commonly to 80 cm. Juveniles and sub-adults occur in river mouths and estuaries from the Gulf of Paria, Venezuela, to northern Brazil. Caught on hook-and-line and in gill nets. Highly prized and marketed fresh.

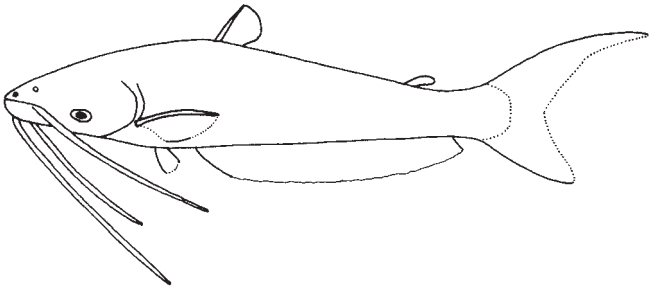


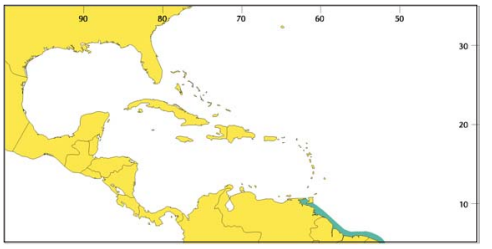


Hypophthalmus edentatus (Spix and Agassiz, 1829)

En - Highwaterman catfish; **Fr** - Bagre paysan; **Sp** - Bagre paisano.

Maximum size 57 cm total length; commonly to 45 cm. Occurs in estuaries and along the coast to a depth of 37 m, along the northern coast of South America from the Gulf of Paria, Venezuela, to northern Brazil. This species is caught by people fishing for predominantly marine species (mainly with traps). Because it appears in these catches only during the rainy season when the rivers are in flood, this species is locally known as “highwaterman”. It is marketed locally, both fresh and salted.

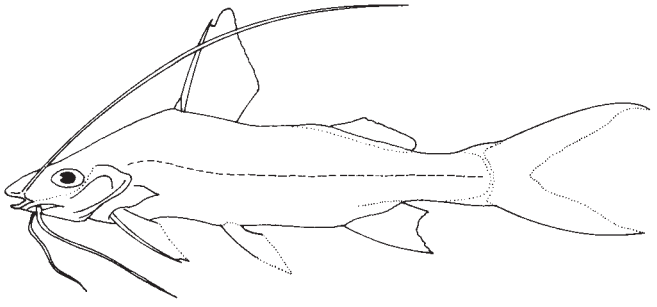


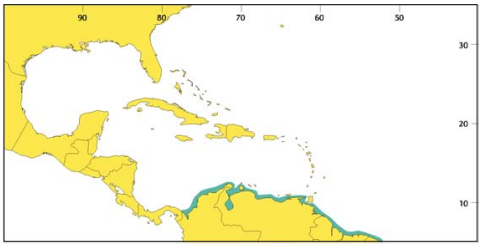


Pimelodus blochii Valenciennes, 1840

En - Bloch’s catfish; **Fr** - Bagre pimélode; **Sp** - Bagre cogotúo.

Maximum size 35 cm total length; commonly to 20 cm. Occurs in river mouths and occasionally in estuaries, from southern Panama to Brazil. Caught in gillnets and by hook-and-line.





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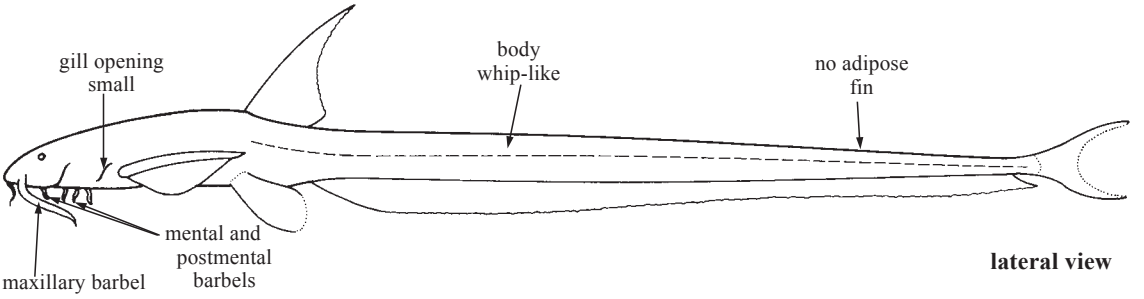
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ASPREDINIDAE

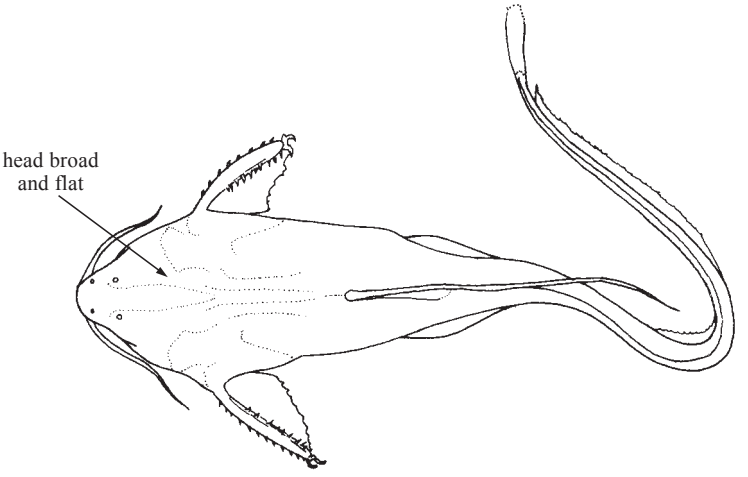
Banjo catfishes

by C.J. Ferraris, Jr., Portland, Oregon, USA (after Taylor, 1977)

Diagnostic characters: Small- to medium-sized fishes (to 40 cm total length). Head and anterior part of body broad and depressed; body long and whip-like posteriorly. Eye minute; anterior and posterior nostrils separated by space greater than nostril diameter. Mouth inferior; maxillary barbel present at corner of mouth, often with additional small barbel (absent in *Platystacus cotylephorus*); **ventral surface of head and abdomen with 2 to 10 pairs of barbels; gill opening reduced to tiny slit anterior to pectoral fin. Dorsal surface of head with strong, flattened, bony shield. Dorsal-fin base short, with weak, flexible spine**; adipose fin absent; **anal-fin base very long, with 50 to 60 soft rays**; pectoral fin low on body, with a strong, serrated spine which can be locked into erect position. Scales absent. **Colour:** back and upper sides beige, brown, or nearly black, sometimes with lighter or darker markings; belly grey, yellowish, rosy, or whitish.



lateral view



dorsal view

Habitat, biology, and fisheries: Marine and estuarine species of banjo catfishes are bottom-dwelling fishes with peculiar mode of egg incubation. The females carry eggs attached by a short stalk (cotylophore) to underside of body. Most of the approximately 36 species of Aspredinidae (Friel, 1994) are confined to fresh water. Those occurring in salt water are confined to the lowland, muddy coast of northern Venezuela, Guyana, Suriname, French Guiana, and northeastern Brazil, where they occur in the sea, in estuaries, and in tidal portions of rivers. Banjo catfish are occasionally taken by shrimp trawlers, sometimes in great numbers. Near Cayenne they are caught in fish traps made of stakes driven into the mud of tidal areas. *Aspredo aspredo* and *Aspredinichthys tibicen* are both commonly seen in the Georgetown market, where they are known as "banjaman", although their flesh is apparently not highly esteemed as food.

Remarks: Diagnosis applies only to those species found in marine and estuarine habitats.

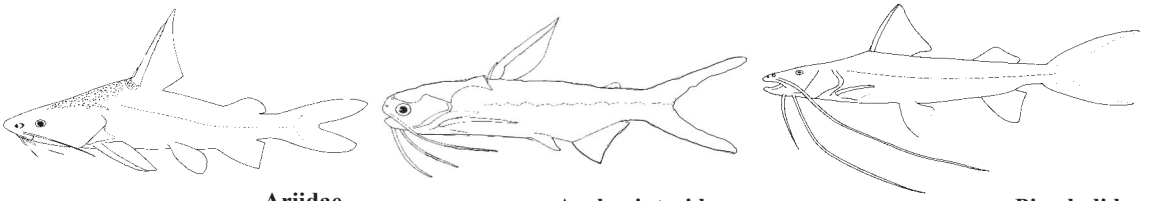
Similar families occurring in the area

Other marine and brackish water catfishes that occur in northern South America can be distinguished by having a much stouter body, larger eyes and gill openings, and the presence of an adipose fin. Additional distinguishing characters of marine representatives of each of the following catfish families include:

Ariidae: short anal-fin base; anterior and posterior nostrils close together; dorsal fin with stout spine anteriorly.

Auchenipteridae: head shield bones swollen, with honeycomb-like surface; anal-fin base short; anterior and posterior nostrils close together; dorsal fin with stout spine, spine with swollen base.

Pimelodidae: body not depressed; dorsal fin usually with stout spine (absent in *Hypophthalmus*); maxillary barbel extends well past opercular margin; eye lateral or ventrolateral.



Ariidae **Auchenipteridae** **Pimelodidae**

Key to the species of Aspredinidae occurring in the area

1a. Seven or more pairs of barbels or small tentacles on ventral surface of head and abdomen; maxillary barbel without basal membrane (Figs 1, 2) . . . . . → *2*

1b. Only 2 pairs of barbels on ventral surface of head, none on abdomen; maxillary barbel joined to head by membrane at base (Fig. 3) . . . . → *3*

2a. Tip of snout smooth, without hooked spines; about 7 pairs of mental and postmental barbels (Fig. 1) . . . . . ***Aspredinichthys filamentosus***

2b. Tip of snout with 4 broad, hooked spines (Fig. 3); about 10 pairs of mental and postmental barbels (Fig. 2) . . . . . ***Aspredinichthys tibicen***

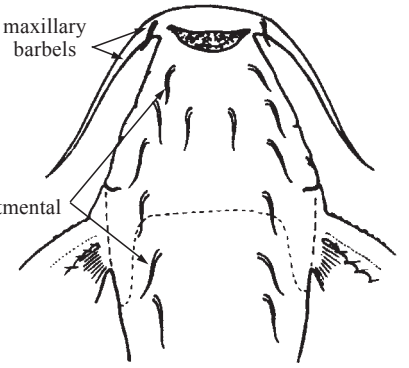


Fig. 1 ventral view
Aspredinichthys filamentosus

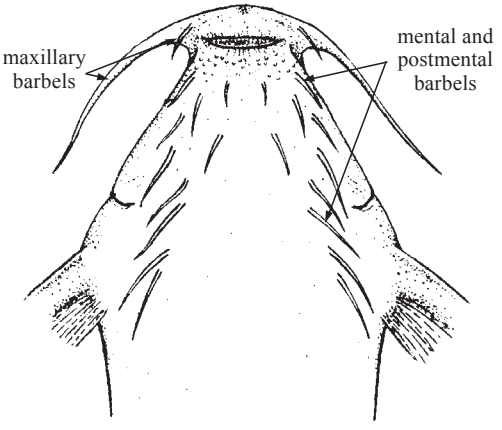


Fig. 2 ventral view
Aspredinichthys tibicen

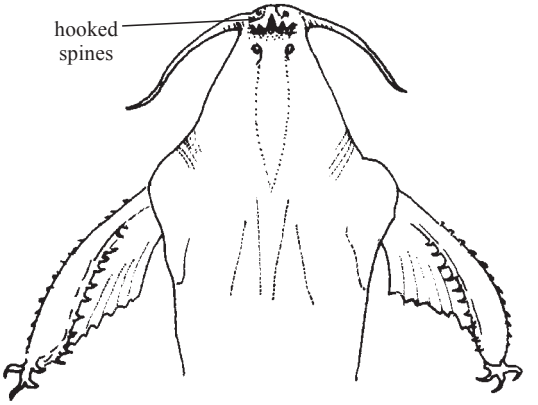


Fig. 3 dorsal view
Aspredinichthys tibicen

3a. Maxillary barbel with small accessory barbel at base; no ridges on side of body except for lateral line (Fig. 4); coloration usually plain . . . . . ***Aspredo aspredo***

3b. Maxillary barbel without accessory barbel; 3 or 4 longitudinal ridges along side of body; coloration usually mottled . . . . . ***Platystacus cotylephorus***

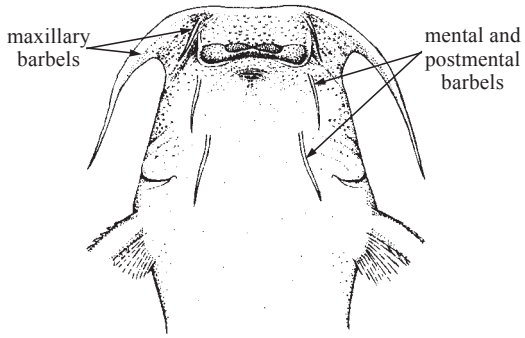


Fig. 4 ventral view
Aspredo aspredo

List of species occurring in the area

The symbol ◄ is given when species accounts are included.

◄ *Aspredinichthys filamentosus* (Valenciennes, 1840).

◄ *Aspredinichthys tibicen* (Valenciennes, 1840).

◄ *Aspredo aspredo* (Linnaeus, 1758).

◄ *Platystacus cotylephorus* Bloch, 1794.

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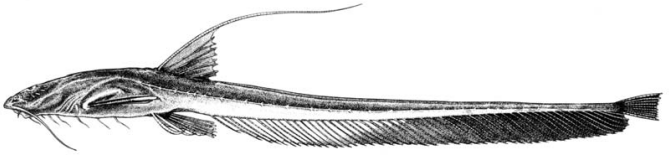
Mees, G.F. 1987. The members of the subfamily Aspredininae, family Aspredinidae in Suriname (Pisces, Nematognathi). *Proc. Konin. Nederl. Akad. Weten., ser. C, 90(2):173-192.*

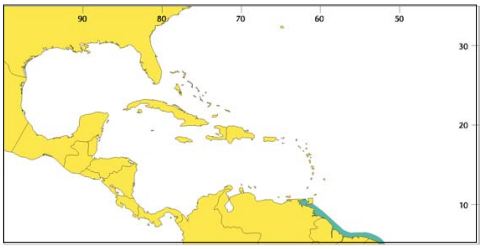
Taylor, W.R. 1977. Aspredinidae. In *FAO Species Identification Sheets, Western Central Atlantic (Fishing Area 31), Vol. 1*, edited by W. Fischer. Vol. 1. Rome, FAO (unpaginated).

Aspredinichthys filamentosus (Valenciennes, 1840) ADF

En - Sevenbarbed banjo; **Fr** - Claqueur sept-barbes; **Sp** - Bagre roncador sietebarbas.

Maximum size to 22 cm total length; commonly to 15 cm. Found in estuaries and river mouths over mud bottoms. Distributed from Guyana to the mouths of the Amazon River, Brazil.

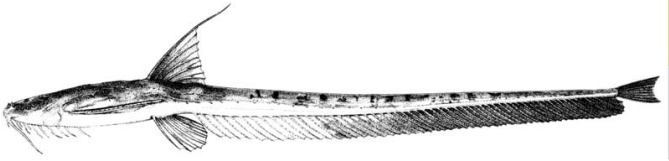


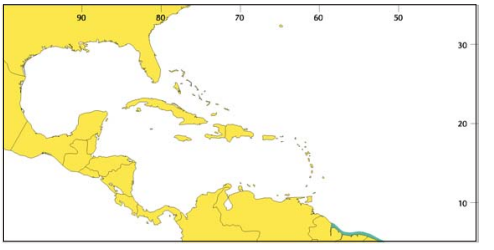


Aspredinichthys tibicen (Valenciennes, 1840)

En - Tenbarbed banjo; **Fr** - Claqueur dix-barbes; **Sp** - Bagre roncador diez barbas.

Maximum size to 18 cm total length; commonly to 15 cm. Found in estuaries and river mouths over mud bottoms. Distributed from Guyana to the mouths of the Amazon River, Brazil.

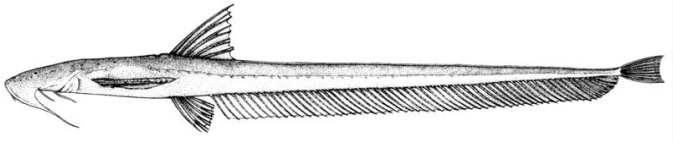


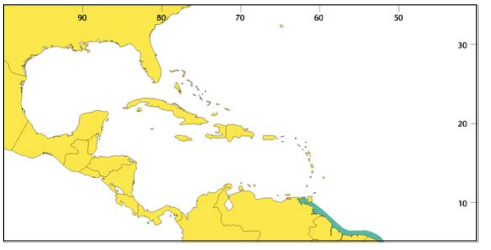


Aspredo aspredo (Linnaeus, 1758) ADR

En - Banjo; **Fr** - Croncron; **Sp** - Chicharrita.

Maximum size to 40 cm total length; commonly to 35 cm. Found in estuaries and river mouths over mud bottoms. Distributed from the Gulf of Paria, Venezuela to the mouths of the Amazon River, Brazil.

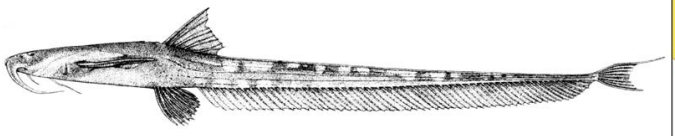


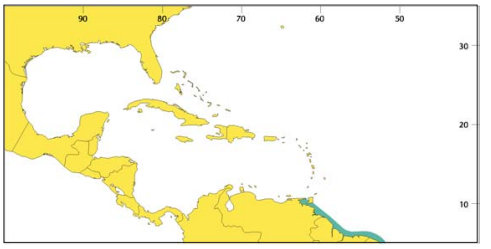


Platystacus cotylephorus Bloch, 1794

En - Banded banjo (AFS: Whiptail banjo catfish); **Fr** - Croncron rayé; **Sp** - Chicharrita rayada.

Maximum size to 20 cm total length; commonly to 15 cm. Found in estuaries and river mouths over mud bottoms. Distributed from the Gulf of Paria, Venezuela to the mouths of the Amazon River, Brazil.



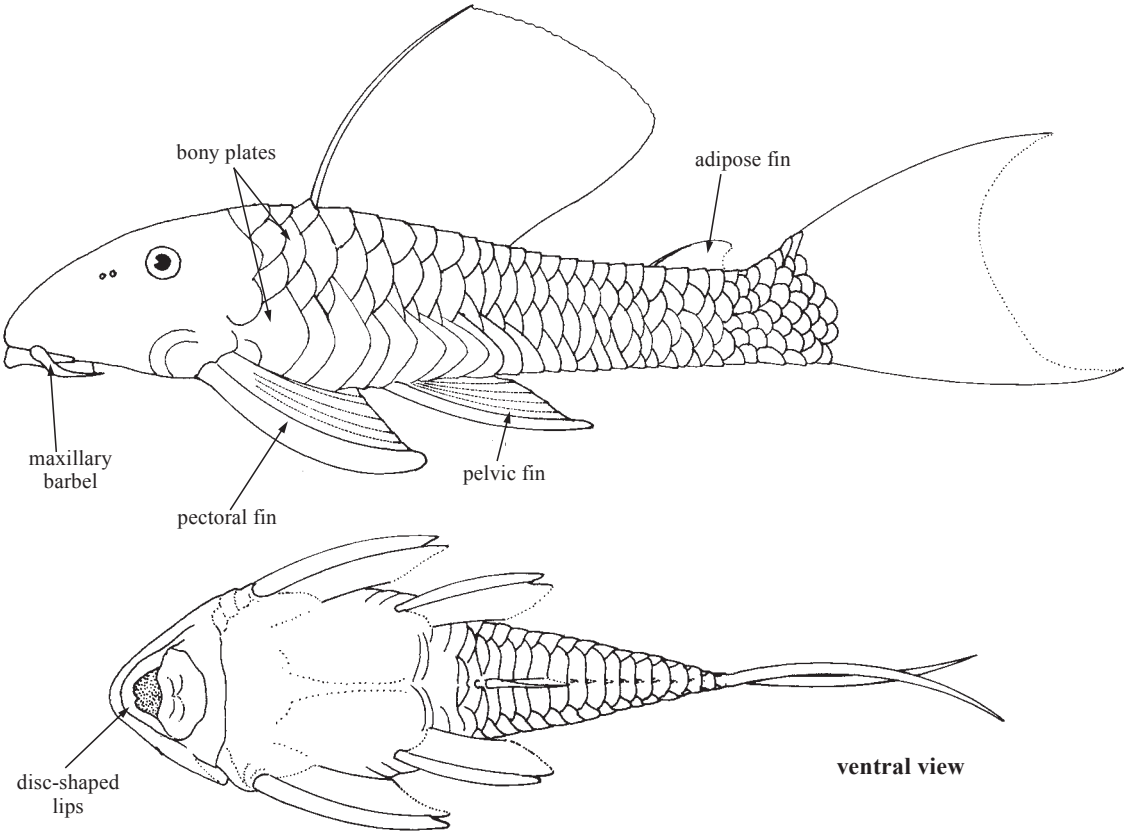


LORICARIIDAE

Suckermouth armoured catfishes (mailed catfishes, plated catfishes)

by C.J. Ferraris, Jr., Portland, Oregon, USA

Diagnostic characters: Small to medium-sized fishes (to 75 cm total length). Head depressed, but sometimes only slightly so, lower surface of head and body flattened. Snout rounded to elongate and pointed, anterior and posterior nostrils close together, their margins nearly touching; posterior nostril with flap along anterior margin, located near eye; **mouth completely inferior with broad, disc-shaped lips; jaw teeth usually curved and bifurcated at tip**; functional jaw teeth in a single series; no teeth on palate; gill membranes united to isthmus, the openings restricted to sides of head; **only 1 pair of barbels present, at corner of mouth; barbel united basally with oral disc**. Dorsal fin short, usually with a tiny spine followed by a longer, somewhat flexible second spine and several soft rays; adipose fin present or absent, if present, consisting of a bony spine followed by a thin membrane; caudal fin varying in shape from deeply forked to nearly truncate; pectoral fin close to ventral profile, with a more or less pungent spine which can be locked into erect position; pelvic fin with 6 soft rays, the first thickened and simple, the others branched; anal-fin base short. **Scales absent, but most or all of body covered with overlapping bony plates often armed with tooth-like spines.** **Colour:** yellowish olive through dark brown to bluish black, often with dark brown or black spots on back and sides; lighter below.



Habitat, biology, and fisheries: Armoured catfishes are inhabitants of fresh waters, but a few are restricted to lowland areas with slow-flowing muddy water and sometimes venture into the salty estuaries; they may, therefore, appear in catches taken in estuarine waters from Central America to Brazil.

Similar families occurring in the area

All other catfishes (marine and brackish water representatives only): body not covered with overlapping bony plates; 1 or more barbels present on ventral surface of head.

Key to the species of Loricariidae listed as living in and about lowland river mouths in the area

1a. Adipose fin absent . . . . . → *2*

1b. Adipose fin present . . . . . → *3*

2a. Snout margin without spines or bristles; tail region long, depressed, with a single series of bony plates on sides; surface of lips covered with papillae and tentacles . . . . ***Loricaria cataphracta***

2b. Snout margin with numerous short spines or bristles; tail region short and slender, with more than 1 series of isolated lateral plates; surface of lips smooth . . . . . ***Acanthicus hystrix***

3a. Depth of caudal peduncle contained 1.4 to 1.7 times in distance between bases of dorsal and adipose fins; body covered with dark, vague spots or blotches that do not extend onto belly . . . . . ***Hypostomus plecostomus***

3b. Depth of caudal peduncle contained 2 to 2.4 times in distance between bases of dorsal and adipose fins; body covered with large, well defined, dark spots that extend onto belly . . . . . ***Hypostomus watwata***

List of species occurring in the area

Acanthicus hystrix Spix and Agassiz, 1829. Maximum size to 53 cm SL. Amazon river basin and coastal rivers of the Guianas.

Hypostomus plecostomus (Linnaeus, 1758). Maximum size to 50 cm SL. Coastal rivers of N South America.

Hypostomus watwata Hancock, 1828. Maximum size to 45 cm SL. Coastal rivers of the Guianas.

Loricaria cataphracta Linnaeus, 1758. Maximum size to 30 cm SL. Amazon river basin and coastal rivers of the Guianas.

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Boeseman, M. 1968. The genus *Hypostomus* Lacépède, 1803, and its Surinam representatives (Siluriformes, Loricariidae). *Zoo. Verhand.,* 99:1-89.

Boeseman, M. 1976. A short review of the Surinam Loricariinae; with additional information on Surinam Harttiinae, including the description of a new species (Loricariidae, Siluriformes). *Zoo. Meded.*, 50(11):153-177.

Taylor, W.R. 1977. Loricariidae. In *FAO Species Identification Sheets, Western Central Atlantic (Fishing Area 31), Vol. 3*, edited by W. Fischer. Rome, FAO (unpaginated).

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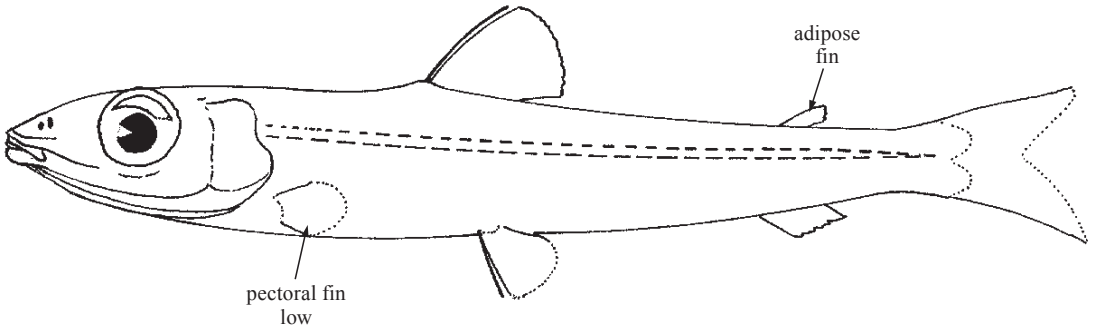
Order OSMERIFORMES

ARGENTINIDAE

Argentines

by J.A. Carter, University of New England, Maine, USA and K.E. Hartel, Harvard University, Massachusetts, USA

Diagnostic characters: Small-sized (10 to 70 cm) with elongated, robust body, usually convex head profile, small terminal mouth, ending in front of eye; **teeth absent on premaxillary and maxillary**. A single dorsal fin with soft rays near the midpoint of body, **followed by an adipose dorsal fin on the posterior 1/4 of the body above anal fin; pectoral fin placed low, on the ventrolateral contours of body**; pelvic fins beneath or behind dorsal fin. **No spines in fins; dorsal fin with 10 to 14 rays, anal fin with 10 to 17 rays, pectoral fins with 11 to 25 rays, pelvic fins with 10 to 15 rays**. Swimbladder present, sometimes with bright silvery pigment. Scales cycloid (smooth to touch), easily detached. **Colour:** light straw to silvery-coloured, often iridescent. Usually with a silvery or brownish band along sides.



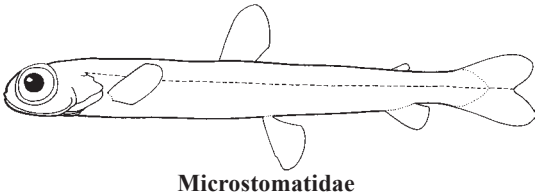
Habitat, biology, and fisheries: On the outer shelf and upper slope; pelagic near bottom. Locally abundant in some places, taken in shrimp trawls. Marine, mesopelagic entering bathypelagic environments, demersal from 100 to 1 400 m. Found on soft bottom, mud, gravel, sand, and rock. Some species change colour with age. Feeds on planktonic invertebrates and euphausiids, small fishes. Eggs and larvae pelagic. Only 1 species, *Argentina silus* important to fisheries, used fresh or in fish meal. Atlantic, Indian, and Pacific Oceans.

Similar families occurring in the area

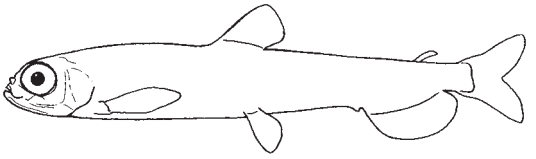
Microstomatidae: pectoral fins high, on sides of body; lateral-line scales extending onto caudal fin.

Bathylagidae: no swimbladder.

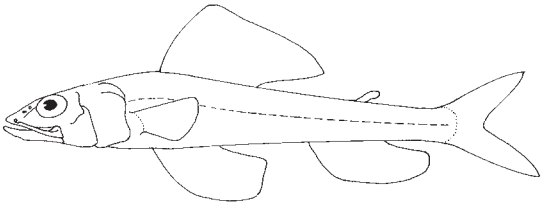
Aulopidae, Chlorophthalmidae, Synodontidae: pectoral fins high on sides of body; teeth (sometimes very small) present on premaxillary.



Microstomatidae



Bathylagidae



Aulopidae

Key to genera of Argentinidae occurring in the area

1a. Gill rakers on upper arch 7 or fewer; rakers quite robust and conical . . . . . → ***2***

1b. Gill rakers on upper arch 10 or more; rakers thin and long . . . . . → ***6***

2a. Lower gill rakers 13 (11 to 15) (not found in area) . . . . . ***Argentina silus***

2b. Lower gill rakers 7 or fewer . . . . . → ***3***

3a. Lower gill rakers usually 7; vertebrae 45 (44 to 46) . . . . . ***Argentina brucei***

3b. Lower gill rakers usually 6; vertebrae 47 to 54 . . . . . → ***4***

4a. Body oval in cross-section; depth 8.2 (6.4 to 10.3) in standard length; pectoral-fin rays19 (18 to 21); caudal peduncle depth 5.2 (4.4 to 6.0) in head length; vertebrae 49 (47 to 51); swimbladder usually with definate silvery pigment or iridescence; always lacking ventral black pigment except on chin . . . . . ***Argentina striata***

4b. Body square in cross-section; swimbladder lacking silvery pigment, sometimes irridescent. . . . . → ***5***

5a. Body depth 9.5 ((7.4 to 12.0) in standard length; pectoral-fin rays 17 (16 to 19); caudal peduncle 6.4 (5.6 to 7.3) in head length; vertebrae 48 (47 to 50); always with ventral black pigment between pectoral and pelvic fins . . . . . ***Argentina georgei***

5b. Body depth 11.8 (9.1 to 13.6) in standard length; pectoral-fin rays 20 (19 to 21); caudal peduncle 6.0 (5.5 to 7.1) in head length; vertebrae 52 or 53; always with ventral black pigment between pectoral and pelvic fins . . . . . ***Argentina stewarti***

6a. Caudal peduncle shallow, depth equal to or less than half of distance from vent to anal-fin origin; lateral-line scales 48 to 50; pectoral-fin rays 19 to 22 . . . . . ***Glossanodon polli***

6b. Caudal peduncle deep, depth equal to or greater than distance from vent to anal-fin origin; lateral-line scales 43 to 46; pectoral-fin rays12 to 14. . . . . ***Glossanodon pygmaeus***

List of species occurring in the area

Argentina brucei Cohen and Atsaides, 1969. To 15 cm. W C Atlantic.
Argentina georgei Cohen and Atsaides, 1969. To about 15 cm SL. Florida to Nicaragua, Antilles.
Argentina stewarti Cohen and Atasides, 1969. To about 17 cm SL. W Atlantic off Nicaragua, Antilles.
Argentina striata (Goode and Bean, 1896. To 21 cm. Temperate to tropical W Atlantic.

Glossanodon pygmaeus Cohen, 1958. To abou 11 cm SL. Gulf of Mexico to Brazil.

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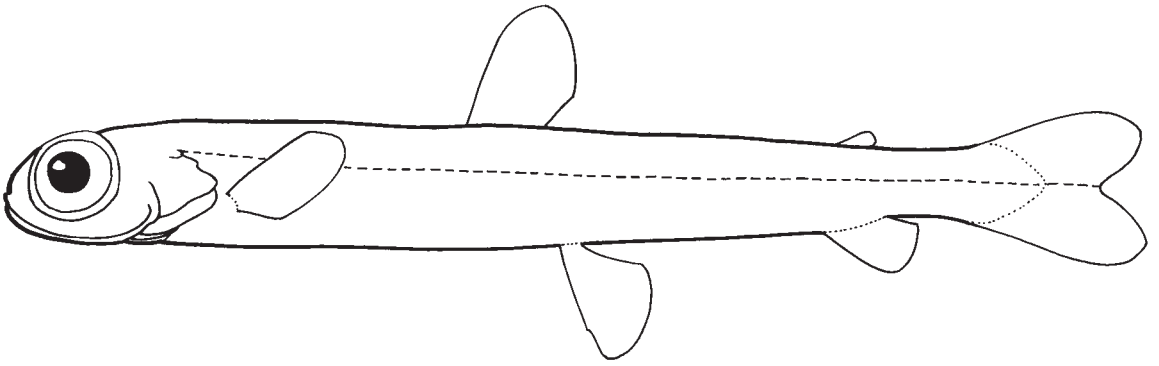
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MICROSTOMATIDAE

Microstomatids

by J.A. Carter, University of New England, Maine, USA and K.E. Hartel, Harvard University, Massachusetts, USA

Diagnostic characters: Small-sized (10 to 21 cm) with slender body. **Eye large, more than twice the length of snout**; small terminal mouth; mesocoracoid absent; orbitosphenoid present. **No spines in fins**; dorsal fin well behind midpoint of body; adipose fin present or absent; pectoral-fin base on side. **Lateral line and lateral-line scales extending onto tail. Colour:** body silvery, dark near tail.

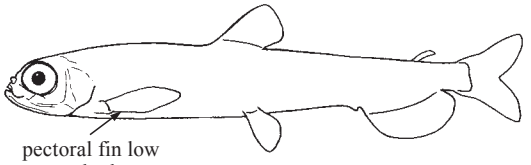


Habitat, biology, and fisheries: Mesopelagic to bathypelagic, marine, deep water, solitary, feeds on zooplankton. Of no interest to commercial fisheries. Atlantic, Pacific and Indian Oceans. Tropical and subtropical seas, western Atlantic Gulf of Mexico region.

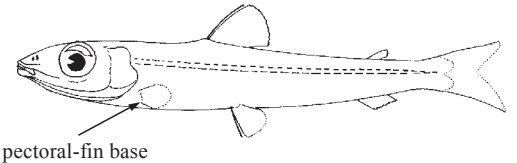
Similar families occurring in the area

Bathylagidae: pectoral fin low on body.

Argentinidae: pectoral-fin base on ventrolateral surface.



Bathylagidae



Argentinidae

Key to the genera of Microstomatidae occurring in the area

1a. Eyes of adults tubular, directed forward . . . . . ***Xenophthalmichthys***

1b. Eyes of adults non-tubular, lateral . . . . . → *2*

2a. Dorsal adipose fin absent; ventral fins inserted ahead of dorsal-fin origin . . . . . ***Microstoma***

2b. Dorsal adipose fin present; ventral fins inserted behind dorsal-fin origin . . . . . ***Nansenia***

List of species occurring in the area

Microstoma microstoma (Risso, 1810). To 21 cm SL. Temperate and tropical Atlantic.

Nansenia longicauda Kawaguchi and Butler, 1984. To about 13 cm SL. Tropical to temperate Atlantic.

Nansenia megalopa Kawaguchi and Butler, 1984. To 14 cm SL. Tropical Atlantic.

Nansenia pelagica Kawaguchi and Butler, 1984. To 11 cm SL. Tropical to subtropical Atlantic and Pacific.

Xenophthalmichthys danae Regan, 1925. To 10 cm SL. Rare, tropical and temperate Atlantic and Pacific.

References

Bigelow, H.B., D.M. Cohen, M.M. Dick, R.H. Gibbs Jr., M. Grey, J.E.M. Morrow Jr. L.P. Schultz and V. Walters. 1964. Fishes of the Western North Atlantic: Soft-rayed Bony Fishes. *Mem. Sears. Found. Mar. Res*., 1(4):599 p.

Cohen, D.M. 1973. Opisthoproctidae. In: Check-list of the fishes of the north-eastern Atlantic and of the Mediterranean (CLOFNAM I and II), edited by J.-C.Hureau and T. Monod, UNESCO, Paris, 1:156-157.

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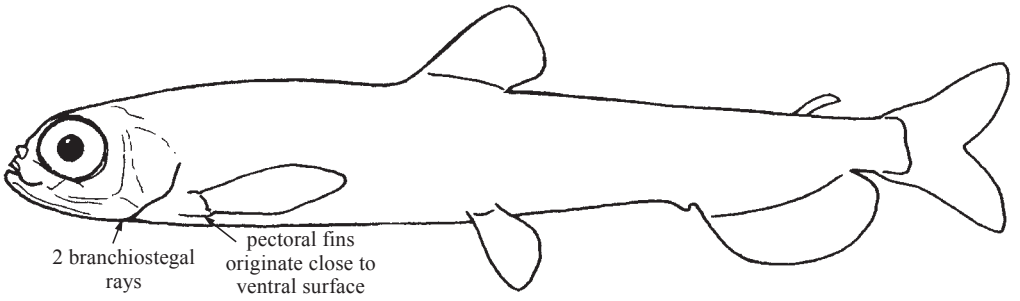
Rass, T.S. 1971 Deep-sea fish in the Caribbean Sea and the Gulf of Mexico (the American Mediterranean Region). In *Symposium on Investigations and Resources of the Caribbean Sea and Adjacent Regions*. UNESCO, Paris, pp. 509-526.

BATHYLAGIDAE

Deepsea smelts

by J.A. Carter, University of New England, Maine, USA and K.E. Hartel, Harvard University, Massachusetts, USA

Diagnostic characters: Small-sized (10 to 20 cm), with elongated body, convex head profile, and terminal mouth with more or less normal large eyes. **Branchiostegal rays 2**. Fins without spines; dorsal-fin rays 6 to 13, anal-fin rays 10 to 28, pectoral-fin rays 7 to 16. Adipose fin present or absent; pectoral-fin base near ventral surface; **swimbladder absent; no orbitosphenoid. Pectoral fins originating close to ventral surface of body. Colour:** head and body range from pale, straw-coloured, to jet black.



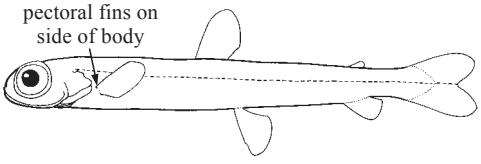
Habitat, biology, and fisheries: Marine, mesopelagic, entering bathypelagic environments (25 to 1 000 m). Feed on plankton. Oviparous, with planktonic eggs and larvae. Of little or no interest to fisheries. Atlantic, Pacific, and Indian Oceans.

Similar families occurring in the area

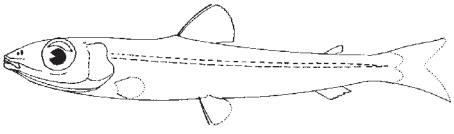
Microstomatidae: lateral line and scales extending onto tail; pectoral fins on side of body.

Argentinidae: swimbladder present.

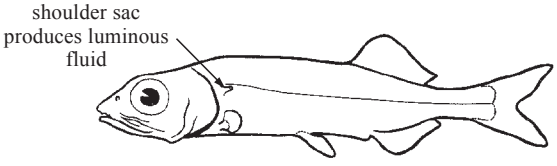
Platytroctidae: shoulder sac produces luminous fluid; canal system subcutaneous.



Microstomatidae



Argentinidae



Platytroctidae

Key to the species of Bathylagidae occurring in the area

After MCZ specimens, Koblyansky (1985) and Cohen (1964).

1a. Body tan in colour; appears scaleless but light-coloured scale pockets may be present . . . . . → *2*

1b. Body dark in colour; scaled or with ragged, dark scale pockets . . . . . → *4*

2a. Anal-fin soft rays 18 to 21 . . . . . ***Dilicholagus longirostris***

2b. Anal-fin soft rays less than 18 . . . . . → *3*

3a. Anal-fin soft rays 15 or 16; gill rakers 23 or 24; about 4 small gill rakers present on first epibranchial; eastern Atlantic . . . . . ***Bathylagoides argyrogaster***

3b. Anal-fin soft rays 11 or 12; gill rakers 25 to 27 (usually 26); small gill rakers absent on back of first epibranchial; western Atlantic . . . . . ***Bathylagichthys greyae***

4a. Eye large (8.8 to 13% of standard length); about 40 lateral-line scales; in adults, predorsal length usually reaches posterior tip of adipose fin when stepped back from dorsal-fin origin; mandibular pores not obvious . . . . . ***Bathylagus euryops***

4b. Eye smaller (5.9 to 8% of standard length); about 50 lateral-line scales; in adults, predorsal length usually only reaches anterior base of adipose fin mandibular pores large and very obvious . . . . . ***Melanolagus bericoides***

List of species occurring in the area

Bathylagichthys greyae (Cohen, 1958). To 16 cm SL. Rare, usually tropical to subtrotical Atlantic.

Bathylagoides argyrogaster (Norman, 1930). To 11 cm SL. Tropical to temperate in E Atlantic, W of 30°W, not in area E of 25°W.

Bathylagus euryops Goode and Bean, 1896. Temperate to boreal, usually N of 35°N Atlantic.

Dilicholagus longirostris (Maul, 1948). To 18 cm SL. Widespread, tropical to temperate in area.

Melanolagus bericoides (Borodin 1929). To 20 cm SL. Widespread, tropical to temperate in Pacific and Atlantic oceans.

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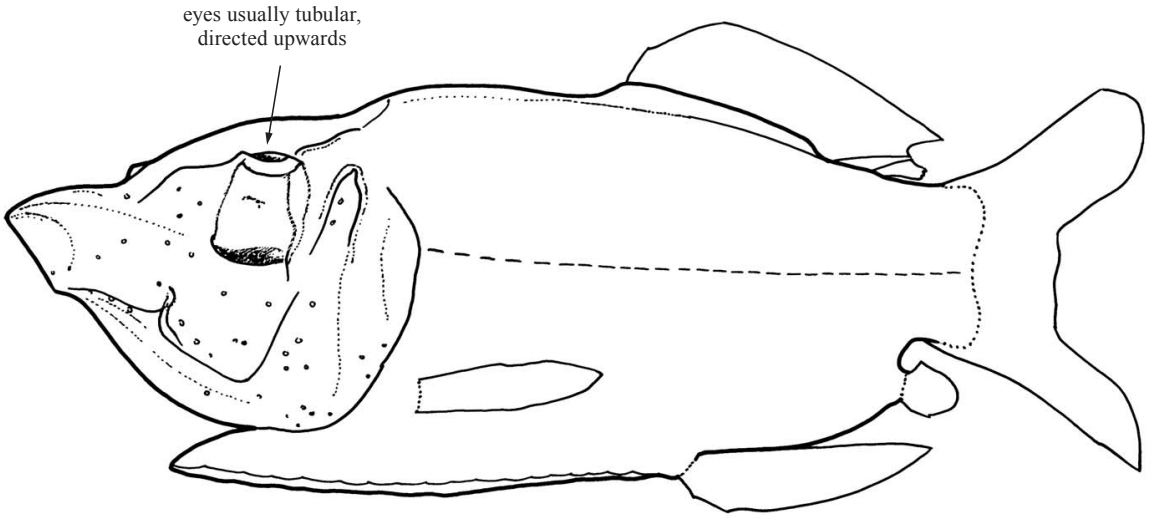
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OPISTHOPROCTIDAE

Barreleyes (spookfishes)

by J.A. Carter, University of New England, Maine, USA and K.E. Hartel, Harvard University, Massachusetts, USA

Diagnostic characters: Small-sized (18 to 24 cm) with slender to somewhat compressed, deep body, large head with short to moderate snout. **Eyes usually tubular, directed upward. Two to 4 branchiostegal rays.** Pectoral-fin base inserted on lower side; pelvic-fin base on side in some; adipose fin in some; photophores in some; most lack swimbladder. **Colour:** silvery in *Opisthoproctus* and various shades of brown in other genera.



Habitat, biology, and fisheries: Mesopelagic to bathypelagic, marine, 300 to 2 000 m; oviparous; feeds mainly on small crustaceans, mostly copepods. Eggs and larvae pelagic. No fishery. Atlantic, Indian and Pacific Oceans.

Similar families occurring in the area

None.

Key to the genera of Opisthoproctidae occurring in the area

(modified from Heemstra and Smith, 1986 and Cohen, 1984)

1a. Body laterally compressed and moderately to extreemly short . . . . . → *2*

1b. Body subcylindrical and elongate . . . . . *Dolichopteryx*

2a. Belly with a flattened scaly ventral sole from head to anus; anus behind ventral-fin base . . . . . *Opisthoproctus*

2b. Belly without ventral sole; anus between ventral-fin bases . . . . . → *3*

3a. Snout relatively short, about equal to orbit width . . . . . *Winteria*

3b. Shout relatively long, longer than orbit width . . . . . *Rhyncohyalus*

List of species occurring in the area

Dolichopteryx binocularis Beebe, 1932. To about 24 cm SL. Circumtropical.
Dolichopteryx brachyrhynchus Parr, 1937. Tropical W Atlantic.
Dolichopteryx longipes (Vaillant, 1888). To 8 cm SL. Circumtropical.

Opisthoproctus grimaldii Zugmayer, 1911. To about 18 cm SL. Tropical to subtropical Atlantic and Pacific.
Opisthoproctus soleatus Vaillant, 1888. To 11 cm SL. Temperate to tropical, circumglobal.

Rhynchohyalus natalensis (Gilchrist and von Bonde, 1924). To 16 cm SL. Temperate to tropical Atlantic.

Winteria telescopa Brauer, 1901. To 15 cm SL. Tropical, circumglobal.

References

Cohen, D.M. 1964. Suborder Argentinoidea. In Fishes of the western North Atlantic. *Mem. Sears Found. Mar. Res*. 1(1):1-70.

Cohen, D.M. 1973. Opisthoproctidae. In Check list of the fishes of the north-eastern Atlantic and of the Mediterranean (CLOFNAM I and II), edited by J.-C.Hureau and T. Monod, 1:156-157. UNESCO, Paris.

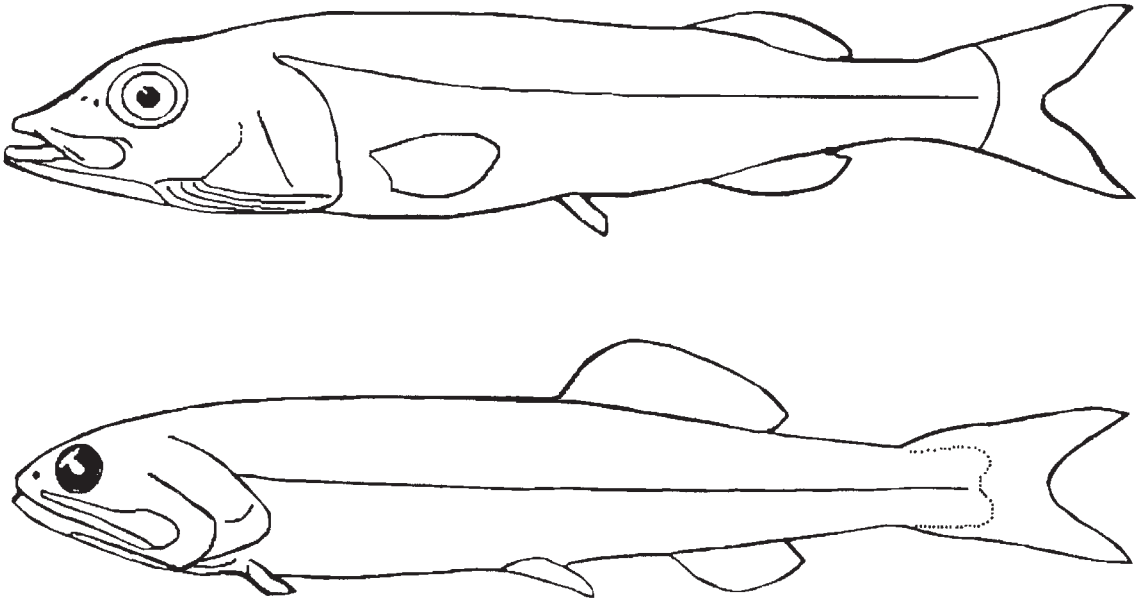
Bigelow, H.B., D.M. Cohen, M.M. Dick, R.H. Gibbs Jr., M. Grey, J.E.M. Morrow Jr. L.P. Schultz and V. Walters. 1964. Fishes of the Western North Atlantic: Soft-rayed Bony Fishes. *Mem. Sears. Found. Mar. Res*. 1(4):599 p.

ALEPOCEPHALIDAE

Slickheads

by J.A. Carter, University of New England, Maine, USA and K.E. Hartel, Harvard University, Massachusetts, USA

Diagnostic characters: Small to medium-sized (40 to 80 cm) with body shape variable, from moderately deep to elongate and eel-like. Head shape compressed to slightly rounded with a large mouth. Tongue present, but usually without teeth; roof and floor of mouth usually with papillae; dentition of jaw and roof of mouth variable, but **premaxilla and mandible usually toothed; no premaxillary tusks. Head without scales**; papillae and raised sensory pores frequently present on head and opercles; **opercles frequently voluminous**, sometimes covering pectoral-fin base. Gill rakers moderate to long, with small tooth-like structures. **No spinous fin rays**; single dorsal and anal fins variable in position, usually placed far back and frequently opposite each other; **no adipose fin**; pectoral fins, if present, moderately high on body; **pelvic fins abdominal**, outer soft ray sometimes with supporting splint bone. **Lateral line present or absent, if present composed of pored scales**, a pored tube supported by ring-like scales, or papillae. Scales on body present or absent, if present always cycloid (smooth to touch), easily abraded. Naked forms usually with black integument and nodular photophores or papillae on body. No dark tube above pectoral fin. **Colour:** usually drab, predominantly brown to black, but 1 group of genera with bright blue skin on head and fin bases.



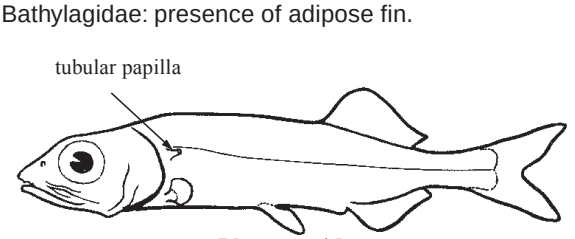
Habitat, biology, and fisheries: Deep-sea fishes, habitat variable from benthic to midwater, bathydemersal (600 to 5 000 m), most numerous below 1 000 m. Feeds on wide range of food items including ctenophores, crustaceans, echinoderms, polychaetes, decapods, tunicates, and fishes. At present, slickheads have no economic importance in the western central Atlantic. Some species are known to congregate in commercial-sized quantities in the North Atlantic. The flesh, though mild, is of poor texture. Some potential exists for commercial fishery.

Distribution: Eastern and western Atlantic, western Indian, eastern and western Pacific Oceans. Worldwide from tropics to high latitudes.

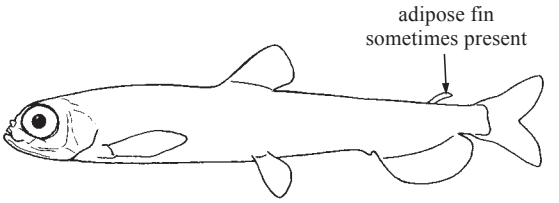
Similar families occurring in the area

Platytroctidae: luminous sack present at shoulder girdle which exits through a dark tubular papilla above the pectoral fin; many with prominent, anteriorly-directed premaxillary tusks.

Bathylagidae: presence of adipose fin.



Platytroctidae



Bathylagidae

Key to the genera of Alepocephalidae occurring in the area

1a. Body completely scaleless (except for modified lateral-line scales in 1 genus) . . . . → *2*

1b. Body entirely or partly scaled . . . . . → *7*

2a. Lateral line in a tube supported by modified ring-like scales standing on edge; anal-fin rays 18 to 22 (Fig. 1) . . . ***Rouleina***

2b. Lateral line, if present, without modified scales above . . . . . → *3*

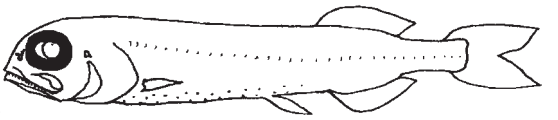


Fig. 1 ***Rouleina***

3a. Photophores present on body . . . . . → *4*

3b. No photophores on body . . . . . → *5*

4a. Photophores on raised stalks; ventral outline of upper jaw with obtuse angle at end of premaxilla; anal-fin soft rays 16 to 19 (Fig. 2) . . . . . ***Photostylus***

4b. Photophores nodular, not on stalks; ventral outline of premaxilla and maxilla approximately straight; anal-fin soft rays 26 to 33 (Fig. 3) . . . . . ***Xenodermichthys***



Fig. 2 ***Photostylus***

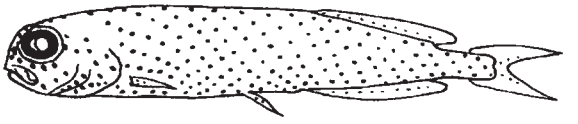


Fig. 3 ***Xenodermichthys***

5a. Dorsal-fin origin distinctly behind anal-fin origin; body tapers to a fine, almost stringy point (Fig. 4) . ***Leptoderma***

5b. Dorsal-fin origin above or before anal-fin origin; body not tapering to a point . . . . . → *6*



Fig. 4 ***Leptoderma***

6a. Dorsal-fin origin approximately opposite anal-fin origin; no teeth in jaws or mouth (Fig. 5) . . . . . ***Mirognathus***

6b. Dorsal-fin origin before anal-fin origin; teeth present in both jaws and on roof of mouth (Fig. 6) . . . . . ***Rinoctes***



Fig. 5 ***Mirognathus***



Fig. 6 ***Rinoctes***

7a. No teeth on maxilla or vomer . . . . . → ***8***

7b. Teeth present on maxilla and/or vomer . . . . . → ***11***

8a. Dorsal-fin origin usually above anal-fin origin; area from gill cavity to pectoral base scaled; pectoral fin not fan-like, upper-rays longer than lower (Fig. 7) . . . . . ***Alepocephalus***

8b. Dorsal-fin origin usually behind anal-fin origin; area from gill cavity to pectoral base naked or with naked strip; pectoral fin fan-like in some with upper and lower rays shortened . . . . . → ***9***



Fig. 7 ***Alepocephalus***

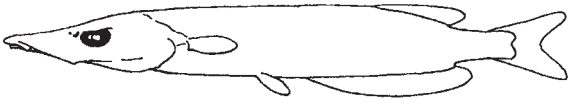


Fig. 8 ***Conocara***

9a. Lower jaw ends under orbit; palatine bones (on roof of mouth) with teeth; body cavity lining darkly pigmented (Fig. 8) . . . . . ***Conocara***

9b. Lower jaw ends behind posterior margin of orbit; no teeth on roof of mouth; body cavity lining unpigmented or slightly pigmented . . . . . → ***10***

10a. Fin ray counts: dorsal 15 to 19, anal 15 to 20, pectoral 14 to 18 (Fig. 9) . . . . . ***Asquamiceps***

10b. Fin ray counts: dorsal 22 to 27, anal 26 to 34, pectoral 9 to 10 (Fig. 10) . . . . . ***Einara***



Fig. 9 ***Asquamiceps***

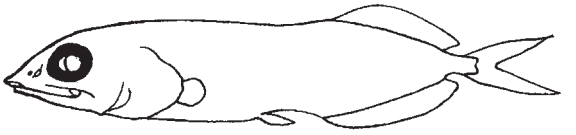


Fig. 10 ***Einara***

11a. Lower jaw without teeth (Fig. 11) . . . . . ***Herwigia***
11b. Lower jaw with teeth . . . . . → ***12***

12a. Dorsal-fin origin approximately opposite anal-fin origin. . . . . → ***13***
12b. Dorsal-fin origin before anal-fin origin . . . . . → ***14***



Fig. 11 ***Herwigia***

13a. Body elongate; pectoral fin reduced; upper jaw with relatively long pointed teeth; no spot near base of dorsal-fin ray (Fig. 12) . . . . . ***Bathyprion***
13b. Body moderately deep; pectoral fin well developed, often with produced rays; upper jaw without long fang-like teeth; a black wart-like spot near base of sixth dorsal-fin ray, often abraded (Fig. 13) . . . . . ***Talismania***

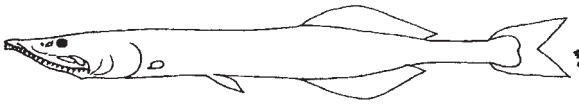


Fig. 12 ***Bathyprion***



Fig. 13 ***Talismania***

14a. Teeth near anterior tips of upper and lower jaws in more than 1 series (Fig. 14) . . . . . ***Narcetes***
14b. Teeth near anterior tips of upper and lower jaws in single series . . . . . → ***15***



Fig. 14 ***Narcetes***

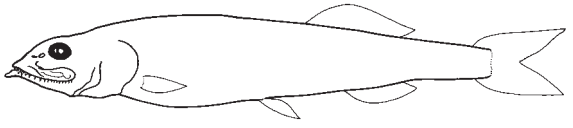


Fig. 15 ***Bajacalifornia***

15a. Lower jaw with a prominent pointed knob directed ventrally (Fig. 15) . . . . . ***Bajacalifornia***
15b. Lower jaw without a prominent knob . . . . . → ***16***

16a. Upper jaw ends well behind posterior margin of orbit (Fig. 16) . . . . . ***Bathylaco***
16b. Upper jaw ends approximately below posterior margin of orbit; pointed knob on lower jaw (Fig. 17) . . . . . ***Bathytroctes***



Fig. 16 ***Bathylaco***



Fig. 17 ***Bathytroctes***

List of species occurring in the area

Alepocephalus agassizii Goode and Bean, 1883. Boreal to temperate Atlantic.
Alepocephalus australie Barnard, 1923. Temperate, circumglobal.
Alepocephalus bairdii Goode and Bean, 1879. Temperate N Atlantic.
Alepoosphalus productus Gill, 1883. Subtropical to temperate, circumglobal.

Asquamiceps caeruleus Markle, 1980. Tropical, Indian and Atlantic oceans.

Bajacalifornia megalops (Lütken, 1898). Tropical to temperate, all oceans.

Bathylaco nigricans Goode and Bean, 1896. Temperate and tropical, circumglobal.

Bathyprion danae Marshall, 1966. Temperate and tropical Atlantic, W Pacific.

Bathytroctes macrolepis Günther, 1887. Temperate and tropical Atlantic.
Bathytroctes michaelsarsi Koefoed, 1927. Temperate and tropical Atlantic.
Bathytroctes microlepis Günther, 1878. Tropical and temperate, all oceans.
Bathytroctes oligolepis Krefft, 1970. Temperate and tropical Atlantic.
Bathytroctes squamosus Alcock, 1890. Tropical Atlantic and Indian oceans.

Conocara macropterum Vaillant, (1888). Temperate and tropical Atlantic.
Conocara murrayi (Koefoed, 1927). Temperate and tropical, circumglobal.
Conocara salmoneum (Gill and Townsend, 1897). Temperate Atlantic and Pacific.

Einara edentula (Alcock, 1892). Temperate and tropical, all oceans.

*Herwigia krefft*i (Nielsen and Larsen, 1970). Temperate and tropical, Atlantic and Pacific.

Leptoderma macrops Vaillant, 1886. Temperate and tropical Atlantic.

Mirognathus normani Parr, 1951. Temperate, N and S Atlantic.

Narcetes stomias (Gilbert, 1890). Temperate and tropical, circumglobal.

Photostylus pycnopterus Beebe, 1933. Temperate and tropical, circumglobal.

Rinoctes nasutus (Koefoed, 1927). Temperate and tropical N Atlantic.

Rouleina attrita (Vaillant, 1888). Temperate and tropical, circumglobal.
Rouleina maderensis Maul, 1948. Tropical, circumglobal.

Talismania antillarum (Goode and Bean, 1896). Tropical, circumglobal.
Talismania homoptera (Vaillant, 1888). Tropical N Atlantic.
Talismania mekistonema Sulak, 1975. Tropical, Atlantic and Indian oceans.

Xenodermichthys copei (Gill, 1884). Temperate and tropical, circumglobal.

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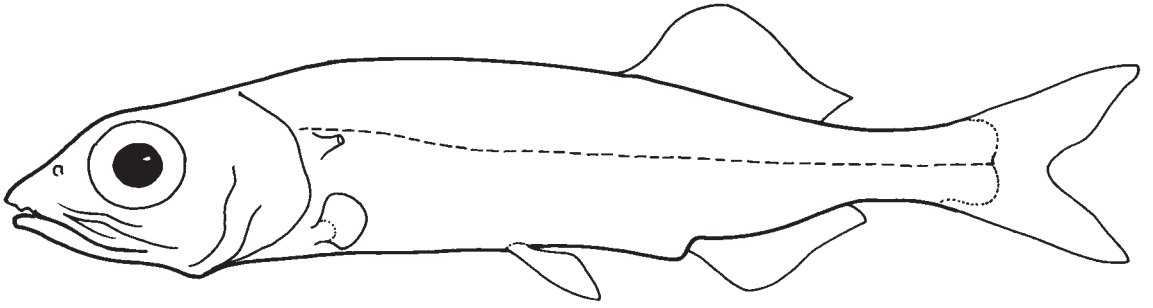
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PLATYTROCTIDAE

Tubeshoulders

by J.A. Carter, University of New England, Maine, USA and K.E. Hartel, Harvard University, Massachusetts, USA

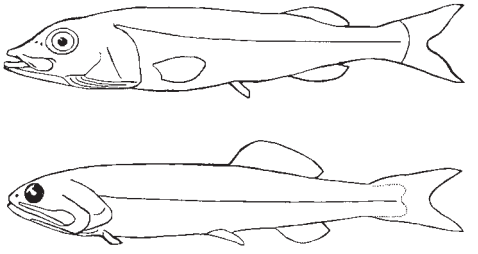
Diagnostic characters: Small-sized (10 to 30 cm) with slender to highly compressed body, tissue often soft, terminal mouth with slightly convex head profile. Four to 8 branchiostegal rays. Fourteen to 28 pectoral-fin soft rays; pelvic-fin rays absent in *Platytroctes apus*. **Canal system subcutaneous connected to scale pockets by pores**; swimbladder absent. **Shoulder sac apparatus (behind shoulder girdle) produces luminous fluid**; light organs present in many species (directed ventrally in adults). **Colour:** black to dark brown.



Habitat, biology, and fisheries: Marine, deep water, mesopelagic, bathypelagic to benthopelagic; 100 to 2 000 m most common between 300 and 1 000 m. Of no commercial interest to fisheries. All oceans except Mediterranean. Range in western Atlantic 35°N to 5°N, 84°W to 40°W.

Similar families occurring in the area

Alepocephalidae: lacks shoulder tube.



Alepocephalidae

Key to the genera of Platytroctidae occurring in the area

1a. Body deep and strongly compressed, upper and lower margins forming a keel; predorsal margin sharp, 1 scale wide . . . . . ***Platytroctes***

1b. Body shallow to deep, moderately compressed to round in cross-section, upper and lower keels shallow or abesnt; predorsal margin more than 1 scale wide . . . . . → ***2***

2a. Dentary with a gap in teeth caused by lower jaw ligament; vomerine teeth well separated; lateral scales large, about 45 to 55 . . . . . ***Barbantus***

2b. Dentary without a gap in teeth or ligament; vomerine teeth closely spaced; lateral scales smaller, usually more than 55 (except *Pellisolus*) . . . . . → ***3***

3a. Cleithral symphysis normal, not a spine; pelvic-fin rays usually 9 (except 6 to 8 in *Searsia*) . . . . . → ***4***

3b. Cleithral symphysis produced as a spine (except in *Pellisolus*); pelvic-fin rays 6 to 8 . . . . . → ***6***

4a. Maxilla ending between mideye and posterior margin of eye; pelvic-fin rays 6 to 8; 1/4 or less of dorsal fin in advance of anal-fin origin . . . . . ***Searsia***

4b. Maxilla ending behind eye; pelvic-fin rays 8 or 9 (usually 9); 1/3 or more of dorsal fin in advance of anal-fin origin . . . . . → ***5***

5a. Premaxillary tusks absent or rudimentary . . . . . ***Sagamichthys***

5b. Premaxillary tusks present . . . . . ***Holtbyrnia***

6a. Frontals widest over mideye. . . . . ***Maulisia***

6b. Frontals widest over posterior end of eye to behind eye . . . . . → *7*

7a. Body compressed, dorsal margin relatively sharp; anal and dorsal fins nearly opposed . ***Normichthys***

7b. Body moderately compressed, dorsal margin rounded; dorsal-fin ahead of anal-fin origin by 1/4 to 1/3 of its base . . . . . ***Pellisolus***

List of species occurring in the area

Barbantus curvifrons (Roule and Angel, 1931). To 13 cm SL. Temperate to tropical Atllantic.
Barbantus elongatus Krefft, 1970. To 18 cm SL. Tropical Atlantic.

Holtbyrnia anomala Krefft, 1980. To 25 cm SL. Boreal to tropical Atlantic.
Holtbyrnia innesi (Fowler, 1934). To 24 cm SL. Temperate and tropical Atlantic and Pacific.
Holtbyrnia macrops Maul, 1957. To 20 cm SL. Temperate and tropical Atlantic.

Maulisia mauli Parr, 1960. To 20 cm SL. Temperate to tropical Atlantic.
Maulisia microlepis Sazonov and Golovan, 1976. To 26 cm SL. Temperate Atlantic.

Normichthys operosus Parr, 1951. To 16 cm SL. Boreal to tropical Atlantic.

Pellisolus facilis Parr, 1951. To about 13 cm SL. Circumtropical.

Platytroctes apus Günther, 1978. To 18 cm SL. Temperate and tropical, circumglobal.

Sagamichthys schnakenbecki (Krefft, 1953). To 27 cm SL. Boreal to tropical Atlantic.

Searsia koefoedi Parr, 1937. To 15 cm SL. Boreal to tropical, all oceans.

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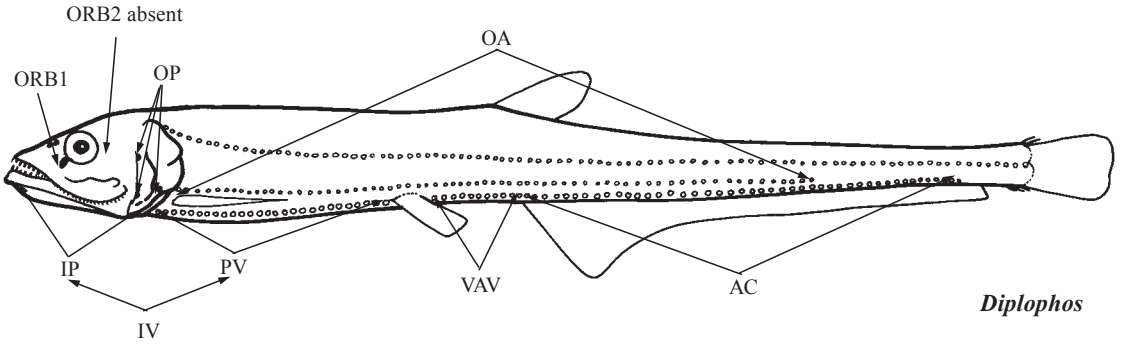
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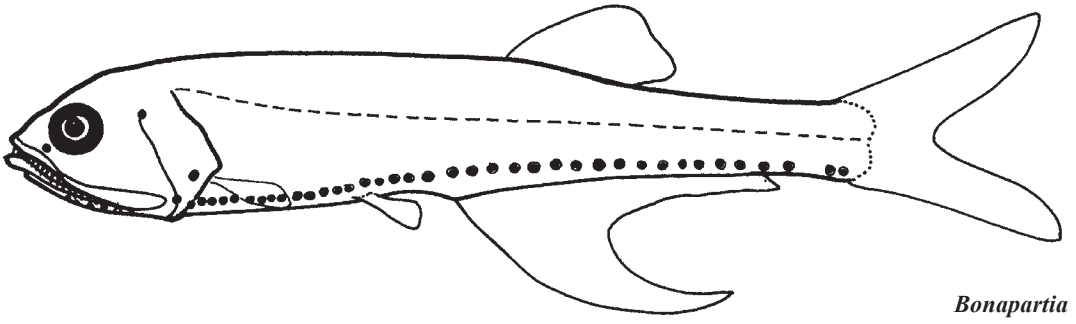
Order STOMIIFORMES
GONOSTOMATIDAE
Bristlemouths

by A.S. Harold, Grice Marine Biological Laboratory, South Carolina, USA

Diagnostic characters: Maximum size about 36 cm. Body moderately elongate; head and body compressed. Relative size of head highly variable. Eye very small to moderately large. Nostrils high on snout, prominent in dorsal view. Mouth large, angle of jaw well posterior to eye. Premaxillary teeth uniserial (except in *Triplophos*); dentary teeth biserial near symphysis. **Chin barbel absent**. Gill openings very wide. Branchiostegals 12 to 16 (4 to 6 on posterior ceratohyal). **Gill rakers well developed**. Pseudobranchiae usually absent (present in *Diplophos* and *Margrethia*). **Dorsal fin at or slightly posterior to middle of body (except in *Triplophos* in which it is anterior)**. Anal-fin base moderately to very long. Dorsal fin with 10 to 20 rays; anal fin with 16 to 68 rays; caudal fin forked; pectoral fin rays 8 to 16; pelvic fin rays 5 to 9. **Dorsal adipose fin present or absent**; ventral adipose fin absent. Scales deciduous. **One or more rows of discrete photophores on body; isthmus photophores (IP) present or absent; postorbital photophore (ORB 2) absent**. Parietals well developed; epioccipitals separated by supraoccipital. Four pectoral-fin radials (except *Cyclothone*, which has 1). **Colour:** skin varying from colourless through brown to black; black and silvery pigmentation associated with photophores.



Diplophos

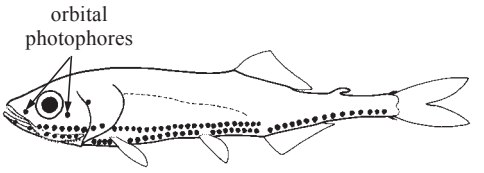


Bonapartia

AC - ventral series posterior to anal-fin origin
BR - series on the branchiostegal membranes
IP - ventral series anterior to pectoral-fin base
IV - ventral series anterior to pelvic-fin base
OA - lateral series
OP - opercular photophores
ORB - anterior (ORB1) and posterior (ORB2) to eye
PV - ventral series between bases of pectoral and pelvic fins
VAV - ventral series between pelvic-fin base and origin of anal fin

Habitat, biology, and fisheries: Mesopelagic and bathypelagic, oceanic. Development, especially of photophores, protracted. Diet consists of other fishes and crustaceans. Sexual dimorphism and/or hermaphroditism present in many species.

Remarks: The family has undergone considerable revision since Grey's (1964) treatment, primarily by Weitzman (1974). Some genera were moved to the Sternoptychidae while others to a completely new family, the Photichthyidae (=Phosichthyidae of this account) (Weitzman, 1974).



Phosichthyidae

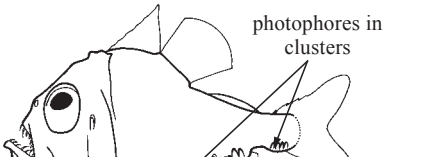
Similar families occurring in the area

Phosichthyidae: row of photophores on isthmus (IP); usually 2 orbital photophores (posterior of the 2 [postorbital] lacking in *Polymetme* and *Yarrella*); photophores Gamma type; 3 bony pectoral-fin radials.

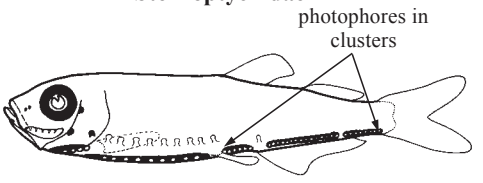
Sternoptychidae: pseudobranch present; ventral photophore series with disjunct clusters of 2 or more photophores; branchiostegal photophores (BR) 6 or 7; 4 bony pectoral-fin radials.

Astronesthidae, Chauliodontidae, Idiacanthidae, Malacosteidae, Melanostomiidae, and Stomiidae: body generally more elongate; chin barbel usually present but reduced or absent in Chauliodontidae, absent in males of Idiacanthidae, and absent in *Malacosteus* and *Photostomias* (Malacosteidae); jaw teeth greatly enlarged, fang-like; gill rakers absent in adults; usually 3 bony pectoral-fin radials.

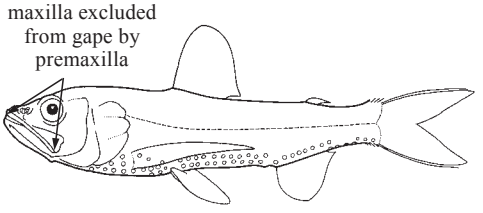
Myctophidae and Neoscopelidae: myctophiform families with photophores but usually with a less elongate body and the maxilla is toothless and completely excluded from the gape by the premaxilla; ventral photophores are usually more widely spaced and in less regular rows.



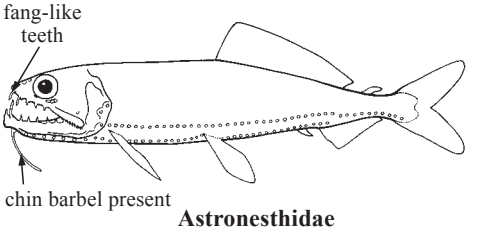
Sternoptychidae



Sternoptychidae



Neoscopelidae



Astronesthidae

Key to the genera of Gonostomatidae occurring in the area

Remarks on key characters: Gonostomatids are quite delicate and the skin and photophores are frequently damaged or lost during capture in commercial deep-water trawls. However, presence or absence of certain photophore groups, fin positions, and ray counts in conjunction with general body form will usually be adequate for identification.

1a. Anal-fin rays 36 to 39; dorsal-fin origin well in advance of anal-fin origin, posterior insertion of dorsal fin directly above or slightly anterior to anal-fin origin; IP photophores present on isthmus (Fig. 1); IV photophores 24 to 50 . . . . . → *2*

1b. Anal-fin rays 16 to 31; dorsal-fin origin not well in advance of anal-fin origin; IP photophores not present on isthmus; IV photophores 13 to 17. . . . . → *4*

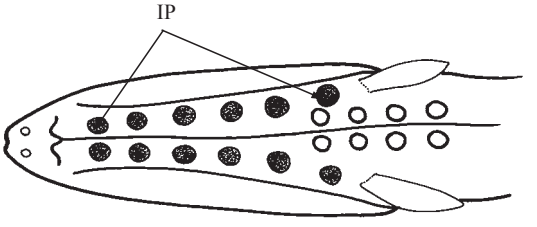


Fig. 1 ventral view of head

2a. Dorsal fin at or behind midpoint of body; VAV photophores 12 to 17 (Fig. 2); ORB photophore below or slightly ahead of anterior margin of eye; lower gill rakers 7 to 10; a row of small photophores on posterior 1/2 of lower jaw; pseudobranchs present; IV photophores 29 to 51 . . . . . → ***3***

2b. Dorsal fin well ahead of midpoint of body; VAV photophores 5 to 7 (Fig. 3); ORB photophore below centre of eye; lower gill rakers 12 to 16; no photophores on posterior 1/2 of lower jaw; pseudobranchs absent; IV photophores 24 to 30 . . . . . ***Triplophos***

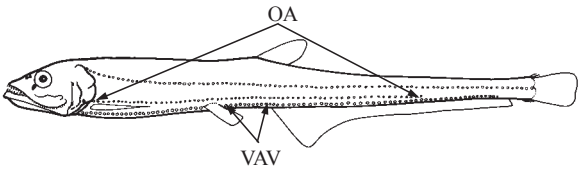


Fig. 2 ***Diplophos***

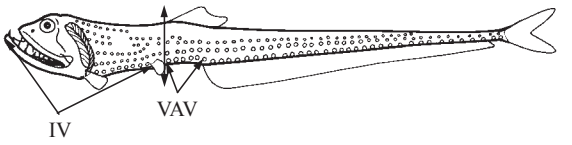


Fig. 3 ***Triplophos***

3a. OA photophores 60 to 77 (Fig. 2); IV photophores 31 to 51; AC photophores 32 to 51; IC photophores 76 to 119; distance from tip of snout to anal-fin origin usually about 47.5 to 51.2% standard length (61.2 to 64.4% standard length in *D. rebainsi*) . . . . . ***Diplophos***

3b. OA photophores 45 to 48 (Fig. 4); IV photophores 29 to 33; AC photophores 28 to 39; IC photophores 69 to 86; distance from tip of snout to anal-fin origin about 59.0 to 63.0% standard length . . . . . ***Manducus***

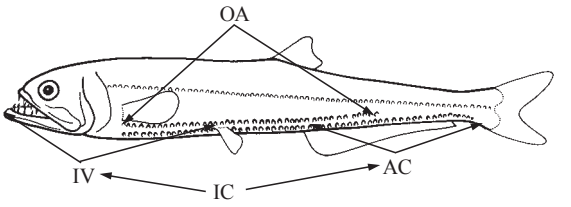


Fig. 4 ***Manducus***

4a. Dorsal-fin origin anterior to anal-fin origin (Fig. 5); pseudobranchiae well developed . . . ***Margrethia***

4b. Dorsal-fin origin above or posterior to anal-fin origin (Fig. 6); pseudobranchiae inconspicuous or absent . . . . . → ***5***

5a. Anal fin with elongate anterior rays (Fig. 6); OA photophores absent; pectoral-fin rays 14 to 16 . . . . . ***Bonapartia***

5b. Anterior rays of dorsal and anal fins not elongate; OA photophores present (6 to 16); pectoral-fin rays 7 to 13 . . . . . → ***6***

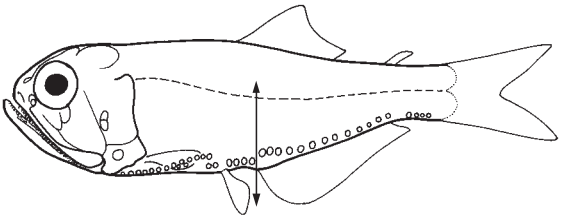


Fig. 5 ***Margrethia***

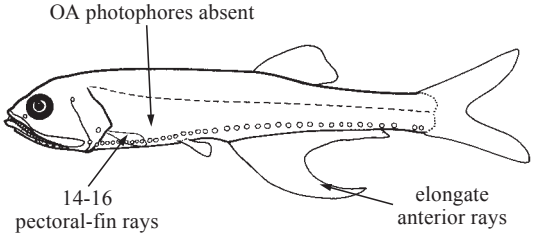


Fig. 6 ***Bonapartia***

6a. Eyes moderate to small (Fig. 7a); OA photophores 11 to 21; SO photophore usually present (absent in *G. bathyphilum*); maxilla with a series of elongate, teeth separated by a series of shorter, subequal teeth (Fig. 8a); palatine teeth in a single row; anal-fin rays 20 to 32 **. *Gonostoma***

6b. Eyes very small (Fig. 7b); OA photophores 6 to 10; SO photophore absent; maxillary teeth short but enlarging posteriorly or with occasional slightly longer teeth distributed at roughly equal intervals (Fig. 8b); palatine teeth in an anterior patch; anal-fin rays 16 to 21**. . . . . *Cyclothone***

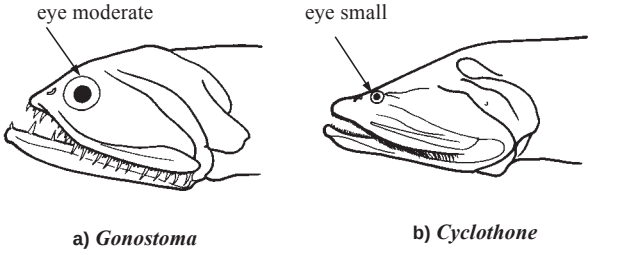


Fig. 7 lateral view of head

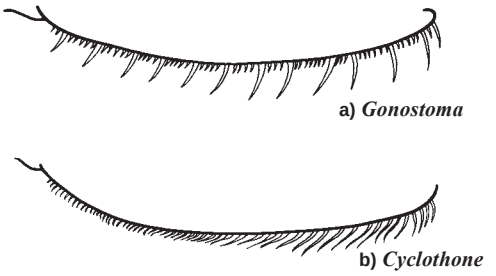


Fig. 8 teeth on maxilla (upper jaw)

List of species occurring in the area

Bonapartia pedaliota Goode and Bean, 1896. To 72 mm. Subtropical to temperate Atlantic.

Cyclothone acclinidens Garman, 1899. To 36 mm. Worldwide, tropical to temperate.
Cyclothone alba Brauer, 1906. To 34 mm. Worldwide, tropical to temperate.
Cyclothone braueri Jespersen and Tåning, 1926. To 38 mm. Worldwide, Subtropical to temperate.
Cyclothone microdon (Günther, 1878). To 66 mm. Worldwide, subtropical to temperate.
Cyclothone obscura Brauer, 1902. To 60 mm. Circumtropical.
Cyclothone pallida Brauer, 1902. To 70 mm. Worldwide, tropical to subtropical.
Cyclothone parapallida Badcock, 1982. To 69 mm. Worldwide, tropical to temperate.
Cyclothone pseudopallida Mukacheva, 1964. To 58 mm. Worldwide, tropical to temperate.

Diplophos taenia Günther, 1873. To 276 mm. Worldwide, tropical to subtropical.

Gonostoma atlanticum Norman, 1930. To 66 mm. Tropical to subtropical Atlantic and Pacific.
Gonostoma bathyphilum (Vaillant in Filhol, 1884). To 150 mm. Tropical to temperate Atlantic.
Gonostoma denudatum Rafinesque, 1810. To 140 mm. Subtropical to temperate N Atlantic and Mediterranean.
Gonostoma elongatum Günther, 1878. To 275 mm. Worldwide, tropical to subtropical.

Manducus maderensis (Johnson, 1890). To 220 mm. Tropical to subtropical Atlantic.

Margrethia obtusirostra Jespersen and Tåning, 1919. To 83 mm. Tropical to temperate N Atlantic.

Triplophos hemingi (McArdle, 1901). To 360 mm. Worldwide in the tropics.

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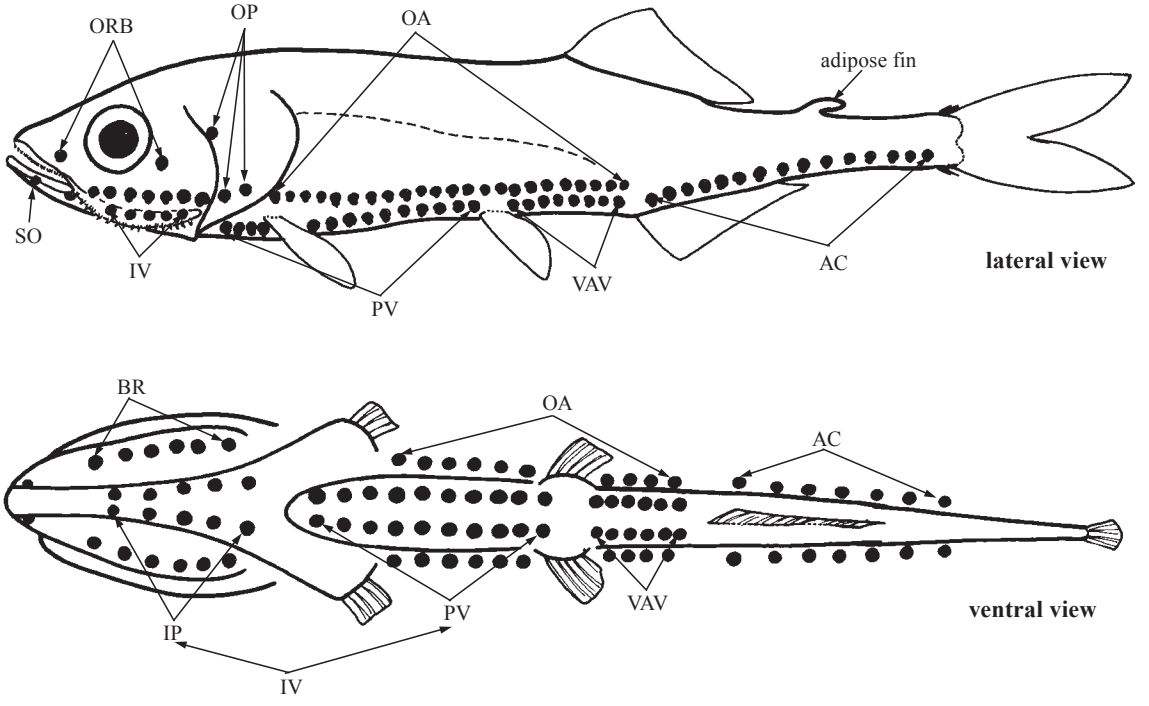
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PHOSICHTHYIDAE

Lightfishes (lighthousefishes)

by A.S. Harold, Grice Marine Biological Laboratory, South Carolina, USA

Diagnostic characters: Maximum size about 30 cm. Body generally moderately elongate, somewhat deep-bodied in some *Ichthyococcus* species, head small to moderately large. Head and body compressed. Mouth large; **teeth** ranging in size from small to large but **not highly elongate and fang-like. Chin barbel absent**. Eleven to 22 branchiostegal rays, 4 to 7 on posterior ceratohyal. **Gill rakers well developed (but true gill rakers restricted to angle of arch in *Woodsia*)**. Pseudobranchiae absent, except *Woodsia meyerwaardeni*. **Dorsal fin usually near middle of body, its origin well in advance of that of anal fin (except *Pollichthys* which has dorsal-fin orgin immediately above that of anal fin). Dorsal adipose fin present (except *Yarrella*). Anal fin with moderately long base but terminating posteriorly ahead of most constricted portion of caudal peduncle. Dorsal fin with 10 to 16 rays; anal fin with 12 to 33 soft rays; caudal fin forked; pectoral-fin soft rays 7 to 11; pelvic-fin soft rays 6 to 8.** Scales present, deciduous. Two ventrolateral rows of well-developed photophores on body, rows of accessory photophores dorsal to main rows in *Yarrella*; OA 17 to 53; IV 19 to 28; VAV 7 to 17; AC 12 to 28; **paired row of photophores on isthmus (IP); 2 orbital photophores, except *Polymetme* and *Yarrella* which lack the posterior (ORB 2)**. Three pectoral-fin radials. Usually 2 supramaxillae. **Colour:** skin varying from light brown in *Pollichthys* to dark brown or nearly black in *Yarrella*.



AC	-	ventral series posterior to anal-fin origin	OP	-	opercular photophores
BR	-	on the branchiostegal membranes	ORB	-	anterior (ORB1) and posterior (ORB2) to eye
IP	-	ventral series anterior to pectoral-fin base	PV	-	ventral series between bases of pectoral and pelvic fins
IV	-	ventral series anterior to pelvic-fin base	SO	-	paired photophores near symphysis of lower jaw
OA	-	lateral series	VAV	-	ventral series between pelvic-fin base and anal-fin origin

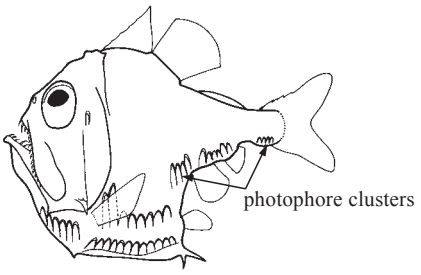
abbreviated terminology of photophores

Habitat, biology, and fisheries: Mesopelagic and bathypelagic adults (*Yarrella* and *Polymetme* may be benthopelagic). Larvae nearer surface than adults. Diet consists mainly of zooplankton, crustaceans in particular.

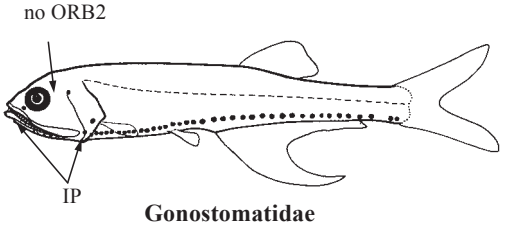
Similar families occurring in the area

Gonostomatidae: photophores present on isthmus (IP) (*Diplophos, Manducus,* and *Triplophos*) or absent (*Bonapartia, Cyclothone, Gonostoma,* and *Margrethia*); posterior orbital (ORB2) photophore absent; 4 bony pectoral-fin radials.

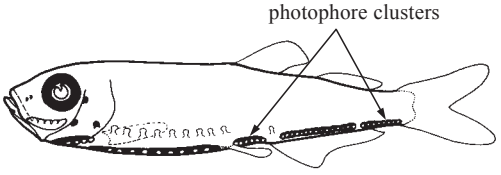
Sternoptychidae: pseudobranch present; ventral photophore series with clusters of 2 or more photophores; posterior orbital (ORB2) photophore absent; 4 bony pectoral-fin radials.



Sternoptychidae



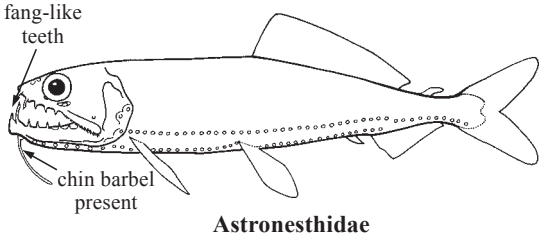
Gonostomatidae



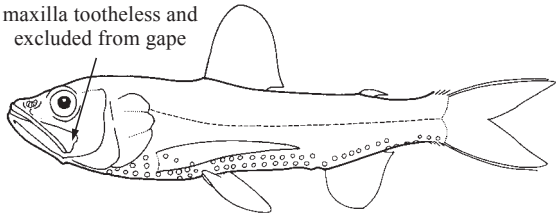
Sternoptychidae

Astronesthidae, Chauliodontidae, Idiacanthidae, Malacosteidae, Melanostomiidae, and Stomiidae: similar arrangement of photophores but body generally more elongate; chin barbel usually present but reduced or absent in Chauliodontidae, absent in males of Idiacanthidae, and absent in *Photostomias* and *Malacosteus* (Malacosteidae); jaw teeth greatly enlarged, fang-like; gill rakers absent in adults.

Myctophidae and Neoscopelidae: maxilla toothless and completely excluded from gape by premaxilla.



Astronesthidae



Neoscopelidae

Key to the genera and monotypic species of Phosichthyidae occurring in the area

(adapted from Grey, 1964 and Badcock, 1984)

1a. Two ORB photophores, 1 anteroventral, 1 midventral to posteroventral to eye; premaxillary teeth uniserial . . . . . → *2*

1b. One ORB photophore, anteroventral to eye; premaxillary teeth biserial . . . . . → *5*

2a. Anal-fin origin beneath or close behind last dorsal-fin ray base; BR photophores 8 or 9 . . . . . → *3*

2b. Anal-fin origin well behind last dorsal-fin ray base; BR photophores 11 to 18 . . . . . → *4*

3a. Anal- and dorsal-fin bases about equal in length; anal-fin rays 12 to 16 (Fig. 1); AC photophores 12 to 16, with 6 or 7 over anal fin . . . . . ***Vinciguerria***

3b. Anal-fin base length more than twice dorsal-fin base (Fig. 2); anal-fin rays 22 to 30; AC photophores 19 to 21, with 13 to 15 over anal fin . . . . . ***Pollichthys***

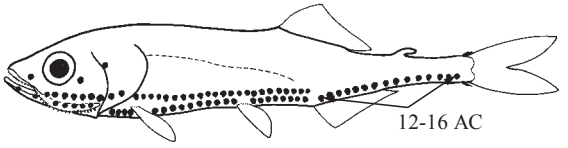


Fig. 1 ***Vinciguerria***

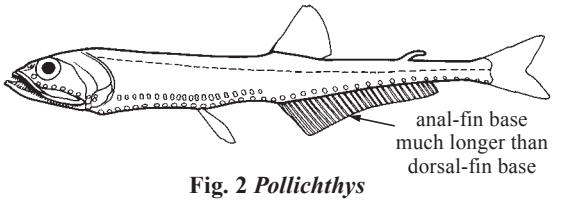


Fig. 2 ***Pollichthys***

4a. Pelvic-fin base posterior to dorsal-fin origin (Fig. 3); posterior ORB photophore midventral to eye; eyes tubular; dorsal adipose-fin base long, about length of anal-fin base . . . . ***Ichthyococcus***

4b. Pelvic-fin base anterior to dorsal-fin origin (Fig. 4); posterior ORB photophore posteroventral to eye; eyes lateral, not tubular; dorsal adipose-fin base short, much shorter than anal-fin base length . . . . . ***Woodsia***

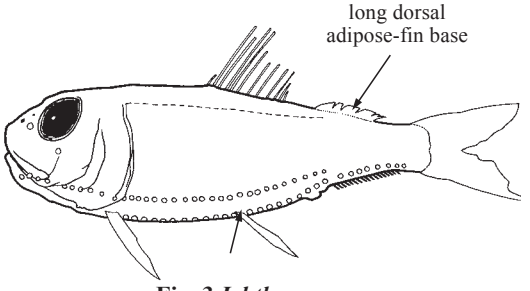


Fig. 3 ***Ichthyococcus***

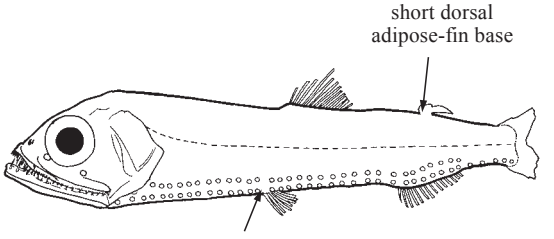


Fig. 4 ***Woodsia***

5a. Body with 2 rows of serial photophores; dorsal adipose fin present (Fig. 5); VAV photophores 7 or 8; ninth or tenth IV photophore elevated; 1 or 2 anterior AC photophores elevated; dorsal-fin rays 11 to 13 . . . . . ***Polymetme***

5b. Body with more than 2 rows of serial photophores; dorsal adipose fin absent (Fig. 6); VAV photophores 9 to 12; IV and AC photophore series straight, no photophores elevated; dorsal-fin rays 14 to 17 . . . . . ***Yarrella***

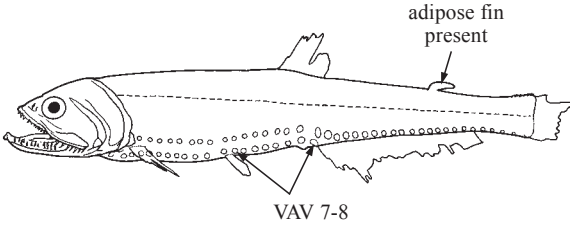


Fig. 5 ***Polymetme***

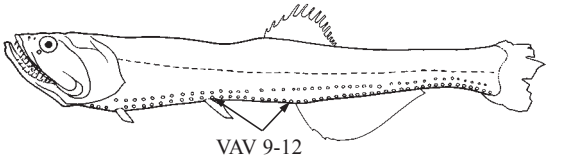


Fig. 6 ***Yarrella***

List of species occurring in the area

Ichthyococcus ovatus (Cocco, 1838). To 6 cm. Circumglobal in subtropics.

Pollichthys mauli (Poll, 1953). To 6 cm. Tropical and subtropical Atlantic, W Pacific.

Polymetme thaeocoryla Parin and Borodulina, 1990. To 22 cm. Tropical to temperate Atlantic.

Vinciguerria attenuata (Cocco, 1838). To 5 cm. Tropical and subtropical Atlantic.
Vinciguerria nimbaria (Jordan and Williams, 1895). To 5 cm. Tropical and subtropical Atlantic, W Indian.
Vinciguerria poweriae (Cocco, 1838). To 4 cm. Tropical and subtropical N Atlantic, Pacific.

Woodsia nonsuchae (Beebe, 1932). To 9 cm. Subtropical N Atlantic, Pacific.

Yarrella blackfordi Goode and Bean, 1896. To 32 cm. Tropical and subtropical Atlantic.

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Badcock, J. 1984. Photichthyidae. In *Fishes of the North-eastern Atlantic and the Mediterranean*, edited by P.J.P. Whitehead, M.-L. Bauchot, J.-C. Hureau, J. Nielsen, and E. Tortonese. UNESCO, 1:510 p.

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Parin, N.V. and O.D. Borodulina. 1990. Survey of the genus *Polymetme* (Photichthyidae) with a description of two new species. *Vopr. ikhtiol*. 30:733-743.

Schaefer, S., R.K. Johnson, and J. Badcock. 1986. Family No. 73: Photichthyidae. In *Smiths' Sea Fishes*, edited by M.M. Smith, and P.C. Heemstra. Johannesburg, MacMillan, South Africa, pp 243-247.

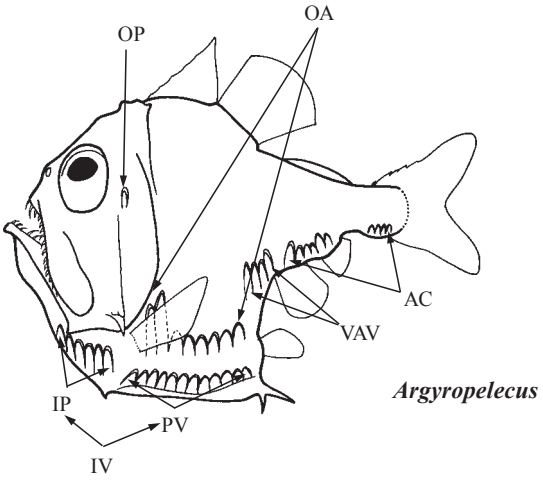
Harold, A.S. and S.H. Weitzman. 1996. Interrelationships of Stomiiform Fishes. In *The Interrelationships of Fishes*, edited by M.L.J. Stiassny, L.R. Parenti and G.D. Johnson. London, Academic Press, pp 333-353.

STERNOPTYCHIDAE

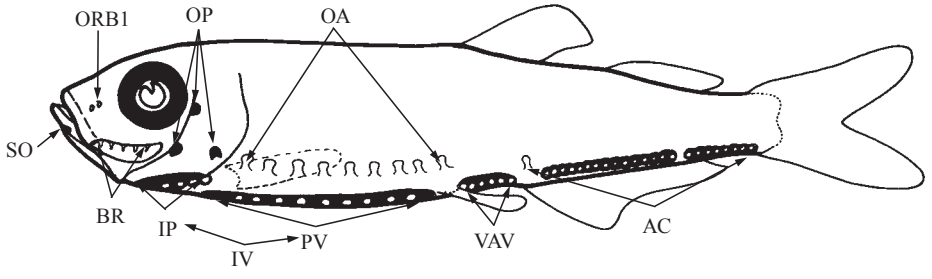
Hatchetfishes

by A.S. Harold, Grice Marine Biological Laboratory, South Carolina, USA

Diagnostic characters: Maximum size about 10 cm standard length. Elongate to deep-bodied. Head moderate to very large, more than 1/3 of standard length in *Sternoptyx*. Eye large, up to about half of head length, directed vertically and telescopic in some *Argyropelecus*. Snout short. Mouth small to moderate in size, terminal, oblique to nearly vertical; jaw teeth generally small, some *Argyropelecus* species with well-developed canine teeth. Chin barbel absent. Branchiostegals 6 to 10. **Pseudobranch present**. Gill rakers well-developed. Dorsal-fin origin usually near middle of body (anterior in *Danaphos*, posterior in *Araiophos*). Anal fin moderate to long-based, interrupted centrally by a group of photophores in some genera (e.g., *Argyripnus*, *Argyropelecus*, *Polyipnus*). Dorsal fin with 6 to 20 soft rays; anal fin with 17 to 38 soft rays; caudal fin forked; pectoral fin with 11 to 18 soft rays; pelvic fin with 5 to 7 soft rays. Dorsal adipose fin usually present. Scales present, deciduous. **Ventral photophore series with disjunct clusters of 2 or more photophores**. Two ventrolateral rows of photophores on body; OA 0 to 10; IV 10 to 24; VAV 3 to 32; AC 3 to 51; paired row of photophores on isthmus (IP); branchiostegal photophores 6 (7 in *Sonoda*); 1 orbital photophore present (ORB1), posterior orbital photophore (ORB2) absent. **Three branchiostegal rays originating on posterior ceratohyal**. Four pectoral-fin radials. **Colour:** skin light to dark brown, often with reflective guanine pigment on side of body; silvery and black pigmentation usually associated with photophores. Some species with dark dorsum pigment and/or with saddle-like markings and lateral bars or incomplete stripes as in *Polyipnus*.



Argyropelecus



AC	-	ventral series posterior to anal-fin origin	OP	-	opercular photophores
BR	-	on the branchiostegal membranes	ORB1	-	anterior to eye
IP	-	ventral series anterior to pectoral-fin base	PV	-	ventral series between bases of pectoral and pelvic fins
IV	-	ventral series anterior to pelvic-fin base	SO	-	paired photophores near symphysis of lower jaw
OA	-	lateral series	VAV	-	ventral series between pelvic-fin base and anal-fin base

abbreviated terminology of photophores

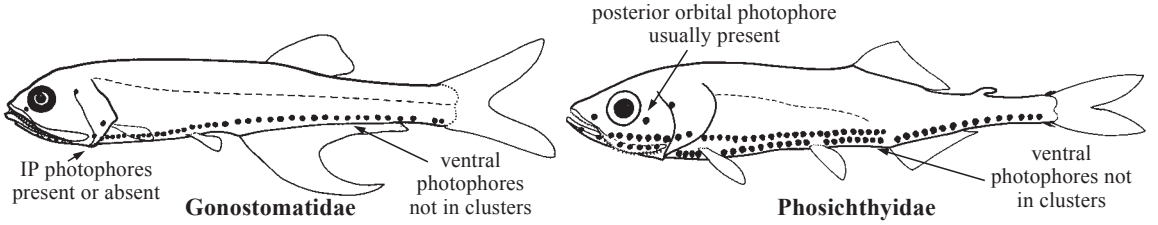
Habitat, biology, and fisheries: Mainly mesopelagic as adults, occasionally bathypelagic or benthopelagic (*Argyripnus, Sonoda, Polyipnus*). Development, especially of photophores, protracted. Diet consists of small fishes and zooplankton, including crustaceans, annelids, chaetognaths, and molluscs.

Remarks: The family Sternoptychidae as recognized here is consistent with Weitzman's (1974) revision. The elongate species had previously (Grey, 1964) been placed with the Gonostomatidae, with which they bore superficial resemblance. Specialized photophore structure and other details of anatomy described by Weitzman (1974) indicated they should be placed with the deep-bodied hatchetfishes in an expanded Sternoptychidae.

Similar families occurring in the area

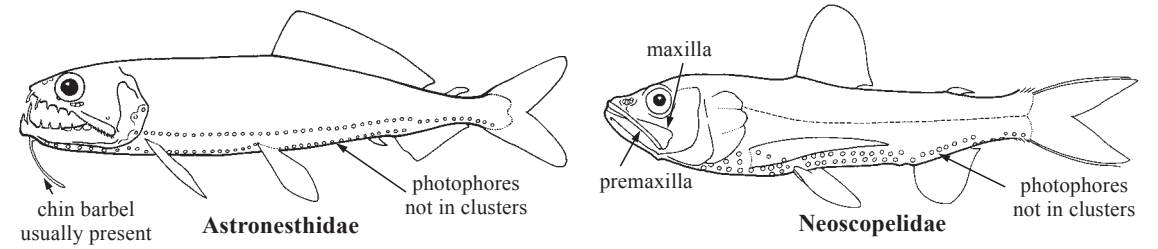
Gonostomatidae: pseudobranchiae usually absent (present in *Diplophos* and *Margrethia*); IP photophores present or absent (*Bonapartia*, *Cyclothone*, *Gonostoma,* and *Margrethia*); postorbital photophore absent; ventral photophore series (AC) not in clusters.

Phosichthyidae: pseudobranchiae absent; usually 2 orbital photophores but postorbital lacking in *Polymetme* and *Yarrella*; ventral photophore series not in clusters; 3 bony pectoral-fin radials.



Astronesthidae, Chauliodontidae, Idiacanthidae, Malacosteidae, Melanostomiidae, and Stomiidae: similar arrangement of photophores but body generally more elongate; chin barbel usually present but reduced or absent in Chauliodontidae, absent in males of Idiacanthidae, and absent in *Photostomias* and *Malacosteus* (Malacosteidae); jaw teeth greatly enlarged, fang-like; gill rakers absent in adults; usually three bony pectoral-fin radials.

Myctophidae and Neoscopelidae: maxilla toothless and completely excluded from gape by premaxilla. Photophores, when present, not in clusters.



Key to the genera of Sternoptychidae occurring in the area (modified from Badcock, 1984)

1a. Body laterally compressed, deep, greatest body depth 0.8 to 2.0 in standard length; exposed bony dorsal blade ahead of dorsal fin; iliac or postabdominal spines present . . . . . → ***2***

1b. Body fusiform, greatest body depth 3.7 to 7.7 in standard length; dorsal blade and iliac spines absent . . . . . → ***4***

2a. Eyes tubular, directed dorsally (Fig. 1); PV photophores 12 . . . . . ***Argyropelecus***

2b. Eyes not tubular, directed laterally; PV photophores 10 . . . . . → ***3***

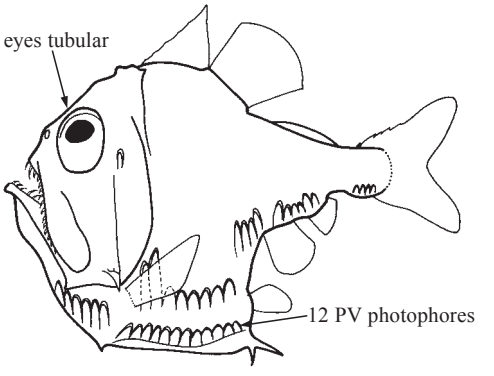


Fig. 1 ***Argyropelecus***

3a. Dorsal blade a single median flattened spine and prominent; BR photophores 3, IP 5 (Fig. 2) . . . . . ***Sternoptyx***

3b. Dorsal blade comprising 2 posteriorly-directed spines, reduced; BR photophores 6, IP 6 (Fig. 3). . . . . ***Polyipnus***

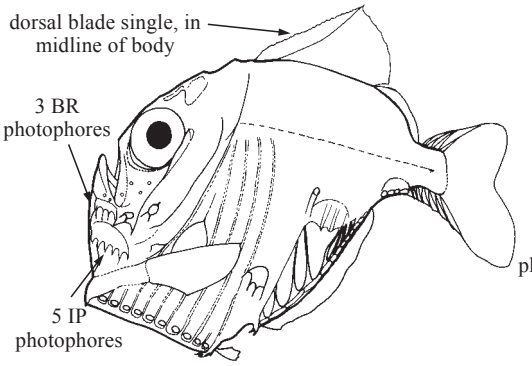


Fig. 2 ***Sternoptyx***

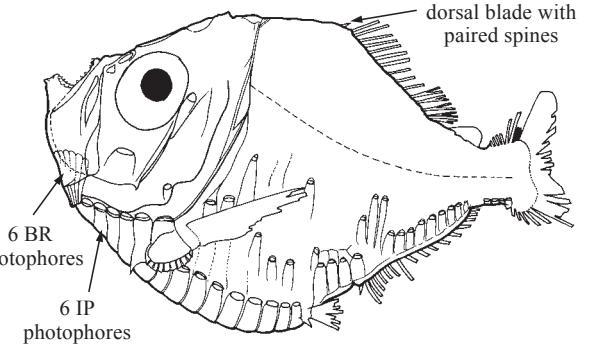


Fig. 3 ***Polyipnus***

4a. AC photophores in 3 to 6 groups, each of 2 to 4 photophores (Fig. 4); IP in 2 groups, of 3 and 4 photophores; gill rakers on first arch 12 or 13 on upper limb and 2 to 4 on lower limb, total 14 to 16 . . . . . ***Valenciennellus***

4b. AC with 2 or 3 groups of 5 or more photophores; IP in a single group of 6 (rarely 7) photophores; gill rakers on first arch 11 to 22 on upper limb and 3 to 8 on lower limb, total 15 to 30 . . . . . → ***5***

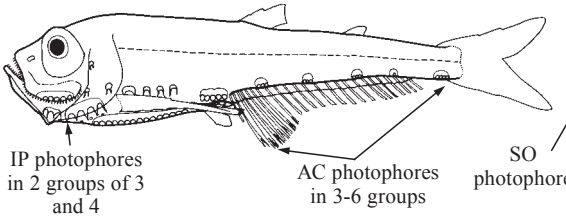


Fig. 4 ***Valenciennellus***

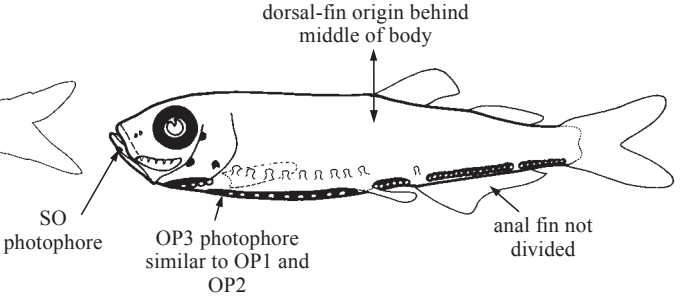


Fig. 5 ***Maurolicus***

5a. Dorsal-fin origin behind middle of body (Fig. 5); anal fin not divided by a cluster of AC photophores into 2 distinctly separate parts; SO photophore present; OP3 similar to other OP photophores, directed ventrally . . . . . ***Maurolicus***

5b. Dorsal-fin origin at or ahead of middle of body; anal fin divided by a cluster of AC photophores into 2 distinctly separate parts (Figs 6,7); SO photophore absent; OP3 greatly enlarged relative to other OP photophores, elongated dorsoventrally . . . . . → ***6***

6a. VAV and anterior AC photophores (ACA) form continuous photophore group, extending over anterior anal-fin rays (Fig. 6); anterior group of anal-fin rays 11 to 15 (rarely 10) rays; dorsal adipose fin present . . . . . ***Argyripnus***

6b. VAV separate from AC photophores, no photophores over anterior few anal-fin rays (Fig. 7); anterior group of anal-fin rays 8 to 10; dorsal adipose fin absent . . . . . ***Sonoda***

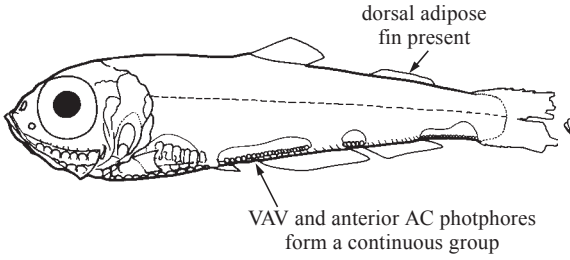


Fig. 6 ***Argyripnus***

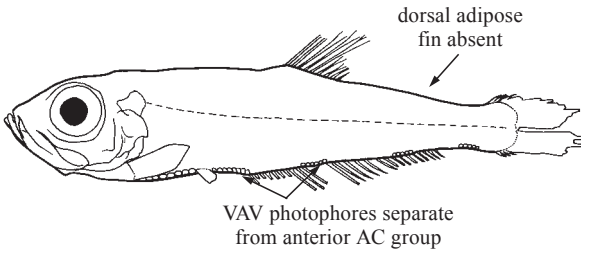


Fig. 7 ***Sonoda***

List of species occurring in the area

Argyripnus atlanticus Maul, 1952. To 7 cm. Areas W31 and E34.

Argyropelecus aculeatus Valenciennes in Cuvier and Valenciennes, 1850. To 8 cm. Circumglobal, tropical to temperate.
Argyropelecus affinis Garman, 1899. To 7 cm. Circumglobal, tropical to temperate.
Argyropelecus gigas Norman, 1930. To 12 cm. Circumglobal, tropical to temperate except N Pacific.
Argyropelecus hemigymnus Cocco, 1829. To 4 cm. Circumglobal, tropical to temperate.
Argyropelecus sladeni Regan, 1908. To 7 cm. Circumglobal, tropical to temperate.

Maurolicus weitzmani Parin and Kobyliansky, 1993. To 5 cm. Areas SW21, NW and SE31, and S34.

Polyipnus asteroides Schultz, 1938. To 8 cm. Tropical NW Atlantic, Caribbean Sea.
Polyipnus clarus Harold, 1994. To 6 cm. Tropical to temperate NW Atlantic.
Polyipnus laternatus Garman, 1899. To 4 cm. Tropical to temperate NW Atlantic.

Sonoda megalophthalma Grey, 1959. To 6 cm. W Caribbean.
Sonoda paucilampa Grey, 1960. To 7 cm. Area W31.

Sternoptyx diaphana Hermann, 1781. To 5 cm. Circumglobal, tropical to temperate.
Sternoptyx pseudobscura Baird, 1971. To 6 cm. Circumglobal, tropical to temperate.

Valenciennellus tripunctulatus (Esmark, 1871). To 8 cm. Tropical to temperate Atlantic and Pacific.

References

Badcock, J. 1984. Sternoptychidae. In Fishes of the North-eastern Atlantic and the Mediterranean, edited by P.J.P. Whitehead, M.-L. Bauchot, J.-C. Hureau, J. Nielsen, and E. Tortonese. *UNESCO*, 1:510 p.

Baird, R.C. 1971. The systematics, distribution and zoogeography of the marine hatchetfishes (family Sternoptychidae). *Bull. Mus. Comp. Zool.*, Harvard Univ., 142:1-128.

Harold, A.S. 1994. A taxonomic revision of the sternoptychid genus *Polyipnus* (Teleostei: Stomiiformes), with an analysis of phylogenetic relationships. *Bull. Mar. Sci.*, 54:428-534.

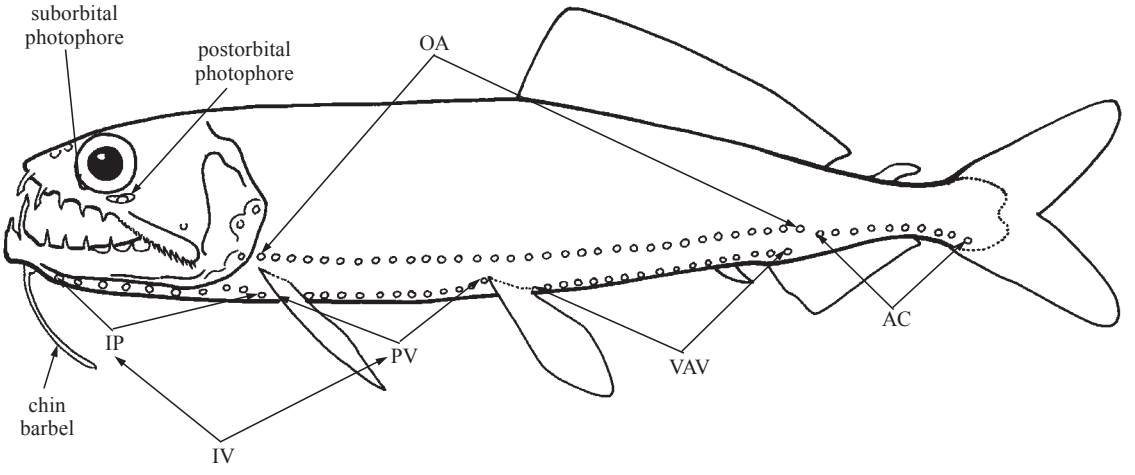
Parin, N.V. and S.G. Kobyliansky. 1993. Review of the genus *Maurolicus* (Sternoptychidae, Stomiiformes), with re-establishing validity of five species considered junior synonyms of *M. muelleri* and descriptions of nine new species. *Trudy Instituta Okeanologii,* 128:69-107.

ASTRONESTHIDAE

Snaggletooths (stareaters)

by A.S. Harold, Grice Marine Biological Laboratory, South Carolina, USA

Diagnostic characters: Maximum size to about 22 cm, but rare at lengths greater than 15 cm. Body fusiform and slightly compressed. Head moderately large, about 25% of standard length. Eye small, less than 1/4 of head length. Snout short to moderate, its length at most twice eye diameter. Mouth large with a small number of teeth ranging in size from small to large and fang-like. Vomerine and palatine teeth present. **Chin barbel present**; terminal bulb present or absent. Branchiostegal rays 14 to 25. Gill rakers rudimentary in adults. **Dorsal fin usually near middle of body, its origin about over pelvic fins**. Anal fin terminating posteriorly on constricted portion of caudal peduncle. Dorsal fin with 9 to 21 soft rays; anal fin with 12 to 28 soft rays; caudal fin forked; pectoral fin with 6 to 9 soft rays; pelvic fin with 5 to 9 soft rays. **Dorsal adipose fin present (except in *Rhadinesthes*)**. Scales absent, no hexagonal areas on body. Two ventrolateral rows of photophores on body; OA 11 to 56; IV 9 to 46; VAV 7 to 28; AC 6 to 18; **anterior portion of lower row (PV) curving upward at pelvic-fin base and appearing disjunct from posterior portion of row (VAV)**; row of photophores on isthmus (IP); many small photophores covering much of body and head, their greatest concentration ventrally; suborbital photophore small, inconspicuous, located at anteroventral margin of eye; **postorbital photophore prominent, located posteroventrally to eye**. Three pectoral-fin radials. Stomach usually large and black, intestine originating near its anterior end; 1 or 2 pyloric caecae present. **Colour:** skin usually black, silvery pigmentation occasionally present on flank; **patches of luminous tissue on body in many species.**



AC	-	ventral series posterior to anal-fin origin
IP	-	ventral series anterior to pectoral-fin base
IV	-	ventral series anterior to pelvic-fin base
OA	-	lateral series
PV	-	ventral series between bases of pectoral and pelvic fins
VAV	-	ventral series between pelvic-fin base and origin of anal fin

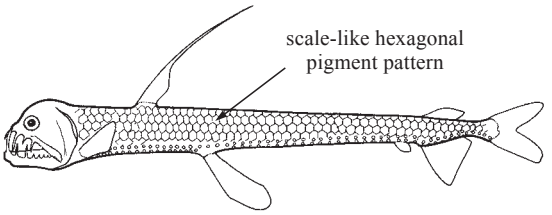
abbreviated terminology of photophores

Habitat, biology, and fisheries: Mainly mesopelagic adults (some species benthopelagic), juveniles have been caught at the surface at night. Diet consists of other mesopelagic fishes and crustaceans.

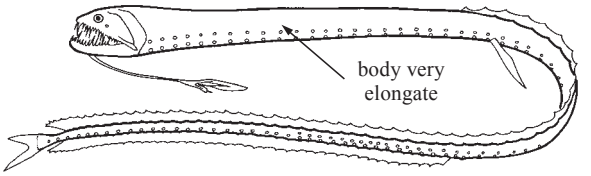
Similar families occurring in the area

Chauliodontidae: chin barbel reduced or absent in adults; dorsal fin well anterior, its origin about 1 head length behind pectoral girdle; scale-like hexagonal pigment pattern on body.

Idiacanthidae: body highly elongate, eel-like; dorsal fin with very long base (54 to 74 rays).



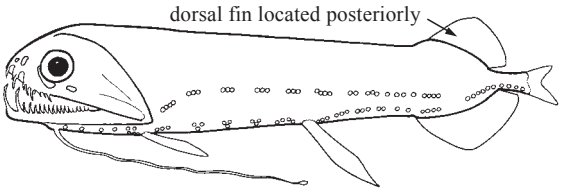
Chauliodontidae



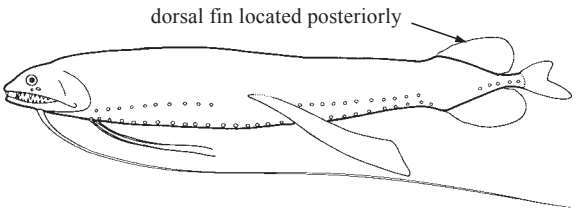
Idiacanthidae

Malacosteidae: no membrane in floor of mouth; dorsal fin located posteriorly, just ahead of caudal fin and above anal fin.

Melanostomiidae: dorsal fin located posteriorly, just ahead of caudal fin and above anal fin.



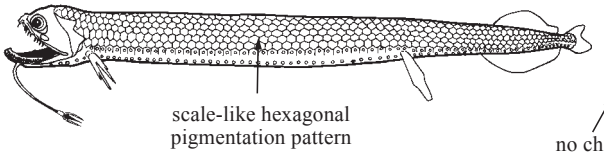
Malacosteidae



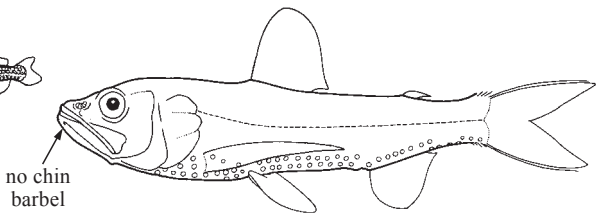
Melanostomiidae

Stomiidae: scale-like hexagonal pigment pattern on body; dorsal fin located posteriorly, just ahead of caudal fin and above anal fin.

Gonostomatidae, Phosichthyidae, and Sternoptychidae: gill rakers as adults, lacks both a chin barbel and greatly enlarged, fang-like jaw teeth.



Stomiidae



Phosichthyidae

Key to the genera and species of Astronesthidae occurring in the area (adapted from Gibbs, 1964, 1984)

1a. Anal-fin soft rays 22 to 27; snout appearing upturned at tip; gill bars with closely-spaced needle-like spines anteriorly along their length (Fig. 1) . . . . . ***Neonesthes***

1b. Anal-fin soft rays 20 or fewer; snout not appearing upturned at tip; gill bars with separated groups of short spines anteriorly along their length (Fig. 2) . . . . . → ***2***

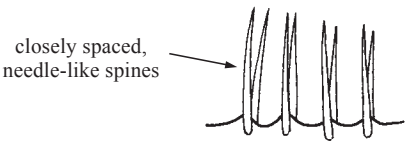


Fig. 1 gill bars (*Neonesthes*)

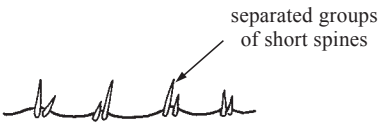


Fig. 2 gill bars

2a. Ventral series of photophores arranged in irregular groups of 1 to 5; PV photophores more than 32; OV more than 33 . . . . . ***Heterophotus ophistoma***

2b. Ventral series of photophores arranged in regular, continuous rows; PV photophores 26 or fewer . . . . . ***→ 3***

3a. Teeth on maxilla (posterior portion of upper jaw) comb-like, closely spaced, slanting backward (Fig. 3) . . . . . ***Astronesthes***

3b. Teeth on maxilla slender, distinctly separated, not slanting backward . . . . . ***→ 4***

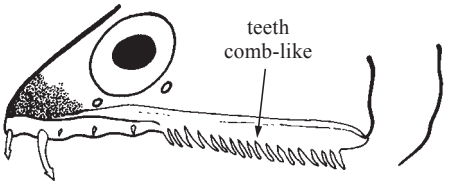


Fig. 3 teeth on maxilla (*Astronesthes*)

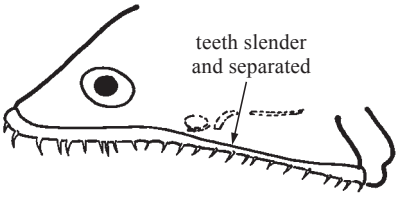


Fig. 4 teeth on maxilla (*Rhadinesthes decimus*)

4a. Greatest body depth less than 10% standard length; teeth in jaws all short and slender, no large fang-like teeth (Fig. 4); dorsal adipose fin absent . . . . . ***Rhadinesthes decimus***

4b. Greatest body depth almost always greater than 10% standard length; long, fang-like teeth in anterior portion of upper and lower jaws; dorsal adipose fin present . . . . . ***Borostomias***

List of species occurring in the area

Astronesthes atlanticus Parin and Borodulina, 1996. To 16 cm. Tropical and subtropical Atlantic.
Astronesthes cyclophotus Regan and Trewavas, 1929. To 3 cm. Subtropical to temperate N Atlantic.
Astronesthes gemmifer Goode and Bean, 1896. To 16 cm. N Atlantic.
Astronesthes leucopogon Regan and Trewavas, 1929. To 5 cm. Temperate N Atlantic.
Astronesthes longiceps Regan and Trewavas, 1929. To 3 cm. Central N Atlantic.
Astronesthes macropogon Goodyear and Gibbs, 1970. To 16 cm. Areas 31, 34, N41, N47.
Astronesthes micropogon Goodyear and Gibbs, 1970. To 8 cm. Tropical and subtropical Atlantic.
Astronesthes neopogon Regan and Trewavas, 1929. To 17 cm. Temperate N Atlantic.
Astronesthes nigra Richardson, 1845. To 6 cm. Tropical to temperate Atlantic.
Astronesthes richardsoni (Poey, 1852). To 15 cm. Tropical to subtropical N Atlantic.
Astronesthes similus Parr, 1927. To 15 cm. Area W31.
Astronesthes zharovi Parin and Borodulina, 1998. To 11 cm. Tropical Atlantic.

Borostomias elucens (Brauer, 1906) To 19 cm. Circumglobal, tropical.
Borostomias mononema (Regan and Trewavas, 1929). To 26 cm. Subtropical to temperate N Atlantic, W Indian.

Heterophotus ophistoma Regan and Trewavas, 1929. To 30 cm. Tropical to subtropical N Atlantic.

Neonesthes capensis (Gilchrist and von Bonde, 1924). To 15 cm. Tropical to temperate Atlantic.

Rhadinesthes decimus (Zugmayer, 1911). To 32 cm. Temperate N Atlantic.

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Parin, N.V. and O.D. Borodulina. 1996. Revision of the *Astronesthes indicus* species group (Astronesthidae), with descriptions of five new species. *J. Ichthyol*., 36:551-565. (Originally published in Russian in *Voprosy Ikhtiologii,* 36:581-596, 1996).

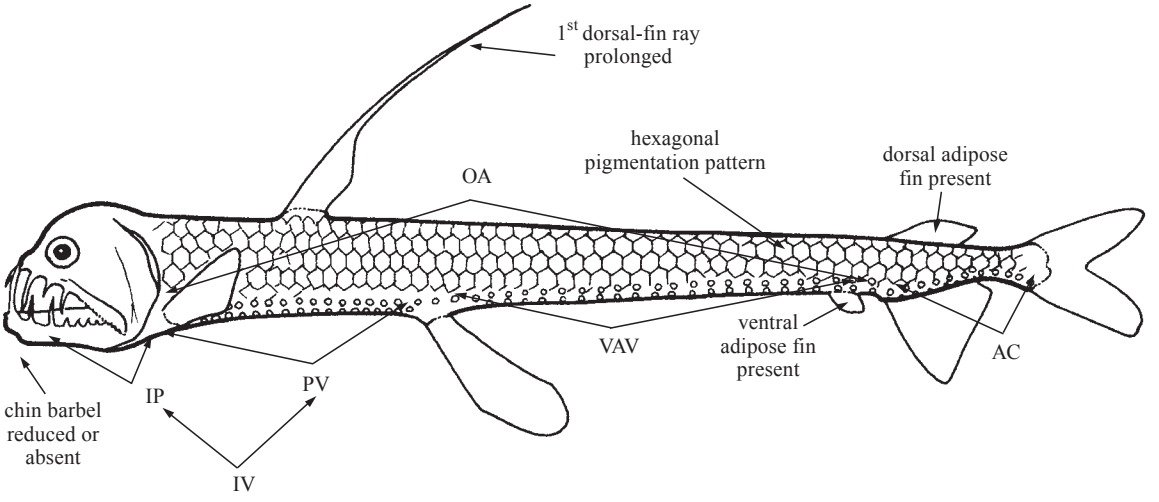
Harold, A.S. and S.H. Weitzman. 1996. Interrelationships of Stomiiform Fishes. In *The Interrelationships of Fishes*, edited by M.L.J. Stiassny, L.R. Parenti and G.D. Johnson. London, Academic Press, pp. 333-353.

CHAULIODONTIDAE

Viperfishes

by A.S. Harold, Grice Marine Biological Laboratory, South Carolina, USA

Diagnostic characters: Maximum size about 30 cm standard length. **Body long, slender, covered by a gelatinous membrane** (usually lost during capture) with luminous inclusions, **maximum depth of body at back of head**. Head short and about as deep as long. Eye diameter about 4 times into head length. Snout short, its length less than eye diameter. Mouth large with numerous very large teeth on premaxilla and dentary, some greatly elongated, fang-like, and extending over front of head to above eye when mouth is closed; posterior half of maxilla with numerous minute teeth. Vomerine teeth absent. Palatine teeth present. **Chin barbel short and simple, becoming reduced or absent during development**. Branchiostegal rays 12 to 21. Gill rakers represented by tooth plates only. **Dorsal fin near head, its origin about half way between that of pectoral and pelvic fins. First dorsal-fin ray prolonged**. Anal fin located posteriorly, near caudal fin. Dorsal fin with 5 to 7 soft rays; anal fin with 10 to 13 soft rays; caudal fin forked; pectoral-fin soft rays 9 to 14; pelvic fin with 6 to 8 soft rays. **Dorsal and ventral adipose fins present. Five longitudinal rows of scales covering body, delineated by a hexagonal pigmentation pattern**. Two ventrolateral rows of photophores on body; OA 39 to 50; IV 25 to 34; VAV 22 to 30; AC 8 to 13; paired row of photophores on isthmus (IP); 1 or more small photophores associated with each hexagonal area on body; suborbital and postorbital photophores present. Premaxillae not protractile; epioccipitals well developed and lateral to supraoccipital; parietals minute. Anterior vertebrae unossified. Three pectoral-fin radials. **Colour:** iridescent silver-grey to silver-blue in some species; body scale rows delineated by a hexagonal pigmentation pattern.



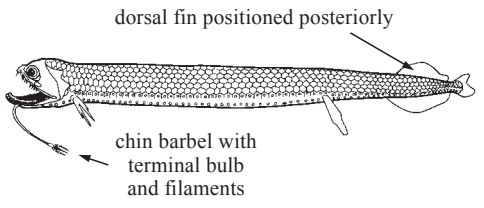
AC - ventral series posterior to anal-fin origin
IP - ventral series anterior to pectoral-fin base
IV - ventral series anterior to pelvic-fin base
OA - lateral series
PV - ventral series between baases of pectoral and pelvic fins
VAV - ventral series between pelcic-fin base and origin of anal fin

Habitat, biology, and fisheries: Meso- to bathypelagic, to 2 800 m maximum, in open ocean; juveniles undergo vertical migration to near surface at night. Diet consists of other fishes and crustaceans.

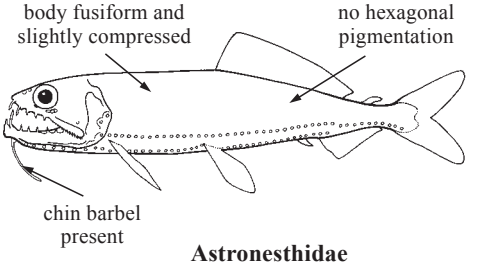
Similar families occurring in the area

Stomiidae: only other stomiiform family with hexagonal pigmentation pattern; body more elongate and slender; chin barbel present, with terminal bulb and filaments; dorsal fin located posteriorly, just ahead of caudal fin; dorsal adipose fin absent.

Astronesthidae: body fusiform and slightly compressed; chin barbel present, terminal bulb present or absent; dorsal-fin near middle of body, origin well ahead of that of anal fin; no hexagonal pigment areas on body; anterior portion of ventral photophore row (PV) curving upward at pelvic-fin base.



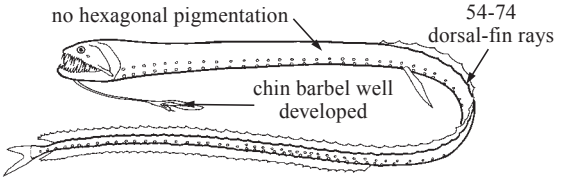
Stomiidae



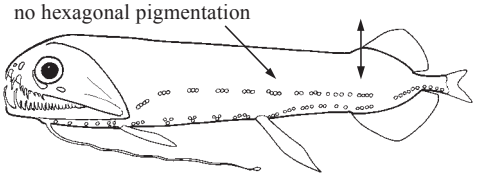
Astronesthidae

Idiacanthidae: body highly elongate, eel-like; hexagonal pigmentation pattern not present on body; chin barbel well-developed in females; dorsal fin with very long base (54 to 74 soft rays), its origin well anterior to midbody; bases of dorsal- and anal-fin rays with a small sharp spur; dorsal and ventral adipose fins absent; pectoral fins present in larvae, absent in adults; pelvic fins absent in males.

Malacosteidae: hexagonal pigmentation pattern not present on body; no membrane in floor of mouth; chin barbel present or absent; presence of a preorbital light organ associated with suborbital organ (absent in *Photostomias*); dorsal fin located posteriorly, just ahead of caudal fin; dorsal adipose fin absent; pectoral fins absent or consisting of only free, filament-like rays.



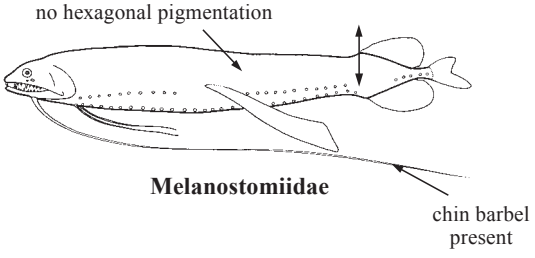
Idiacanthidae



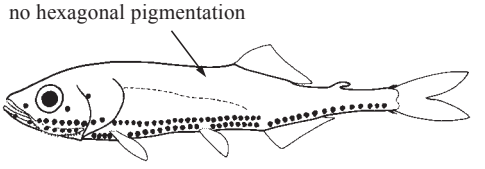
Malacosteidae

Melanostomiidae: hexagonal pigmentation pattern not present on body; maxillae with erect teeth anteriorly and small, oblique denticles posteriorly; chin barbel present, variable in length; pectoral fins present or absent.

Gonostomatidae, Phosichthyidae, and Sternoptychidae: these remaining stomiiform families often with somewhat similar body form and photophore arrangement, but have gill rakers as adults and lack the hexagonal pigmentation pattern, chin barbel, and enlarged, fang-like jaw teeth.

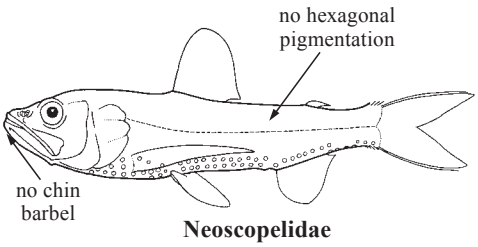


Melanostomiidae



Phosichthyidae

Myctophidae and Neoscopelidae: myctophiform families with photophores but with a less elongate body, lack a chin barbel at all stages, have gill rakers as adults, and the maxilla is completely excluded from the gape by the premaxilla; ventral photophores are usually more widely spaced and not arranged in such regular rows as in the Chauliodontidae.



Neoscopelidae

List of species occurring in the area

Chauliodus danae Regan and Trewavas, 1929. To 15 cm. Tropical to temperate Atlantic.
Chauliodus sloani Bloch and Schneider,1801. To 28 cm. Worldwide, tropical to temperate.

References

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Morrow, J. E., Jr. 1964. Family Chauliodontidae. In Fishes of the Western North Atlantic, edited by H. B. Bigelow, D.M. Cohen, M.M. Dick, R.H. Gibbs, Jr., M. Grey, J.E. Morrow, Jr., L.P. Schultz, and V. Walters. *Mem. Sears Found. Mar. Res*., 1(4):274-289.

Regan, C.T. and E. Trewavas. 1929. The fishes of the families Astronesthidae and Chauliodontidae. *Danish Dana Expedition in the North Atlantic and Gulf of Panama*, 1920-22, 5:1-39, 7 pls.

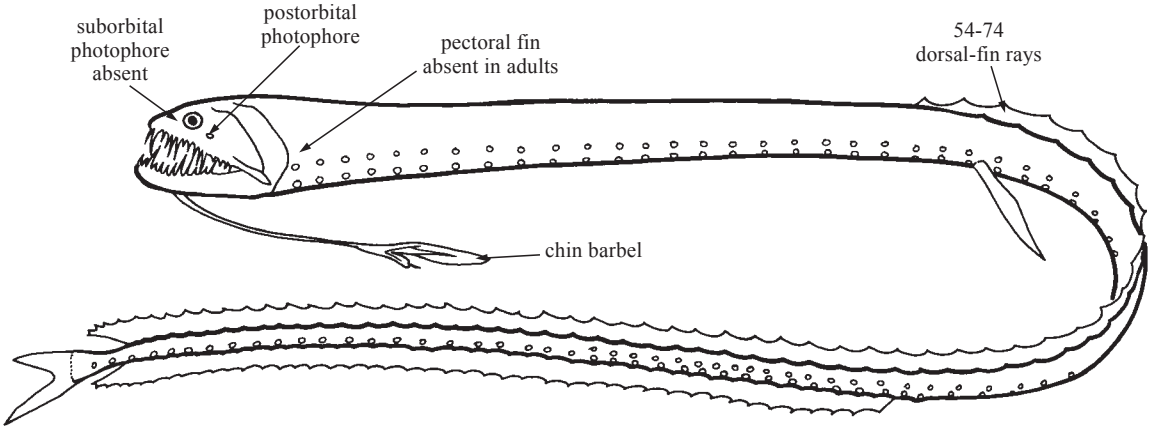
Harold, A.S. and S.H. Weitzman. 1996. Interrelationships of Stomiiform Fishes. In *The Interrelationships of Fishes*, edited by M.L.J. Stiassny, L.R. Parenti, and G.D. Johnson. London, Academic Press, pp. 333-353.

IDIACANTHIDAE

Black dragonfishes (sawtailfishes)

by A.S. Harold, Grice Marine Biological Laboratory, South Carolina, USA

Diagnostic characters: Maximum size about 48 cm standard length for females, 7 cm for males. **Body markedly elongate, eel-like, slightly compressed**. Head small. Snout equal to or less than orbit diameter. Jaw teeth absent in males. Mouth large in adult females, with numerous barbed, hinged, fang-like teeth, variable in size; few teeth present on vomer and palatine. **Chin barbel length about twice head length in females, absent in males. Gill arches without rakers or teeth. Dorsal fin with very long base, its origin well anterior to midbody**. Anal-fin base length about half the length of dorsal fin, its origin below middle dorsal-fin rays. Dorsal and anal fins terminating posteriorly on constricted portion of caudal peduncle. **Base of each dorsal- and anal-fin ray with a small, sharp spur**. Dorsal fin with 54 to 74 rays; anal fin with 29 to 49 rays; caudal fin forked; **pectoral fins present in larvae, absent in adults; pelvic fins with 6 rays in females, absent in males**. Dorsal adipose fin absent. Scales absent. Two main rows of photophores on body ventrolaterally (see family Astronesthidae family figure for definition of abbreviated terms); OA 52 to 61; IV 31 to 36; VAV 15 to 18; AC 13 to 18; paired row of photophores on isthmus (IP); small light organs scattered over head and body in patterns on each body segment; suborbital photophore absent; **postorbital photophore prominent, located posteroventrally, equal in size to eye in males, smaller in females**. Premaxillae not protractile. Gas bladder absent. **Colour:** skin usually black in females, males dark brown; hexagonal pigment areas lacking.

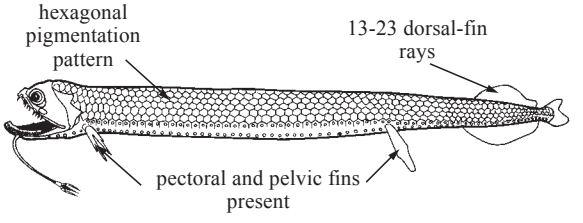


female

Habitat, biology, and fisheries: Meso- to bathypelagic, recorded to 2 000 m. Diet consists mainly of fishes. Markedly sexually dimorphic; males reaching about 15% of female body size, retaining some larval features; anterior anal-fin rays modified as intromittent organ. Eyes on the ends of long stalks in larvae.

Similar families occurring in the area

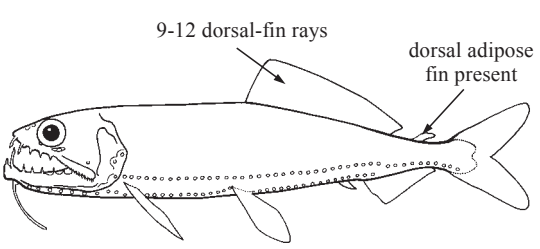
Stomiidae: hexagonal pigment pattern on body; dorsal fin short-based, located posteriorly, just ahead of caudal fin.



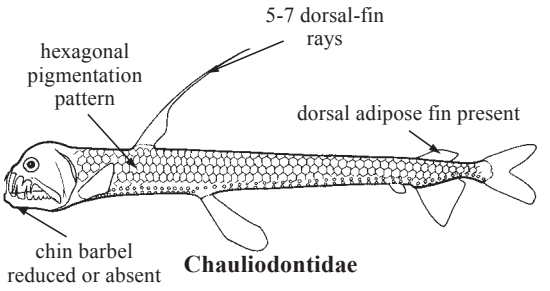
Stomiidae

Astronesthidae: dorsal-fin short-based, near middle of body (9 to 21 rays); dorsal adipose fin present; anterior portion of ventral photophore row (PV) curving upward at pelvic-fin base.

Chauliodontidae: chin barbel reduced or absent in adults; dorsal fin short-based (5 to 7 rays), located between pectoral and pelvic fins; dorsal adipose fin present; scale-like hexagonal pigment pattern on body.



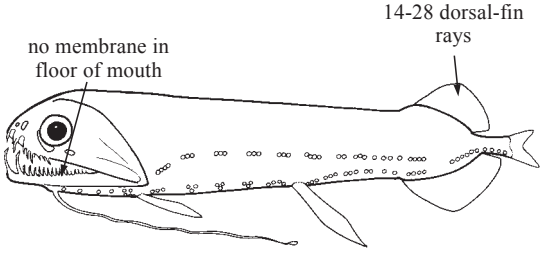
Astronesthidae



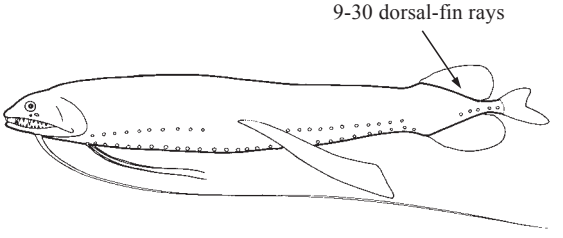
Chauliodontidae

Malacosteidae: no membrane in floor of mouth; dorsal fin short-based (14 to 28 rays), located posteriorly, over anal fin.

Melanostomiidae: dorsal fin short-based, located posteriorly, just ahead of caudal fin and above anal fin.



Malacosteidae



Melanostomiidae

List of species occurring in the area

Idiacanthus fasciola Peters, 1877. Females to 48 cm, males to 7 cm. N Atlantic, E Indian, tropical W Pacific.

References

Gibbs, R. H., Jr. 1964. Family Idiacanthidae. In Fishes of the Western North Atlantic, edited by H. B. Bigelow, D.M. Cohen, M.M. Dick, R.H. Gibbs, Jr., M. Grey, J.E. Morrow, Jr., L.P. Schultz, and V. Walters. *Mem. Sears Found. Mar. Res*. 1(4):512-522.

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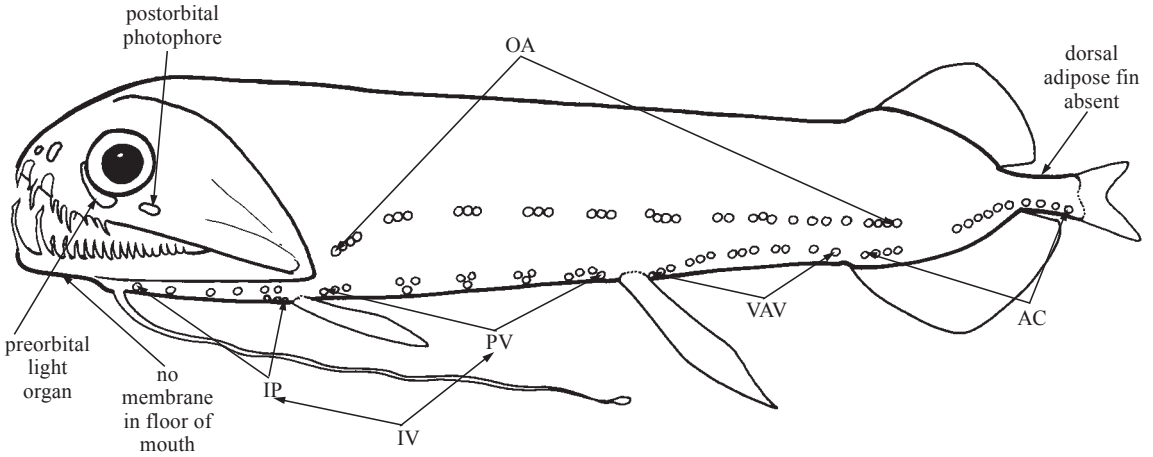
Harold, A.S. and S.H. Weitzman. 1996. Interrelationships of Stomiiform Fishes. In *The Interrelationships of Fishes*, edited by Stiassny, M.L.J., L.R. Parenti and G.D. Johnson. London, Academic Press, pp. 333-353.

MALACOSTEIDAE

Loosejaws

by A.S. Harold, Grice Marine Biological Laboratory, South Carolina, USA

Diagnostic characters: Maximum size about 24 cm standard length. Body elongate, compressed. Head and eye large relative to body. Snout usually quite short (elongate in *Aristostomias*). **Mouth large, jaws longer than skull, about 15 to 30% standard length; membranes forming floor of mouth absent**. Jaw teeth variable in size, some very large and barbed. Vomerine teeth absent. Palatine with or without teeth. **Chin barbel present or absent**. Branchiostegal rays 9 to 15. Gill arches without well-developed rakers. **Dorsal fin located well posteriorly, directly above anal fin**. Dorsal fin with 14 to 28 soft rays; anal fin with 17 to 32 soft rays; caudal fin small, forked; **pectoral fins absent or consisting of 2 to 17 rays**; pelvic fins at about midbody, with 5 to 9 rays. **Dorsal and ventral adipose fins absent**. Scales absent, no hexagonal areas on body. Two ventrolateral rows of photophores on body; OA 7 to 39; IC 12 to 22; paired row of photophores on isthmus (IP); many small light organs covering much of body and head; preorbital light organ present or absent; suborbital photophore present, varying in size from minute to very large, or absent; **postorbital photophore prominent, located posteroventrally to eye**. Premaxillae not protractile. First few vertebrae unossified. Stomach distensible, pigmented. Pyloric caecae present or absent. **Colour:** skin black to dark brown.



AC - ventral series posterior to anal-fin origin
IP - ventral series anterior to pectroal-fin base
IV - ventral series anterior to pelvic-fin base
OA - lateral series
PV - ventral series between bases of pectoral and pelvic fins
VAV - ventral series between pelvic-fin base and anal-fin origin

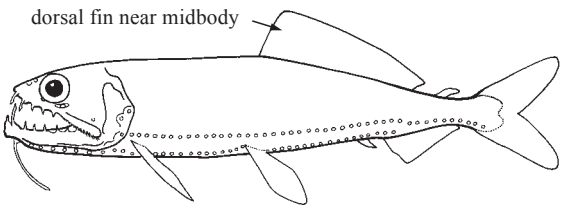
abbreviated terminology of photophores

Habitat, biology, and fisheries: Meso- to bathypelagic adults, at depths to 4 000 m. Diet consists of fishes and crustaceans. Floor of lower jaw lacks membranes, which allows the jaws to swing widely while feeding, hence the common name “loosejaws.”

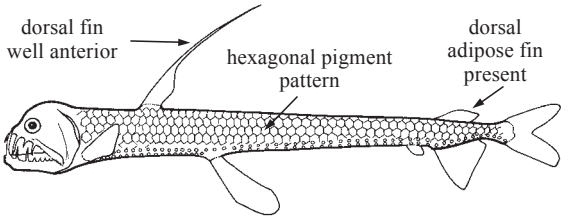
Similar families occurring in the area

Astronesthidae: membrane present in floor of mouth; dorsal fin near middle of body; dorsal adipose fin usually present; anterior portion of ventral photophore row (PV) curving upward at pelvic-fin base.

Chauliodontidae: body elongate, maximum depth at back of head; chin barbel reduced or absent in adults; dorsal fin well anterior, between pectoral and pelvic fins; scale-like, hexagonal pigment pattern on body.



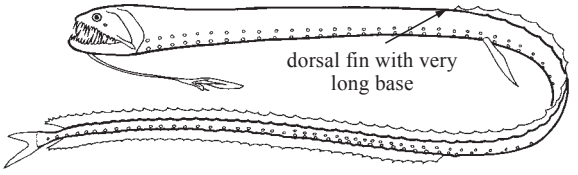
Astronesthidae



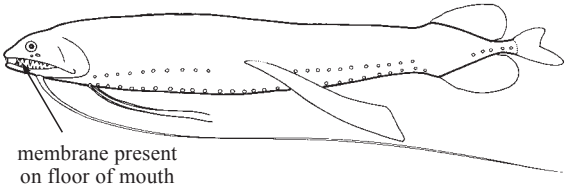
Chauliodontidae

Idiacanthidae: body highly elongate, eel-like; dorsal fin with very long base, its origin well anterior to midbody.

Melanostomiidae: membrane forming floor of mouth present; maxillae with erect teeth anteriorly and small, oblique denticles posteriorly.



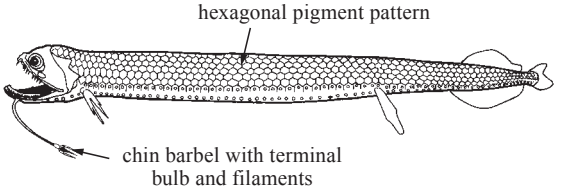
Idiacanthidae



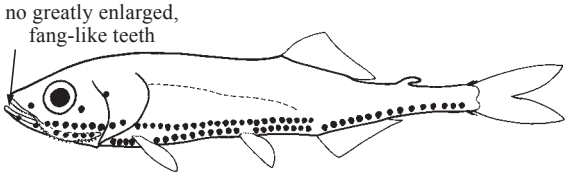
Melanostomiidae

Stomiidae: chin barbel with terminal bulb and filaments; scale-like hexagonal pigment pattern on body.

Gonostomatidae, Phosichthyidae, and Sternoptychidae: have gill rakers as adults, lack a chin barbel and lack greatly enlarged, fang-like jaw teeth.



Stomiidae



Phosichthyidae

Key to the genera of Malacosteidae occurring in the area

(Modifed after Gibbs, 1984 and Goodyear and Gibbs, 1986)

1a. Pectoral fins present; suborbital photophore well-developed and crescentic . . . . . → *2*

1b. Pectoral fins absent; suborbital photophore small and elliptical in males, absent in females (Fig. 1) . ***Photostomias***

2a. Chin barbel present (Fig. 2); snout longer than eye; pale luminous patches present on head, especially around eye; 2 pairs of nostrils on each side of snout . . . . . ***Aristostomias***

2b. Chin barbel absent (Fig. 3); snout shorter than eye; no pale luminous patches on head; a single nostril on each side of snout . . . . . ***Malacosteus***

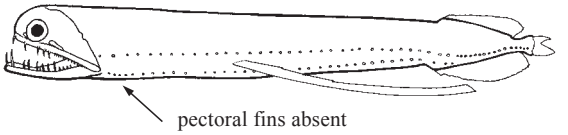


Fig. 1 ***Photostomias***

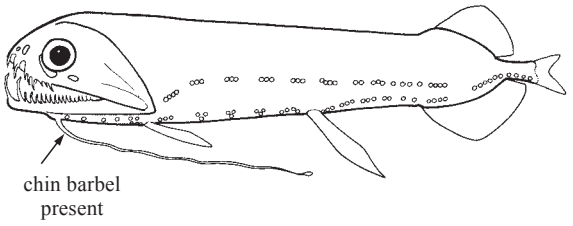


Fig. 2 ***Aristostomias***

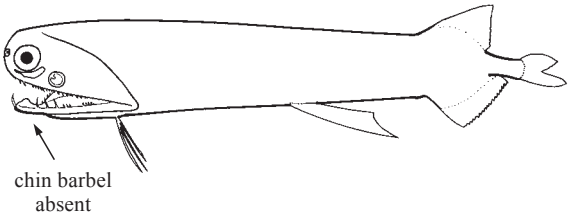


Fig. 3 ***Malacosteus***

List of species occurring in the area

Aristostomias grimaldii Zugmayer, 1913. To 12 cm. Tropical to temperate NW Atlantic.
Aristostomias lunifer Regan and Trewavas, 1930. To 14 cm. Tropical to subtropical NW Atlantic.
Aristostomias tittmanni Welsh, 1923. To 9 cm. Tropical to temperate N Atlantic.
Aristostomias xenostoma Regan and Trewavas, 1930. To 12 cm. Areas W31, SE34, S77.

Malacosteus niger Ayres, 1848. To 22 cm. Circumglobal, tropical to subarctic.

Photostomias guernei Collett, 1889. To 16 cm. Tropical to subarctic.
Photostomias mirabilis (Beebe, 1933). To 4 cm. N Atlantic, off Bermuda.

References

Gibbs, R.H., Jr. 1984. Malacosteidae. In *Fishes of the North-eastern Atlantic and the Mediterranean*, edited by P.J.P. Whitehead, M.-L. Bauchot, J.-C. Hureau, J. Nielsen, and E. Tortonese. UNESCO, Vol 1:510 p.

Goodyear, R.H. and R.H. Gibbs, Jr. 1986. Family No. 71: Malacosteidae. In *Smiths' Sea Fishes*, edited by M.M. Smith and P.C. Heemstra. Johannesburg, Macmillan, South Africa, pp. 235-236.

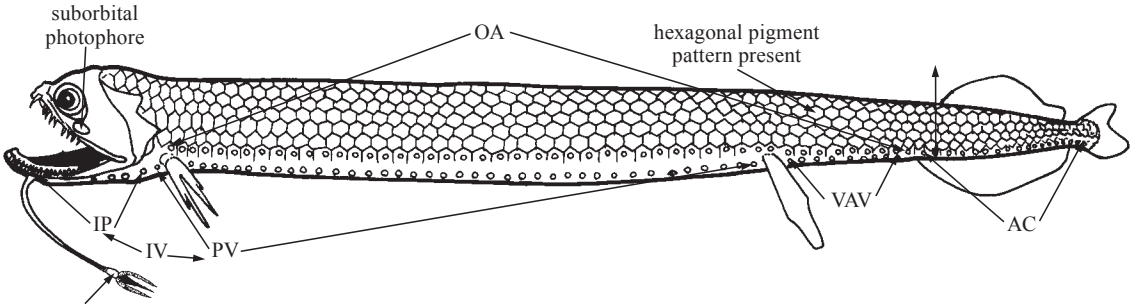
Harold, A.S. and S.H. Weitzman. 1996. Interrelationships of Stomiiform Fishes. In *The Interrelationships of Fishes*, edited by M.L.J. Stiassny, L.R. Parenti and G.D. Johnson. London, Academic Press, pp. 333-353.

STOMIIDAE

Scaly dragonfishes

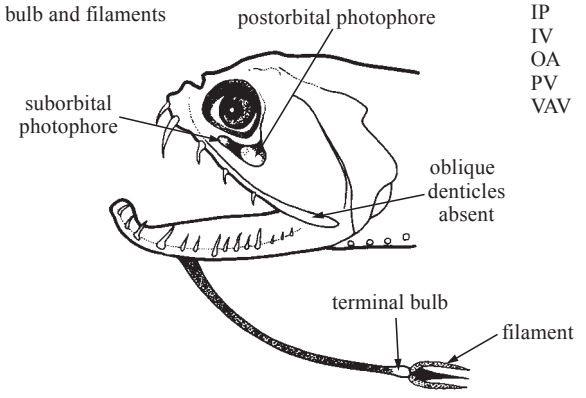
by A.S. Harold, Grice Marine Biological Laboratory, South Carolina, USA

Diagnostic characters: Maximum size about 41 cm. Body long and slender, covered by gelatinous layer enclosed by membrane. Head small. Mouth large relative to head, with teeth ranging in size from small to moderately large and fang-like. Lower jaw curved upward slightly. Chin barbel prominent, terminal bulb with filaments present. Branchiostegals 16 to 18. No true gill rakers in adults. **Dorsal fin located just anterior to caudal fin, directly above anal fin**. Dorsal fin with 13 to 23 rays; anal fin with 15 to 25 rays; caudal fin forked or rounded; pectoral fins with 6 to 9 rays; pelvic fins with 4 or 5 rays. Dorsal adipose fin absent. **Body covered with scale-like hexagonal pigment pattern**. Two ventrolateral rows of photophores on body; OA 36 to 67 or 137 to 153; IV 41 to 64 or 89 to 99; VAV 5 to 16 or 58 to 67; AC 14 to 22; paired row of photophores on isthmus (IP); 1 or more small photophores associated with hexagonal scale-like areas; suborbital photophore small, inconspicuous, located at anteroventral margin of eye; postorbital photophore prominent, located posteroventrally to eye. **Colour:** iridescent silver, bronze, or dark green.



AC	-	ventral series posterior to anal-fin origin
IP	-	ventral series anterior to pectoral-fin base
IV	-	ventral series anterior to pelvic-fin base
OA	-	lateral series
PV	-	ventral series between bases of pectoral and pelvic fins
VAV	-	ventral series between pelvic-fin base and anal-fin base

abbreviated terminology of photophores



lateral view of head

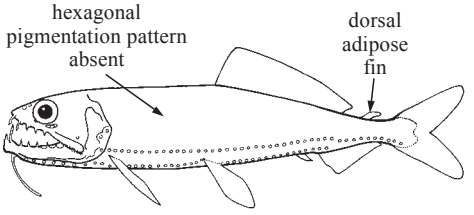
Habitat, biology, and fisheries: Mainly mesopelagic (to 1 000 m) as adults, with some species bathypelagic, to 2 000 m. Migration to near surface at night in some species. Diet consists of other midwater fishes.

Remarks: *Stomias longibarbatus* was previously placed in a separate genus, *Macrostomias*, due mainly to the relatively high photophore counts in this species. Fink and Fink (1986) analyzed the species in the family phylogenetically and found there to be no grounds for the continued placement of *S. longibarbatus* in a separate genus.

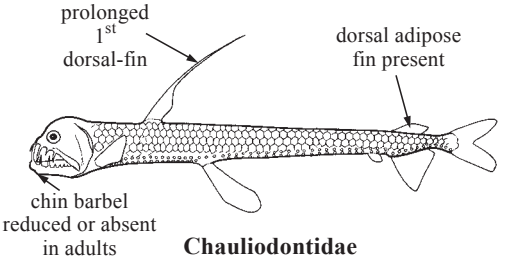
Similar families occurring in the area

Astronesthidae: dorsal fin near middle of body, origin well ahead of that of anal fin; no hexagonal pigment areas on body.

Chauliodontidae: only other stomiiform family with scale-like hexagonal pigment pattern; dorsal fin well anterior, near head with first ray prolonged.



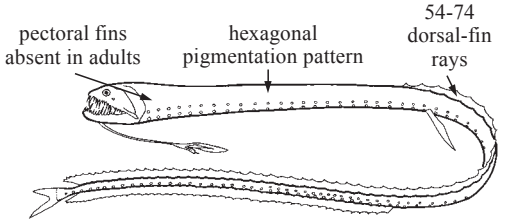
Astronesthidae



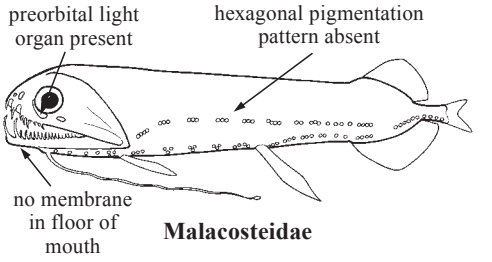
Chauliodontidae

Idiacanthidae: body highly elongate, eel-like; dorsal fin very long (54 to 74 rays), its origin well anterior to midbody; scale-like hexagonal pigment pattern absent.

Malacosteidae: no membrane in floor of mouth; preorbital photophore usually present (absent in *Photostomias*).



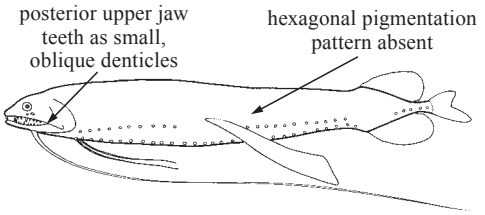
Idiacanthidae



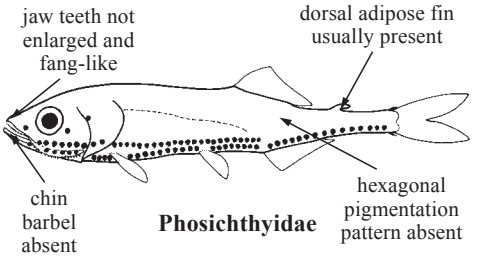
Malacosteidae

Melanostomiidae: maxillae with erect teeth anteriorly and smaller, oblique teeth posteriorly; pectoral fins present or absent; hexagonal pigment pattern absent.

Gonostomatidae, Phosichthyidae, and Sternoptychidae: these remaining stomiiform families often with somewhat similar body form and photophore arrangement, but have dorsal fin at midbody, gill rakers as adults and lack the hexagonal pigmentation pattern, chin barbels, and enlarged, fang-like jaw teeth.

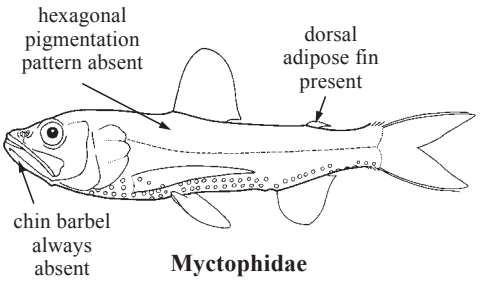


Melanostomiidae



Phosichthyidae

Myctophidae and Neoscopelidae: myctophiform families with photophores but with less elongate bodies, no chin barbels, and maxilla toothless and completely excluded from gape by premaxilla. Ventral photophores usually more widely spaced and not arranged in such regular rows as in Stomiidae.



Myctophidae

List of species occurring in the area

Stomias affinis Günther, 1887. To 20 cm. Circumglobal, trop to warm temperate.
Stomias boa ferox Reinhardt, 1842. To 29 cm. Areas S21, S27, 31, 34.
Stomias brevibarbatus Ege, 1918. To 15 cm. Subtropical to temperate N Atlantic.
Stomias longibarbatus (Brauer, 1902). To 43 cm. Subtropical N Atlantic, equatorial Indian Ocean.

References

Gibbs, R.H., Jr. 1969. Taxonomy, sexual dimorphism, vertical distribution, and evolutionary zoogeography of the bathypelagic fish genus *Stomias* (Stomiatidae). *Smithsonian Contrib. Zool*., 31:1-25.

Gibbs, R. H., Jr. 1986. Family No. 67: Stomiidae. In *Smiths' Sea Fishes*, edited by M.M. Smith and P.C. Heemstra. South Africa, Johannesburg, MacMillan, pp 229-230.

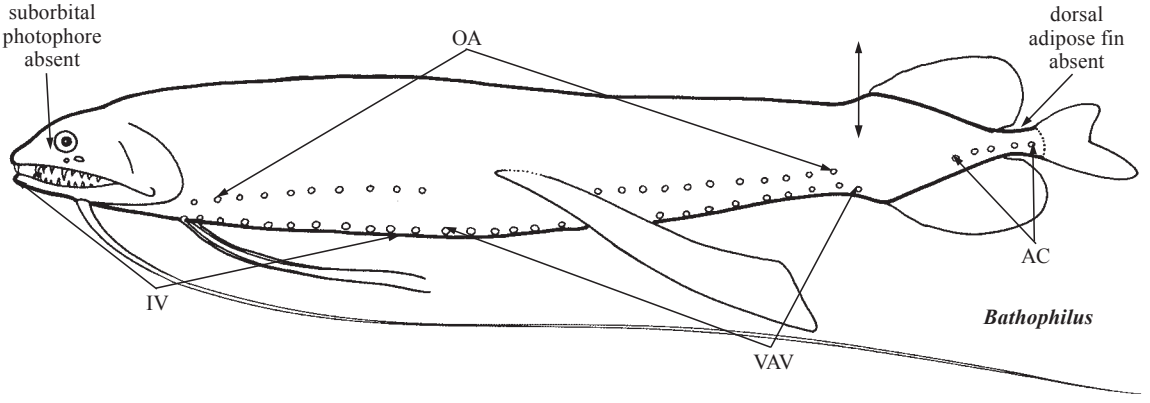
Morrow, J. E., Jr. 1964. Family Stomiatidae. In Fishes of the Western North Atlantic edited by H.B. Bigelow, D.M. Cohen, M.M. Dick, R.H. Gibbs, Jr., M. Grey, J.E. Morrow, Jr., L.P. Schultz, and V. Walters. *Mem. Sears Found. Mar. Res*., 1(4):290-310.

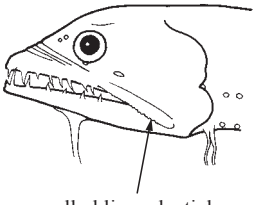
MELANOSTOMIIDAE

Scaleless dragonfishes (scaleless black dragonfishes)

by A.S. Harold, Grice Marine Biological Laboratory, South Carolina, USA

Diagnostic characters: Maximum size about 50 cm standard length. Body elongate, slender, slightly compressed (except *Bathophilus* in which the body is short and highly compressed). Head relatively small. Jaws large, about equal to length of head; membrane forming floor of mouth present. **Small, oblique denticles posteriorly on maxilla**. Vomerine and palatine teeth present or absent. **Chin barbel present; ranging widely in length, with or without branches or terminal elaborations**. Branchiostegal rays 8 to 22. No true gill rakers, arches with series of tooth plates only. **Dorsal fin located well posteriorly, directly above anal fin**. Dorsal fin with 9 to 30 soft rays; anal fin with 9 to 46 soft rays; caudal fin small and forked; pectoral fins present or absent, 0 to 47 soft rays; pelvic fins present, usually with 7 soft rays, range 4 to 26. **Dorsal adipose fin absent (except in *Chirostomias*)**. Scales absent, no hexagonal areas on body. Two ventrolateral rows of prominent photophores on body, (reduced in some *Bathophilus*); OA 18 to 72; IV 16 to 62; VAV 11 to 24; AC 5 to 25; paired row of photophores on isthmus (IP); many small photophores covering much of body and head, often occurring in vertical rows associated with segments of body musculature; preorbital photophore absent, except *Pachystomias*; **suborbital photophore absent; postorbital photophore usually present, located posteroventrally to eye, sometimes reduced or absent in females**. Anterior vertebrae at least slightly modified, allowing greater movement of head; highly reduced in some genera. Stomach long, moderately distensible, usually pigmented; typically 2 pyloric caecae present. **Colour:** skin usually black, sometimes iridescent silver, bronze, or green.





small oblique denticles on posterior portion of maxilla

AC - ventral series posterior to anal-fin origin
IV - ventral series anterior to pelvic-fin base
OA - lateral series
VAV - ventral series between pelvic-fin base and anal-fin origin

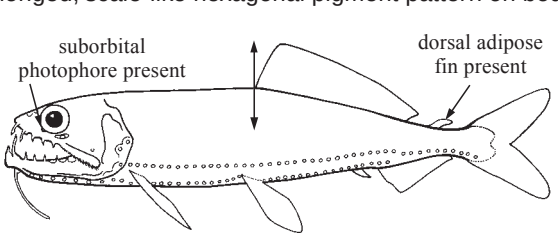
abbreviated terminology of photophores

Habitat, biology, and fisheries: Mainly mesopelagic, occurring in the upper 1 000 m as adults, some species undergoing vertical migration to near surface at night. Some species apparently benthopelagic as adults. Diet consists of other mesopelagic fishes and some crustaceans.

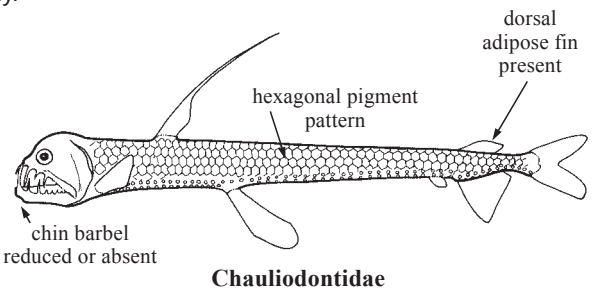
Similar families occurring in the area

Astronesthidae: dorsal fin near middle of body, origin well ahead of that of anal fin; anterior portion of ventral photophore row (PV) curving upward at pelvic-fin base.

Chauliodontidae: chin barbel reduced or absent in adults; dorsal fin well anterior, near head, anterior ray prolonged; scale-like hexagonal pigment pattern on body.



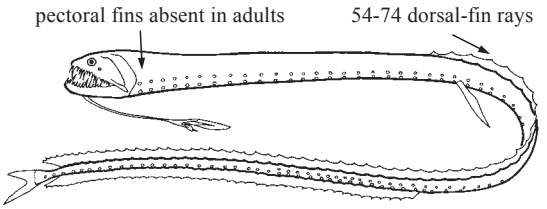
Astronesthidae



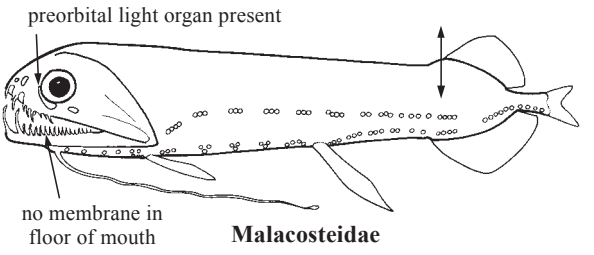
Chauliodontidae

Idiacanthidae: body elongate, eel-like; dorsal fin with very long base (54 to 74 rays).

Malacosteidae: no membrane in floor of mouth; chin barbel present or absent; preorbital photophore present (absent in *Photostomias*, present in the melanostomiid *Pachystomias*); pectoral fins absent or consisting of only free, filament-like rays.



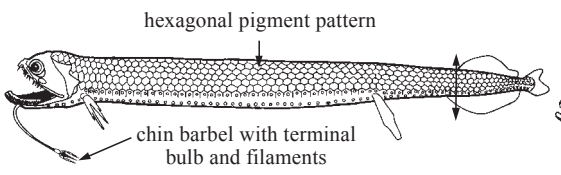
Idiacanthidae



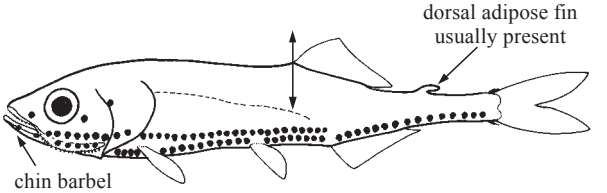
Malacosteidae

Stomiidae: chin barbel with terminal bulb and filaments; scale-like hexagonal pigment pattern on body; pectoral fins present.

Gonostomatidae, Phosichthyidae, and Sternoptychidae: gill rakers in adults, chin barbels and greatly enlarged, fang-like jaw teeth absent.

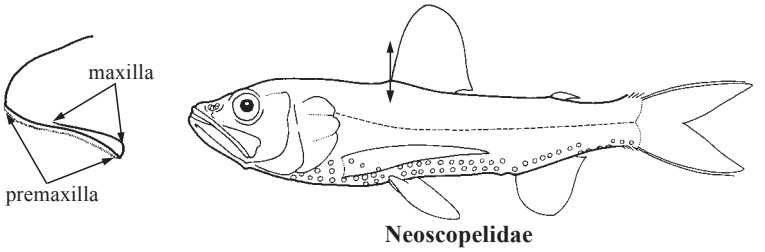


Stomiidae



Phosichthyidae

Myctophidae and Neoscopelidae: lack chin barbels, have gill rakers as adults, and the maxilla is completely excluded from the gape by the premaxilla.



Neoscopelidae

Key to the genera of Melanostomiidae occurring in the area (modified after Gibbs, 1984)

1a. Anal-fin base much longer than dorsal-fin base, its origin much before dorsal-fin origin . . . . . → *2*

1b. Anal- and dorsal-fin bases about same length, anal-fin origin approximately under dorsal-fin origin . . . . . → *3*

2a. First pectoral-fin rays separate, much longer than others; snout blunt, not protrusible (Fig. 1) . . . . ***Flagellostomias***

2b. One or several pectoral-fin rays, none markedly longer than others (Fig. 2); snout slender and tapering, protrusible (Fig. 3) . . . . . ***Eustomias***

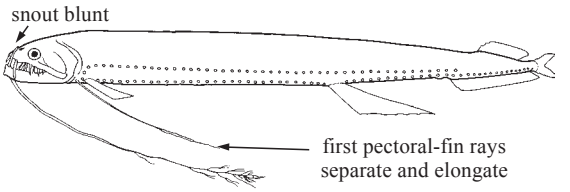


Fig. 1 ***Flagellostomias***

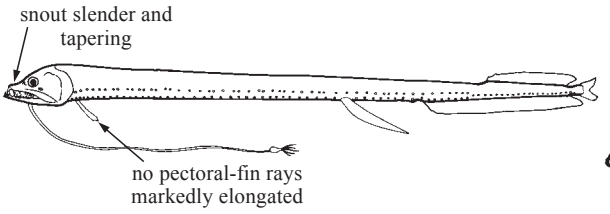


Fig. 2 ***Eustomias***

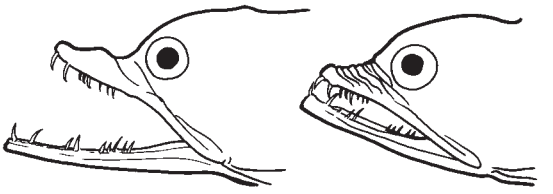


Fig. 3 ***Eustomias*** **jaw protrusion**

3a. Pelvic-fin bases high on body (see family figure), near lateral midline on flank . . . . . ***Bathophilus***

3b. Pelvic-fin bases low on body (Fig. 4), close together near ventral midline . . . . . → *4*

4a. Long cresent-shaped suborbital photophore below eye (Fig. 4), and smaller organs in front (preorbital) and behind (postorbital) eye . . . . . ***Pachystomias***

4b. No suborbital or preorbital photophores; large postorbital organ present (Fig. 5) . . . . . → *5*

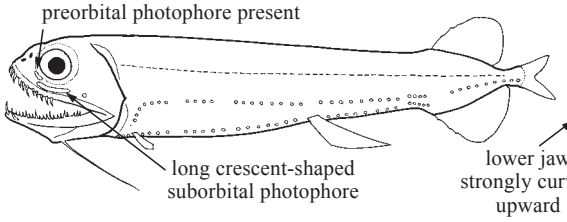


Fig. 4 ***Pachystomias***

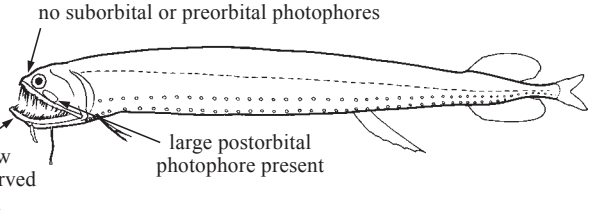


Fig. 5 ***Photonectes***

5a. Lower jaw strongly curved upward, long and projecting beyond snout (Fig. 5); pectoral fin with 0 to 2 soft rays . . . . . ***Photonectes***

5b. Lower jaw about equal to upper, not projecting or strongly curved upward; pectoral fin with 4 to 11 soft rays . . . . . → *6*

6a. Body long and slender, its depth 10 times or more in body length (Fig. 6); 39 or more photophores in PV series . . . . . ***Leptostomias***

6b. Body moderately elongate, its depth less than 10 times in body length; no more than 30 photophores in PV series . . . . . → *7*

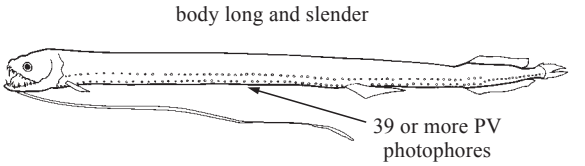


Fig. 6 ***Leptostomias***

7a. One long pectoral-fin ray, separated from the remaining 3 to 11 rays (Fig. 7) . . . . . → ***8***

7b. Pectoral fin without an isolated, elongated ray; rays approximately equal, none separated from rest . . . . . → ***9***

8a. Pectoral-fin rays 1 + 10 or 11, end of isolated ray split into filaments (Fig. 7) . . . . . ***Thysanactis***

8b. Pectoral-fin rays 1 + 3, end of isolated ray simple, not divided into filaments (Fig. 8) . . . ***Echiostoma***

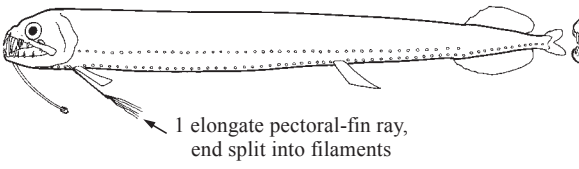


Fig. 7 ***Thysanactis***

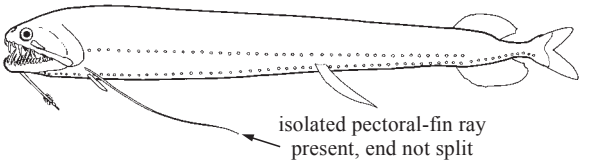


Fig. 8 ***Echiostoma***

9a. Luminous loop on flank above and behind pectoral fin (Fig. 9); 15 to 17 PV photophores . . . . . ***Grammatostomias***

9b. No luminous loop on flank; 22 to 30 PV photophores . . . . . → ***10***

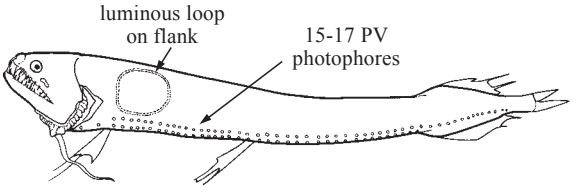


Fig. 9 ***Grammatostomias***

10a. Pectoral-fin ray tips branched; dorsal adipose fin present; postorbital light organ small, less than 1/3 eye diameter; terminal bulb of barbel swollen and complex, with numerous filaments (Fig. 10) . . . . . ***Chirostomias***

10b. Pectoral-fin ray tips unbranched; no dorsal adipose fin (Fig. 11); postorbital light organ large, 1/2 eye diameter or larger; barbel tip usually flattened, without filaments or with a single filamentous appendage . . . . . ***Melanostomias***

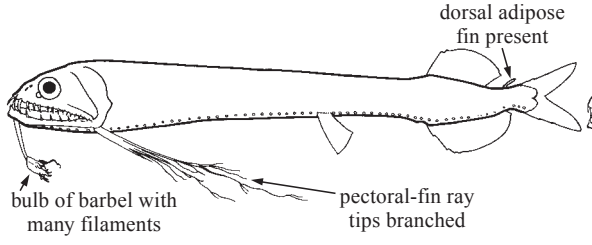


Fig. 10 ***Chirostomias***

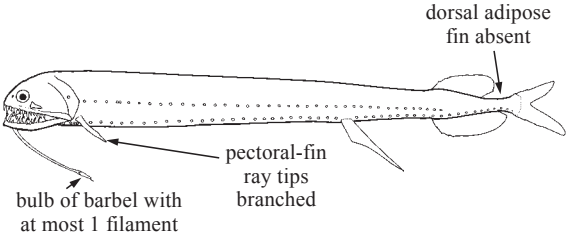


Fig. 11 ***Melanostomias***

List of species occurring in the area

Bathophilus altipinnis Beebe, 1933. To 6 cm. NW Atlantic off Bermuda.
Bathophilus brevis Regan and Trewavas, 1930. To 5 cm. Tropical to temperate N Atlantic.
Bathophilus digitatus (Welsh, 1923). To 3 cm. Off Bermuda.
Bathophilus longipinnis (Pappenheim, 1914). To 11 cm. Areas 31, W34, SE47.
Bathophilus metallicus (Welsh, 1923). To 14 cm. Subtropical to temperate N Atlantic.
Bathophilus nigerrimus Giglioli, 1882. To 11 cm. Tropical to temperate N Atlantic, Mediterranean.
Bathophilus pawneei Parr, 1927. To 12 cm. Tropical to subtropical NW Atlantic.
Bathophilus proximus Regan and Trewavas, 1930. To 6 cm. Off Bermuda.
Bathophilus schizochirus Regan and Trewavas, 1930. To 7 cm. Subtropical NW Atlantic.

Chirostomias pliopterus Regan and Trewavas, 1930. To 23 cm. Subtropical to temperate N Atlantic.

Echiostoma barbatum Lowe, 1843. To 32 cm. Tropical to temperate Atlantic.

Eustomias achirus Parin and Pokhilskaya, 1974. To 9 cm. Subtropical to temperate N Atlantic, SW Pacific.
Eustomias arborifer Parr, 1927. To 25 cm. Tropical to subtropical Atlantic.
Eustomias bibulbosus Parr, 1927. To 20 cm. Tropical to temperate N Atlantc.
Eustomias bigelowi Welsh, 1923. To 20 cm. Tropical to subtropical Atlantic.
Eustomias binghami Parr, 1927. To 10 cm. Tropical to subtropical NW Atlantic.
Eustomias borealis Clarke, 2000. To 17 cm. Areas NW31 and SW21.
Eustomias braueri Zugmayer, 1911. To 12 cm. Tropical to temperate N Atlantic.
Eustomias brevibarbatus Parr, 1927. To 15 cm. Tropical to subtropical N Atlantic.
Eustomias contiguus Gomon and Gibbs, 1985. To 18 cm. Subtropical N Atlantic.
Eustomias decoratus Gibbs, 1971. To 26 cm. Temperate NW Atlantic.
Eustomias dendriticus Regan and Trewavas, 1930. To 15 cm. Areas NE31 and NE34.
Eustomias digitatus Gomon and Gibbs, 1985. To 12 cm. Tropical NW Atlantic, off Leeward Islands.
Eustomias dispar Gomon and Gibbs, 1985. To 12 cm. Tropical NW Atlantic.
Eustomias dubius Parr, 1927. To 13 cm. Tropical to subtropical NW Atlantic.
Eustomias enbarbatus Welsh, 1923. To 12 cm. Areas W31 and SE34.
Eustomias filifer (Gilchrist, 1906). To 23 cm. Tropical to subtropical Atlantic.
Eustomias fissibarbis (Pappenheim, 1914). To 15 cm. Areas 31, 34, N41, N47, W77, N87, S51.
Eustomias globulifer Regan and Trewavas, 1930. To 7 cm. Central FAO Fishing Area 31.
Eustomias hulleyi Gomon and Gibbs, 1985. To 12 cm. Subtropical NW Atlantic.
Eustomias hypopsilus Gomon and Gibbs, 1985. To 16 cm. Tropical to subtropical NW Atlantic.
Eustomias intermedius Clarke, 1998. To 13 cm. Area SE31.
Eustomias kreffti Gibbs, Clarke and Gomon, 1983. To 13 cm. Tropical Atlantic.
Eustomias leptobolus Regan and Trewavas, 1930. To 10 cm. Area W31.
Eustomias lipochirus Regan and Trewavas, 1930. To 9 cm. Tropical to subtropical N Atlantic.
Eustomias longibarba Parr, 1927. To 13 cm. Tropical to subtropical N Atlantic, E tropical Pacific.
Eustomias macronema Regan and Trewaves, 1930. To 16 cm. Areas W31, N41, Pacific, E Indian.
Eustomias macrophthalmus Parr, 1927. To 10 cm. Tropical to subtropical NW Atlantic.
Eustomias macrurus Regan and Trewavas, 1930. To 11 cm. Area NW31.
Eustomias melanostigma Regan and Trewavas, 1930. To 10 cm. Tropical to subtropical N Atlantic.
Eustomias micraster Parr, 1927. To 15 cm. Tropical to subtropical NW Atlantic.
Eustomias micropterygius Parr, 1927. To 6 cm. Subtropical NW Atlantic, off Bahamas.
Eustomias monoclonus Regan and Trewavas, 1930. To 15 cm. Areas W and SE31, SW34, NW51, NW57, NW 71.
Eustomias obscurus Vaillant in Filhol, 1884. To 21 cm. Tropical to temperate N Atlantic, equatorial S Atlantic.
Eustomias parri Regan and Trewavas, 1930. To 14 cm. Subtropical to temperate N Atlantic.
Eustomias paucifilis Parr, 1927. To 17 cm. Area NW31.
Eustomias polyaster Parr, 1927. To 13 cm. Tropical to subtropical N Atlantic.
Eustomias precarius Gomon and Gibbs, 1985. To 13 cm. Tropical NW Atlantic, off Puerto Rico.
Eustomias pyrifer Regan and Trewavas, 1930. To 13 cm. Tropical NW Atlantic, off Virgin Islands.
Eustomias quadrifilis Gomon and Gibbs, 1985. To 11 cm. Temperate NW Atlantic.
Eustomias radicifilis Borodin, 1930. To 16 cm. Area NW31.
Eustomias satterleei Beebe, 1933. To 18 cm. Subtropical to temperate Atlantic, central, W and S Pacific, S Indian.
Eustomias schiffi Beebe, 1932. To 13 cm. Temperate NW Atlantic.

Eustomias schmidti Regan and Trewavas, 1930. To 19 cm. Subtropical to temperate Atlantic and Pacific.
Eustomias silvescens Regan and Trewavas, 1930. To 11 cm. E Caribbean.
Eustomias simplex Regan and Trewavas, 1930. To 9 cm. Area NW31.
Eustomias tenisoni Regan and Trewavas, 1930. To 9 cm. NW Atlantic, off Bermuda.
Eustomias triramis Regan and Trewavas, 1930. To 11 cm. Central and W FAO Fishing Area 31.
Eustomias variabilis Regan and Trewavas, 1930. To 15 cm. Tropical NW Atlantic.
Eustomias xenobolus Regan and Trewavas, 1930. To 17 cm. Area SE31.

Flagellostomias boureei (Zugmayer, 1913). To 32 cm. Tropical to subtropical in Areas 31, 34, 47.

Grammatostomias circularis Morrow, 1959. To 14 cm. Area W31, off Puerto Rico.
Grammatostomias dentatus Goode and Bean, 1896. To 14 cm. Subtropical to temperate NW Atlantic.
Grammatostomias flagellibarba Holt and Byrne, 1910. To 27 cm. Tropical to temperate N Atlantic.

Leptostomias analis Regan and Trewavas, 1930. To 17 cm. Area SE31.
Leptostomias bermudensis Beebe, 1932. To 27 cm. NW Atlantic, off Bermuda.
Leptostomias bilobatus (Koefoed, 1956). To 8 cm. Subtropical to temperate NW Atlantic.
Leptostomias gladiator (Zugmayer, 1911). To 27 cm. Tropical to temperate N Atlantic.
Leptostomias haplocaulus Regan and Trewavas, 1930. To 10 cm. NW Atlantic, off Bermuda.
Leptostomias leptobolus Regan and Trewavas, 1930. To 10 cm. Tropical NW Atlantic.
Leptostomias longibarba Regan and Trewavas, 1930. To 25 cm. Tropical to subtropical NW Atlantic.

Melanostomias biseriatus Regan and Trewavas, 1930. To 22 cm. Tropical to subtropical N Atlantic, N Pacific.
Melanostomias macrophotus Regan and Trewavas, 1930. To 8 cm. Tropical NW Atlantic.
Melanostomias margaritifer Regan and Trewavas, 1930. To 8 cm. Greater Antilles.
Melanostomias melanopogon Regan and Trewavas, 1930. To 15 cm. FAO Fishing Area 31.
Melanostomias melanops Brauer, 1902. To 24 cm. Area W31 off Lesser Antilles and Area 57.
Melanostomias spilorhynchus Regan and Trewavas, 1930. To 24 cm. Subtropical to temperate N Atlantic.
Melanostomias tentaculatus (Regan and Trewavas, 1930). To 20 cm. N and S Atlantic.
Melanostomias valdiviae Brauer, 1902. To 20 cm. Circumglobal, tropical to subtropical.

Pachystomias microdon (Günther, 1878). To 22 cm. N Atlantic, W Pacific.

Photonectes achirus Regan and Trewavas, 1930. To 6 cm. Area W31.
Photonectes braueri (Zugmayer, 1913). To 12 cm. Subtropical N Atlantic.
Photonectes caerulescens Regan and Trewavas, 1930. To 12 cm. Area NW31.
Photonectes dinema Regan and Trewavas, 1930. To 5 cm. Subtropical to temperate N Atlantic.
Photonectes gracilis Goode and Bean, 1896. To 17 cm. Tropical to subtropical in Area 31.
Photonectes leucospilus Regan and Trewavas, 1930. To 5 cm. Subtropical N Atlantic.
Photonectes margarita (Goode and Bean, 1896). To 32 cm. Areas W31 and S21.
Photonectes mirabilis Parr, 1927. To 6 cm. Area W31.
Photonectes parvimanus Regan and Trewavas, 1930. To 6 cm. Subtropical to temperate NW Atlantic.
Photonectes phyllopogon Regan and Trewavas, 1930. To 2 cm. Area W31, Caribbean only.

Thysanactis dentex Regan and Trewavas, 1930. To 14 cm. Area W31.

References

Clarke, T.A. 2000. Review of nine species of North Atlantic *Eustomias*, subgenus Dinematochirus (Pisces: Stomiidae), with the descriptions of two new species. *Copeia*, 2000:96-111.

Gibbs, R.H., Jr. 1984. Melanostomiidae. In *Fishes of the North-eastern Atlantic and the Mediterranean*, edited by P.J.P. Whitehead, M.-L. Bauchot, J.-C. Hureau, J. Nielsen, and E. Tortonese. *UNESCO*, Vol 1:510 p.

Gibbs, R.H., Jr., T.A. Clarke, and J.R. Gomon. 1983. Taxonomy and distribution of the stomioid fish genus *Eustomias* (Melanostomiidae). I. Subgenus Nominostomias. *Smithson. Contrib. Zool.*, 380:139 p.

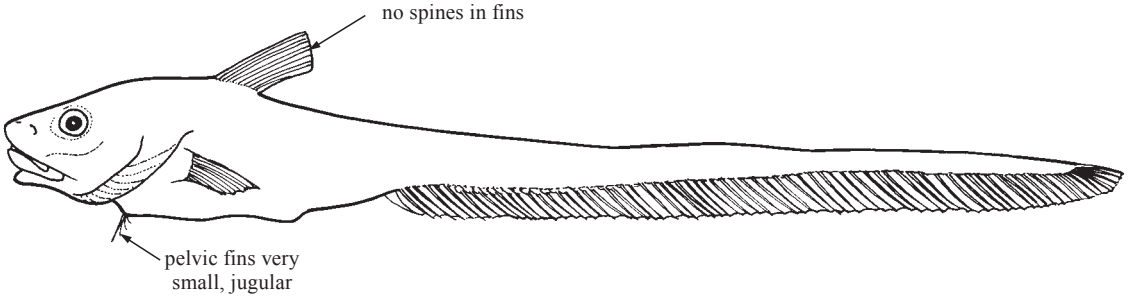
Harold, A.S. and S.H. Weitzman. 1996. Interrelationships of Stomiiform Fishes. In *The Interrelationships of Fishes*, edited by M.L.J. Stiassny, L.R. Parenti and G.D. Johnson. London, Academic Press, pp. 333-353.

Order ATELEOPODIFORMES
ATELEOPODIDAE

Jellynoses (tadpole fishes)

by J.A. Moore, Florida Atlantic University, USA

Diagnostic characters: Elongate fishes (to 2 m) with soft, flabby body; short trunk; tail elongate, compressed, and tapering. Head moderate-sized. Eyes small to moderate. **Snout pointed to rounded, very soft and gelatinous**. Mouth subterminal and protrusible. Teeth villiform, absent, or present in broad band on maxilla and premaxilla, absent on vomer and palatine. **No fin spines; short-based single dorsal fin just behind head, with 8 to 12 soft rays; anal fin elongate and united with caudal fin, with combined total of 80 to 120 soft rays**; pectoral fins with 12 to 14 soft rays; **pelvic fins jugular, adults with 2 to 4 soft rays visible, most rays minute and surrounded by fleshy skin, only 1 ray long and conspicuous**. Body naked, isolated scales present imbedded in lateral line, lateral line obscure exteriorly. Considerable ontogenetic changes in morphometrics and pelvic structure, young have 6 pelvic-fin soft rays with the first longer than the rest. **Colour:** body generally light brown to purplish brown; dorsal, anal, caudal, and pectoral fins dark brown to black, pelvic fins white.

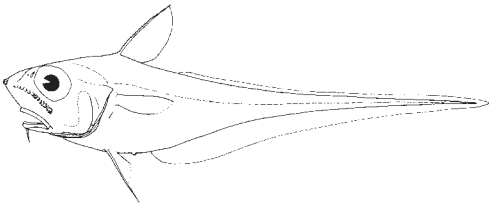


Habitat, biology, and fisheries: Uncommon benthic or benthopelagic fishes usually taken in trawls between 200 and 800 m. Diet consists of benthic invertebrates, especially ophiuroid echinoderms and decapod crustaceans. Of no commercial importance.

Remarks: Currently about 12 species in 4 genera. Specimens placed in the genus *Ijimaia* may represent large adults of *Ateleopus*. This family is in great need of revision. Most recent review of family is by Smith (1986), but the only descriptions of western Atlantic species are in Howell Rivero (1935) and Shimizu (1983).

Similar families occurring in the area

Macrouridae: chin barbel usually present; often spinous rays in first dorsal fin; long low second dorsal fin; scales cover most parts of body and head.



Macrouridae

List of species occurring in the area

Ateleopus sp. To 231 mm TL. French Guiana and Gulf of Mexico.

Ijimaia antillarum Howell Rivero, 1935. To 1 636 mm TL. Areas 31 and SW21.

References

Howell Rivero, L. 1935. The family Ateleopidae and its West Indian form. *Mem. Soc. Cubana Hist. Nat.*, 9(2):91-106.

Shimizu, T. 1983. Family Ateleopididae. In *Fishes trawled off Suriname and French Guiana*, edited by T. Uyeno, K. Matsuura, and E. Fujii. Tokyo, Japan Marine Fishery Resource Research Center, pp. 283-284.

Smith, M.M. 1986. Family Ateleopididae. In *Smiths' sea fishes*, edited by M.M. Smith and P.C. Heemstra. Johannesburg, Macmillan, pp. 404-406.

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Order AULOPIFORMES

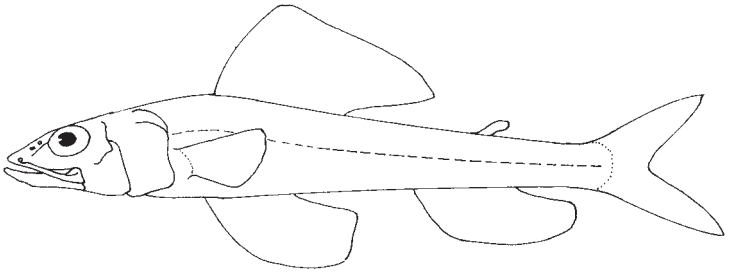
AULOPIDAE

Aulopus (flagfins)

by B. A. Thompson, Louisiana State University, USA

Diagnostic characters (Atlantic only)**:** Medium-sized (30 to 45 cm) aulopiform fishes, elongate; body oval in cross-section. Head 30% standard length; mouth large, extends to rear of eye; **maxilla expanded posteriorly with 2 supramaxillae. Dorsal fin located on anterior 1/3 of body**; dorsal fin with more rays than anal fin; small adipose fin located above midpoint of anal fin; pectoral fin insertion just below lateral line on midbody slightly anterior to both dorsal- and pelvic-fin insertions; pelvic-fin insertion slightly behind dorsal-fin insertion; **pelvic fin longer than pectoral fin with outer 4 rays having thickened epidermis**; dorsal-fin rays 14 to 16, anal-fin rays 10 to 13, pectoral-fin rays 13, pelvic-fin rays 9; all fins lack spines. Scales on head and body spinoid, cycloid on breast and belly; complete lateral line that extends 2 scales onto base of caudal fin; **fucral scales (small bony scutes) preceding caudal rays**; lateral line scales 48 to 53. **Colour:** males with red, orange, and yellow markings on fins; body with several saddles and lateral blotches.

Habitat, biology, and fisheries: Flagfins are uncommon benthic fishes of the continental shelf between 130 to 550 m depth. They are predators on small fish and shrimp. Separate sexes; sexual dimorphism in body, and fin colour, and shape of dorsal, anal, and pelvic fins. Little is known of their biology. No fishery.



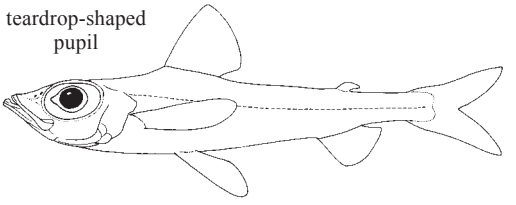
Remarks: Thompson (1998) recognized 10 species in 2 genera (*Aulopus* and *Hime*).

Similar families occurring in the area

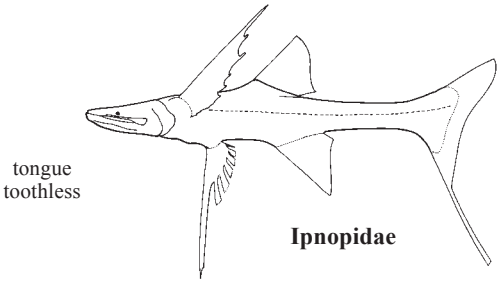
Chlorophthalmidae: eye with teardrop-shaped pupil; lower jaw with bony tip; only 1 supramaxilla present; dorsal fin inserted before pelvic-fin insertion; tongue toothless.

Ipnopidae: lower jaw with fleshy tip; only 1 supramaxilla; dorsla fin inserted before pelvic-fin insertion; tongue toothless.

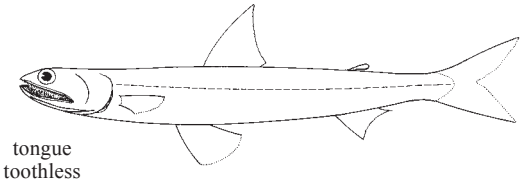
Synodontidae: jaws extending well behind eyes; gill rakers reduced to gill teeth or spines.



Chlorophthalmidae



Ipnopidae



Synodontidae

List of species occurring in the area

Aulopus nanae Mead, 1958. To about 35 cm TL. Widespread in Area 31.

References

Mead, G.W. 1958. A new species of iniomous fish from the Gulf of Mexico. *J. Wash. Acad. Sci.*, 48:188-191.

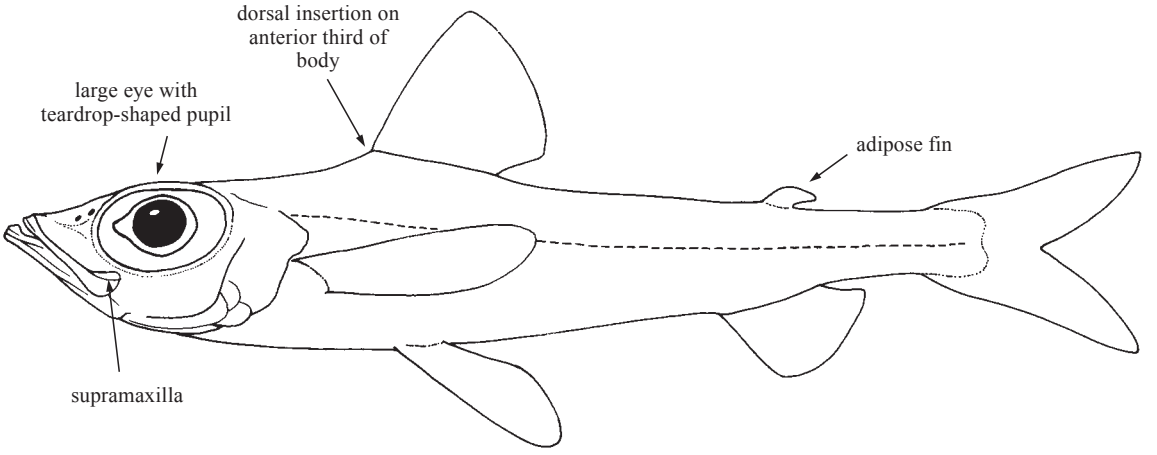
Mead, G.W. 1966. Family Aulopidae. In Fishes of the Western North Atlantic. *Sears Found. Mar. Res. Mem*. 1, Pt. 5. New Haven, Connecticut, Yale University, pp. 19-29.

CHLOROPHTHALMIDAE

Greeneyes

by B.A. Thompson, Louisiana State University, USA

Diagnostic characters: Small (20 to 23 cm), slender aulopiform fishes, nearly oval in cross-section. Head about 30% standard length; **large eye with teardrop-shaped pupil and distinctive lensless space anteriorly**; snout is moderately long, somewhat depressed; lower jaw protrudes beyond upper jaw and ends in symphysial knob; **maxilla is slightly expanded posteriorly, possessing a single supramaxilla, and extends to just behind front of eye; dorsal insertion on anterior third of body**. Dorsal fin with more rays than anal fin; dorsal-fin rays 10 or 11, anal-fin rays 7 to 9; **adipose fin located over middle of anal fin**; pectoral fin inserted below midflank anterior to both dorsal and pelvic fins, longer than pelvic fin, pectoral-fin rays 15 to 17; pelvic fins subthoracic, pelvic-fin rays 8 or 9; all fins lack spines. **Anus located closer to pelvic fins than to anal fin**; lateral line complete; scales either ctenoid or cycloid. **Colour:** body light brown to greenish sometimes with blotches; eye is green in live specimens.



Habitat, biology, and fisheries: Family benthic, captured at depths from 50 to 1 000 m. They are predators eating both fish and crustaceans. All are thought to be hermaphroditic. No fishery.

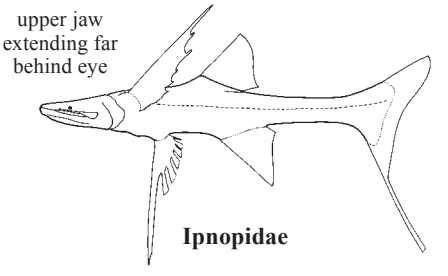
Remarks: Sulak (1977) recognizes an expanded family concept to include the nominal families Bathypteroidae and Ipnopidae as a subfamily, Ipnopinae, within the Chlorophthalmidae. There is debate on limits and relationships within this family (Baldwin and Johnson, 1996). Sato and Nakabo (2002) removed 4 species, placing them in family Paraulopidae and placed *Bathysauropsis* in a monotypic family. A review of world literature suggests there are 3 genera and approximately 25 species.

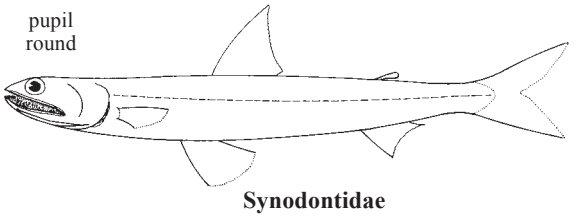
Similar families occurring in the area

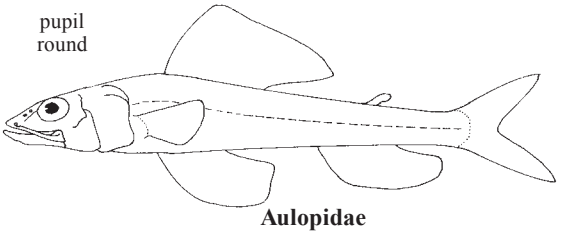
Ipnopidae: upper jaw extending far behind eye; dorsal fininserted over or behind pelvic fins.

Synodontidae: pupil round; teeth present on tongue; gill rakers reduced to gill teeth or spines.

Aulopidae: pupil round; lower jaw without bony or fleshy tip; 2 supramaxillae; dorsal fin inserted behind pelvic fin insertion; teeth present on tongue.







Key to the genera of Chlorophthalmidae occurring in the area

1a. Anus closer to base of anal fin to base of pectoral fin; maxilla extends past rear of eye; dorsal-fin origin posterior to pelvic-fin origin . . . . . ***Bathysauropsis***

1b. Anus closer to pelvic-fin base than to anal-fin base; maxilla extends to front half of eye; dorsal-fin origin anterior to pelvic-fin origin . . . . . → ***2***

2a. Eye diameter less than 1.25 in snout; anus close to base of inner pelvic-fin rays (Fig. 1), separated by 2 or 3 scales; vomerine teeth all small . . . . . ***Chlorophthalmus***

2b. Eye diameter greater than 1.25 in snout; anus well behind base of inner pelvic-fin rays (Fig. 2), separated by 8 to 10 scales; vomer with several large fang-like teeth . . . . . ***Parasudis***

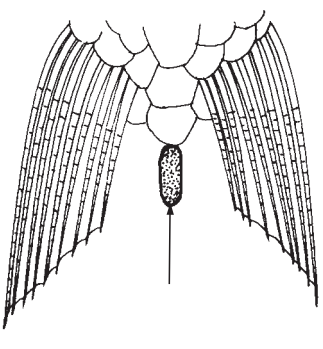


Fig. 1 ***Chlorophthalmus***

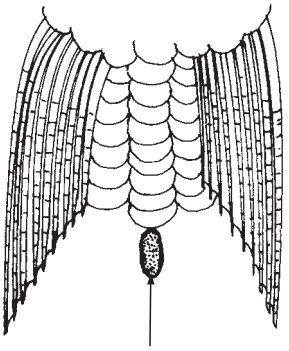


Fig. 2 ***Parasudis***

List of species occuring in the area

Chlorophthalmus agassizi Bonaparte, 1840. To about 23 cm. Widespread in tropical to warm-temperate Atlantic.

Chlorophthalmus brasiliensis Mead, 1958. To about 20 cm. Widespread in tropical W Atlantic.

Parasudis truculenta (Goode and Bean, 1896). To about 25 cm. Widespread in temperate to tropical W Atlantic.

References

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McEachran, J.D. and J.D. Fechhelm. 1998. *Fishes of the Gulf of Mexico*, Vol. 1. Austin, University of Texas, pp. 555-557.

Mead, G.W. 1958. Three new species of archibenthic iniomous fishes from the western north Atlantic. *J. Wash. Acad. Sci.*, 48:362-372.

Mead, G.W. 1966. Family Chlorophthalmidae. In Fishes of the Western North Atlantic. *Sears Found. Mar. Res. Mem.* 1, Pt. 5. New Haven, Connecticut, Yale University, pp. 162-189.

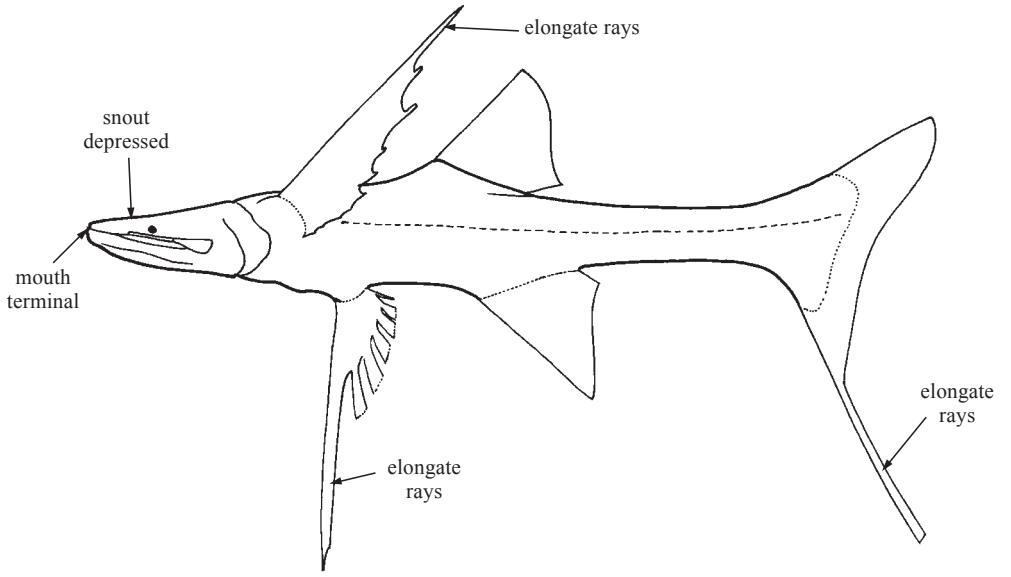
Sato, T. and T. Nakabo. 2002. Paraulopidae and *Paraulopus*, a new family and genus of aulopiform fishes with revised relationships within the order. *Ichthy. Res.*, 49:25-46.

IPNOPIDAE

Tripod fishes

by B.A. Thompson, Louisiana State University, USA

Diagnostic characters: Small (13 to 30 cm), slender aulopiform fishes; body oval in cross-section, but **snout is depressed, sometimes spatulate**; mouth terminal, **maxilla expanded posteriorly with a single supramaxilla; eye variously modified and reduced, often very small or vestigial, sometimes covered by skin and scales**; broad, concave interorbit. Dorsal fin located on anterior third to half of body; dorsal fin may have more rays, fewer rays, or have the same number of rays as the anal fin; dorsal-fin rays not modified or elongate; **adipose fin, when present, located posterior to anal-fin base; caudal fin forked, usually with lower lobe longer than upper lobe and may have elongate rays; pectoral fin variously modified, often with elongate rays; pelvic fin subthoracic, anterior to dorsal-fin insertion and may possess modified elongate rays anteriorly**; all fins lack spines; dorsal-fin soft rays 9 to 15, anal-fin soft rays 8 to 17, pectoral-fin soft rays 12 to 21, pelvic-fin soft rays 8 or 9. Body and head scales decidously cycloid; lateral line complete. Lateral-line scales 48 to 70. **Colour:** variable, many species black or black with white markings, other species pale or white.

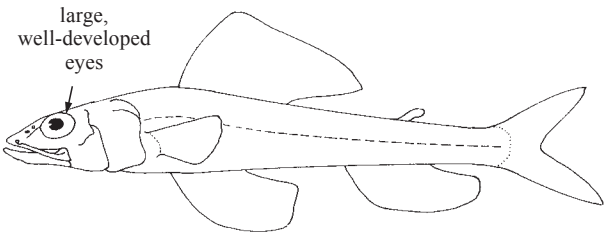


Habitat, biology, and fisheries: Found worldwide in tropical to temperate oceans, often very deep (500 to 6 000 m). Although poorly documented, reported to be benthic predators on small fishes, squids, and crustaceans. All species are thought to be synchronous hermaphrodites. No fishery.

Remarks: Twenty-eight species in 5 genera are recognized. Many species are poorly known, intra- and interspecific variation not well documented.

Similar families occurring in the area

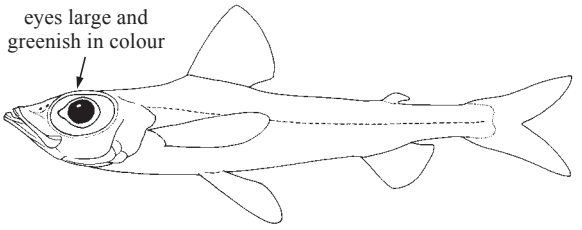
Aulopidae: 2 supramaxilla present; teeth present on tongue; large well-developed eyes; dorsal-fin and pelvic-fin origin about even; many body scales spinoid; lateral line extends posterior to hypural plate; jaw extends only to posterior margin of eye.



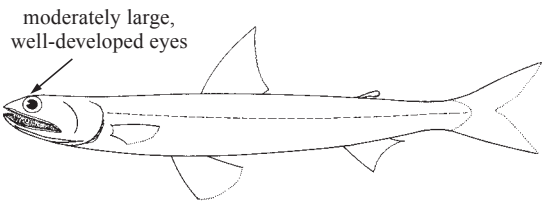
Aulopidae

Chlorophthalmidae: eyes large and greenish in colour with teardrop-shaped pupil; jaw at maximum extends to midpoint of eye; fins never with elongated rays.

Synodontidae: maxilla reduced; teeth present on tongue; fins never with elongated rays; usually with moderately large, well-developed eyes.



Chlorophthalmidae



Synodontidae

Key to the genera of Ipnopidae occurring in the area

1a. Elongate and specialized fin rays present . . . . . ***Bathypterois***

1b. Elongate and specialized fin rays absent . . . . . → ***2***

2a. Top of head covered with thin, flattened bones (modified frontals and parietals) covering degenrate eyes . . . . . ***Ipnops***

2b. Top of head covered with skin, with frontals and parietals unmodified; eyes minute and laterally directed . . . . . → ***3***

3a. Ten to14 well-developed gill rakers on first arch; pectoral fins well in front of dorsal-fin origin . . . . . ***Bathymicrops***

3b. A single well-developed gill raker at junction of upper and lower arms of arch; pectoral fins just anterior to dorsal-fin origin . . . . . ***Bathytyphlops***

List of species occurring in the area

Bathymicrops regis Hjort and Koefoed, 1912. To 13 cm. Atlantic and Indo-West Pacific.

Bathypterois bigelowi Mead, 1959. To 15 cm. Confined to Florida, Gulf of Mexico, and Caribbean Sea.

Bathypterois grallator (Goode and Bean, 1886). To 40 cm. Warm-temperate Atlantic, Indian, And W Pacific oceans.

Bathypterois longipes Günther, 1878. To 27 cm. Widespread in Atlantic and C and E Pacific.

Bathypterois phenax Parr, 1928. To 20 cm. Warm-temperate to tropical Atlantic.

Bathypterois quadrifilis Günther, 1878. To 20 cm. Warm-temperate to tropical Atlantic.

Bathypterois viridensis (Roule, 1916). To 25 cm. Warm-tempertate to tropical Atlantic.

Bathytyphlops marionae Mead, 1959. To 35 cm. Tropical Atlantic and W Indian oceans.

Bathytyphlops sewelli (Norman, 1939). To 32 cm. Temperate and tropical Atlantic and W Indian oceans.

Ipnops murrayi Günther, 1878. To 17 cm. Warm-temperate and tropical Atlantic.

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Mead, G.W. 1966. Family Ipnopidae In Fishes of the Western North Atlantic, edited by G.W. Mead, H.B. Bigelow, C.M. Breder, D.M.Cohen, D. Merriman, Y.H. Olsen, W.C. Schroeder, L.P. Schultz and J.Tee-Van. *Sears Found. Mar. Res. Mem*., 1(5):147-161.

Merrett, N.R. and J.G. Nielsen. 1987. A new genus and species of the family Ipnopidae (Pisces, Teleostei) from the eastern North Atlantic, with notes on its ecology. *J. Fish Biol*., 31:451-464.

Nielson, J.G. 1966. Synopsis of the Ipnopidae (Pisces, Iniomi) with description of two new abyssal species. *Galathea Rept*., 8:49-75.

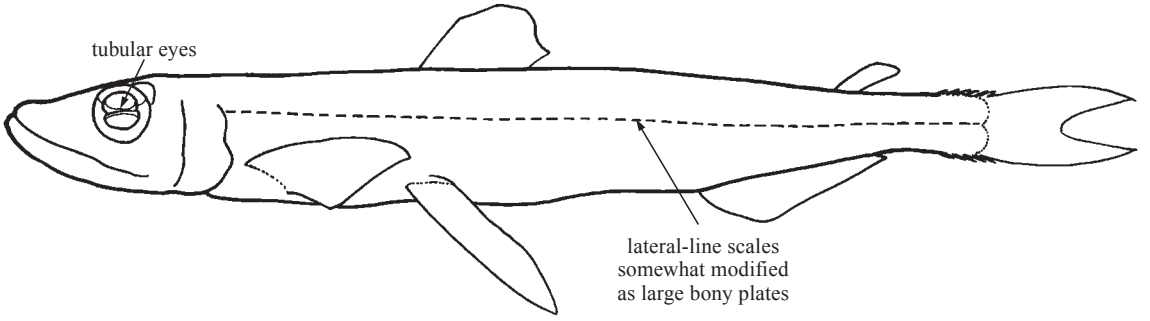
Sulak, K.J. 1977. The systematics and biology of *Bathypterois* (Pisces, Chlorophthalmidae) with a revised classification of benthic myctophiform fishes. *Galathea Rept*., 14:49-108.

SCOPELARCHIDAE

Pearleyes

by B.A. Thompson, Louisiana State University, USA

Diagnostic characters: Small (5 to 15 cm), somewhat elongate, slender, and slightly compressed aulopiform fishes. Head about 25% standard length, snout variable in shape and length; interorbit narrow; **tubular eyes often directed dorsally; mouth terminal with lanceolate teeth in lower jaw and hooked teeth on tongue**; jaw extends past rear margin of eye; supramaxilla present in some species; **gill rakers modified into bony plates**. Dorsal fin inserts slightly anterior to midbody, soft dorsal-fin rays 6 to 9; adipose fin located above rear part of anal fin; anal fin with more rays than dorsal fin, soft anal-fin rays 18 to 29; caudal fin moderately forked; pectoral fins located on lower side of body anterior to both dorsal fin and pelvic fins and can be either shorter or longer than pelvic fins, soft pectoral-fin rays 18 to 28; pelvic fins located under dorsal fin, soft pelvic-fin rays 9 or 10; no modified or elongate fin rays; no spines in any fins; **body and part of head covered with cycloid scales; lateral-line scales somewhat modified as large bony plates with a large pore partially covered by tympanum**; swimbladder absent; several species have luminous tissue; lateral-line scales 40 to 59. **Colour:** brown, brassy to black, some iridescence, some species with dark band at or above and below lateral line.



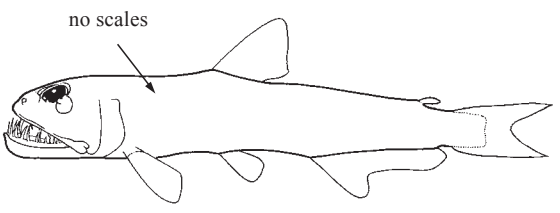
Habitat, biology, and fisheries: Found in tropical oceans, worldwide; meso- and bathypelagic at 500 to 1 000 m. Predators on a variety of pelagic fishes. The family considered to be synchronous hermaphrodites. No fishery.

Remarks: Johnson (1974a) recognized 17 species in 4 genera.

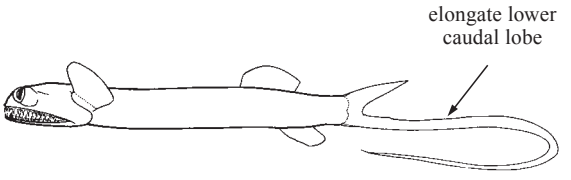
Similar families occurring in the area

Evermannellidae: tongue toothless; no body or lateral-line scales; dorsal fin with 10 to 13 rays.

Giganturidae: tongue toothless; elongate lower caudal lobe; scales and lateral line absent; pelvic fins absent in adults; pectoral fins high on body.



Evermannellidae



Giganturidae

Key to the genera (adults only) of Scopelarchidae occurring in area

(modified from Johnson, 1974a)

1a. Equal or subequal pigment stripes above and below lateral line extending forward from caudal peduncle; pectoral fin greater than pelvic fin in length; pectoral fin with 18 to 22 soft rays; no distinct concentration of pigment on upper caudal-fin lobe . . . . . ***Scopelarchus***

1b. No distinct pigment stripes above and below lateral line extending forward from caudal peduncle; pectoral fin less than or equal to pelvic fin in length; pectoral fin with 20 to 28 soft rays; distinct concentration of pigment on upper caudal-fin lobe . . . . . → ***2***

2a. Pelvic-fin insertion distinctly anterior to dorsal-fin insertion . . . . . → ***3***

2b. Pelvic-fin insertion under or posterior to dorsal-fin insertion . . . . . ***Scopelarchoides***

3a. Pectoral fin with 25 to 28 rays; pectoral fin less than pelvic fin in length; lateral-line scales 55 to 59; luminous tissue present . . . . . ***Benthalbella***

3b. Pectoral fin with 21 to 26 rays; pectoral fin equal to pelvic fin in length; lateral-line scales 47 to 53; luminous tissue absent . . . . . ***Rosenblattichthys***

List of species occurring in the area

Benthalbella infans Zugmayer, 1911. To 15 cm. Warm-temperate to tropical oceans worldwide.

Rosenblattichthys hubbsi Johnson, 1974. To 16 cm. Subtropical and tropical oceans worldwide.

Scopelarchoides danae Johnson, 1974. To 13 cm. Tropical oceans worldwide.

Scopelarchus analis (Brauer, 1902). To 13 cm. Warm-temperate to tropical oceans worldwide.
Scopelarchus guentheri Alcock, 1896. To 13 cm. Subtropical and tropical oceans worldwide.
Scopelarchus michaelsarsi Koefoed, 1955. To 11 cm. Subtropical and tropical oceans worldwide.

References

Johnson, R.K. 1974a. Five new species and a new genus of alepisauroid fishes of the family Scopelarchidae (Pisces: Myctophiformes). *Copeia*, 1974:449-457.

Johnson, R.K. 1974b. A revision of the alepisauroid family Scopelarchidae (Pisces: Myctophiformes). *Fieldiana: Zoology*, 66:1-249.

Johnson, R.K. 1982. Fishes of the families Evermannellidae and Scopelarchidae: systematics, morphology, interrelationships, and zoogeography. *Fieldiana: Zoology, New Ser.*, 12:1-252.

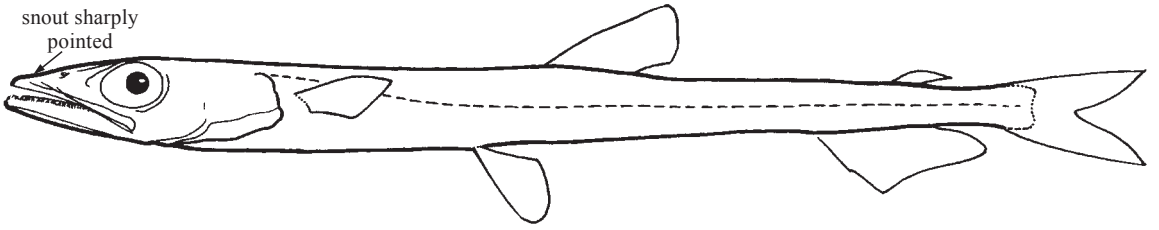
Rofen, R.R. 1966. Family Scopelarchidae. In *Fishes of the Western North Atlantic*, edited by G.W. Mead, H.B. Bigelow, C.M. Breder, D.M. Cohen, D. Merriman, Y.H. Olsen, W.C. Schroeder, L.P. Schultz and J.Tee-Van. *Sears Found. Mar. Res. Mem*. 1(5):566-602.

NOTOSUDIDAE

Waryfishes

by B. A. Thompson, Louisiana State University, USA

Diagnostic characters: Small to moderately large (10 to 50 cm), slender, elongate aulopiform fishes. Head variable in length; nontubular eye large, placed laterally on head; **snout long, sharply pointed, and somewhat depressed; jaw extends close to rear of eye; jaw teeth small, no enlarged fangs**. Dorsal fin located midway on body, soft dorsal-fin rays 10 to 13; adipose fin above anal fin; anal fin placed far back on body, with more fin rays than dorsal fin, soft anal-fin rays 17 to 21; pectoral fins placed at or above midline of sides, longer than pelvic fin, soft pectoral-fin rays 10 to 15; pelvic fins found anterior to dorsal fin insertion, soft pelvic-fin rays 9. **Body and head covered with large, deciduous, cycloid scales**; photophores absent; lateral line complete; lateral-line scales 46 to 64. **Colour:** brown to black, head and opercle often black, some with silver on body.



Habitat, biology, and fisheries: Found in tropical and temperate oceans, worldwide. They are usually epi- to upper-bathypelagic, some species more demersal. Larvae are epipelagic. They feed on zooplankton, small fishes, and crustaceans. With maturity, gill rakers and teeth are lost. All species thought to be synchronous hermaphrodites. No fishery.

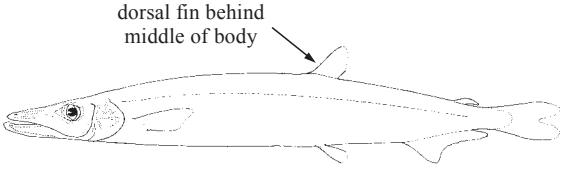
Remarks: Formerly placed in family Scopelosauridae. Bertelsen, et al. (1976) recognized 19 species in 3 genera.

Similar families occurring in the area

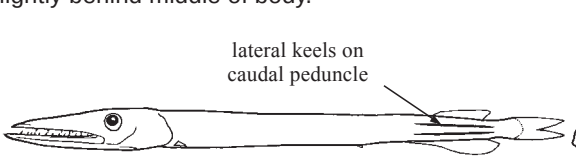
Paralepididae: dorsal fin behind middle of body; teeth slender canines; anal fin rays 20 to 50; pectoral fin set lower on body; gill rakers reduced to gill teeth or spines.

Anotopteridae: dorsal fin absent; no gill rakers; lateral keels on caudal peduncle.

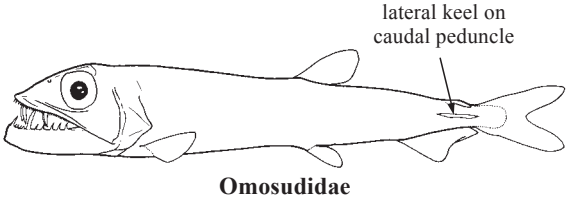
Omosudidae: massive lower jaw; lateral keel on caudal peduncle; pectoral fins low on body; dorsal fin slightly behind middle of body.



Paralepididae



Anotopteridae



Omosudidae

Key to the genera of Notosudidae occurring in the area

1a. Pelvic fin inserts below or just in front of dorsal-fin origin; posterior infraorbital bones simple half-tubes . . . . . ***Ahliesaurus***

1b. Pelvic fin inserts distinctly in front of dorsal-fin origin; posterior infraorbital bones with posterior expansions . . . . . ***Scopelosaurus***

List of species occurring in the area

Ahliesaurus berryi Bertelsen, Krefft and Marshall, 1976. to 30 cm. Subtropical and tropical Atlantic, Indian, and C Pacific oceans.

Scopelosaurus argenteus (Maul, 1954). To 24 cm. Temperate and tropical Atlantic above equator.

Scopelosaurus lepidus (Krefft and Maul, 1955). To 38 cm. N to tropical Atlantic.

Scopelosaurus mauli Bertelsen, Krefft and Marshall, 1976. To 11 cm. Subtropical and tropcial W Atlantic, W Indian, and W Pacific oceans.

Scopelosaurus smithii Bean, 1925. To 25 cm. Worldwide in warm-temperate to tropical waters.

References

Bertelsen, E., G. Krefft, and N.B. Marshall. 1976. The fishes of the family Notosudidae. *Dana Rept.*, 86:1-114.

Krefft, G. 1984. Notosudidae In *Fishes of the North-eastern Atlantic and the Mediterranean*, Vol. 1. Paris, UNESCO, pp. 421-425.

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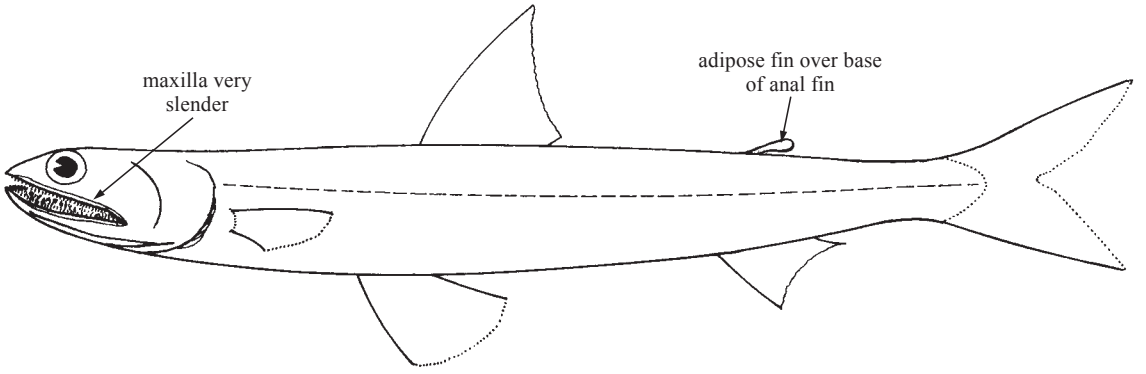
McEachran, J.D. and J.D. Fechhelm. 1998. *Fishes of the Gulf of Mexico*, Vol. 1. Austin, University of Texas, pp. 568-574.

SYNODONTIDAE

Lizardfishes

by B.C. Russell, Northern Territory Museum, Darwin, Australia

Diagnostic characters: Small to medium-sized (to 45 cm) fishes with **elongate cylindrical body**. Head of some compressed, others depressed; bony surfaces on top of head, little to very rugose. Eye of moderate size or small; laterally directed. **Adipose eyelid on anterior and posterior margins of eye**. Mouth large, gape tending to be oblique. Upper jaw not protractile, its entire length bordered by premaxillary, its length more than half length of head and extending well past posterior margin of orbit in adult specimens; **maxilla reduced (very slender and closely adherent to premaxilla in *Saurida*, *Synodus,* and *Trachinocephalus)*; 2 small supramaxillae present (*Saurida*) or absent (*Synodus* and *Trachinocephalus*)**. Lower jaw with or without a fleshy knob at its tip. Teeth of moderate size, depressible; no distinct canines; **teeth on palatines (present in a single band in *Synodus* and *Trachinocephalus*, or 2 bands in *Saurida*) and on tongue. Vomer present (*Saurida*) or absent (*Synodus*, *Trachinocephalus*)**. Gill openings large; gill membranes free from isthmus; 4 gill arches, extending far forward into mouth, well in advance of the angle of gape. Opercular flap with free edge formed by both opercle and subopercle. Gill rakers rudimentary or minute and spine-like. **Branchiostegals 12 (*Trachinocephalus*), 13 (*Saurida*), or 15 to 18 (*Synodus*). Head and body with cycloid scales. Scales present on both procurrent and primary caudal-fin soft rays (*Saurida*), present only on procurrent rays (*Trachinocephalus*), or absent (*Synodus*)**. Fins with articulated soft rays except a few anterior secondary caudal-fin rays, none greatly prolonged. **Dorsal fin about midway on back**, posterior to pelvic-fin insertion; the first 2 rays always unbranched, the others usually branched, the last ray always branched to its base. **Adipose fin over base of anal fin. Anal fin posterior to end of dorsal fin**; the first 2 rays always unbranched, the other rays branched or unbranched, the last ray always branched to its base. Caudal fin forked, with 19 principle rays, 17 branched rays. Pectoral fins not reaching to or extending beyond origin of pelvic fins; the first and last rays always unbranched, the other rays usually branched. **Pelvic fins with 8 (*Synodus*, *Trachinocephalus*) or 9 rays (*Saurida*)**, fins close together and inserted abdominally, posterior to pectoral-fin origin and anterior to dorsal-fin origin; the first and last rays unbranched, all other rays branched; **inner rays of pelvic fins subequal or slightly longer than outer rays (*Saurida*) or distinctly longer than outermost rays (*Synodus*, *Trachinocephalus*)**. Anus located just anterior to anal-fin origin. **Colour:** variable, but often brown, reddish, or silvery, with red, yellow, or blue markings; peritoneum either pale with 5 to 11 black spots on each side of midventral line, or black.

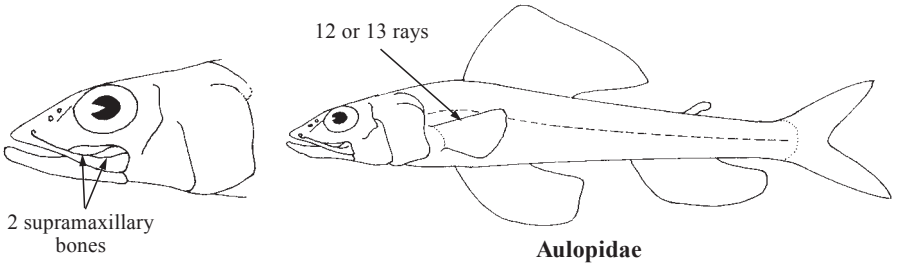


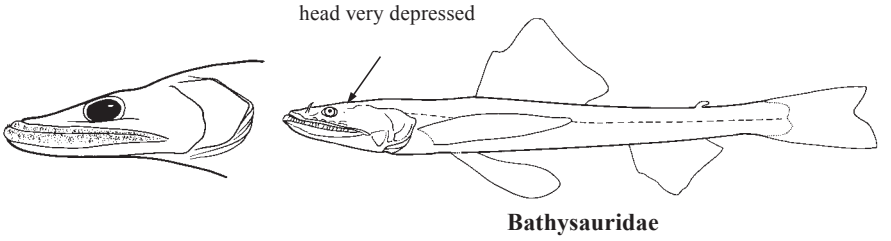
Habitat, biology, and fisheries: Marine, bottom-living fishes found on coral and rock, or mud and sand bottoms in coastal, estuarine, and offshore shelf waters. Most species occur in shallow water, but there are records to depths as great as 545 m. Voracious predators, feed mainly on other small fishes and crustaceans. Spawning and larval development is reported for *Synodus*, with release of gametes occurring in midwater up to 4 m above the substrate. Eggs are small to medium-sized (0.8 to 1.1 mm). Larvae are distinctive in possessing paired spots or patches of dark pigment in the lining of the peritoneum and along the midventral line of the anal fin and caudal peduncle. The spots persist internally in adults and are an aid to identification. Lizardfishes are of little interest to fisheries in the area, being taken mainly incidentally to other fishing operations in a few areas, and then not usually utilized. They occasionally appear as poorer foodfishes in some fish markets. Caught mainly with bottom trawls or occasionally by hook-and-line.

Similar families occurring in the area

Aulopidae: mouth moderate, upper jaw reaching rear end of eye; 2 supramaxillary bones; adipose fin present; pectoral fins with 12 or 13 rays, the uppermost rays usually longest; pelvic fins with 9 rays; procurrent and principle rays of caudal fin without scales; branchiostegal rays 15 or 16; gill rakers normal, lath-like shape; well-developed bony fulcral scale in front of caudal fin.

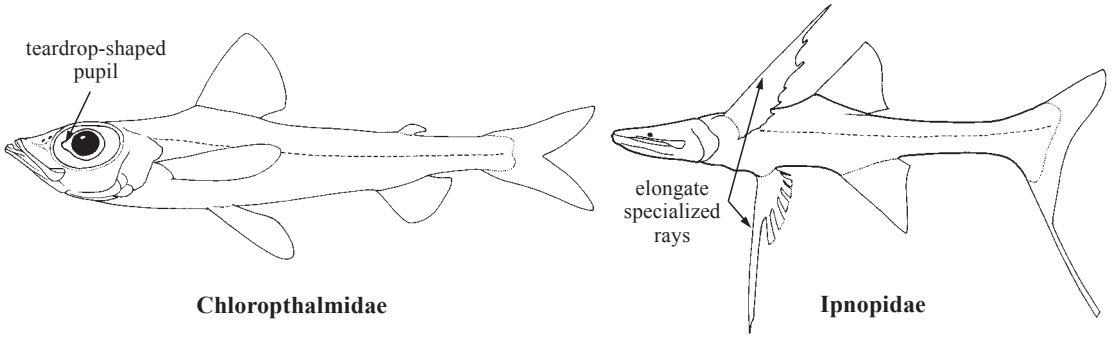
Bathysauridae: head very depressed; eyes set well back from snout; dorsal-fin base about equal to head length; adipose fin absent; pectoral fins with 15 rays, central ray or rays prolonged; pelvic-fin rays 8, inner rays slightly shorter than outer rays; lateral-line scales enlarged; procurrent and principle rays of caudal fin with a row of scales; branchiostegal rays about 12; teeth present on vomer; gill rakers reduced to patches of spines.





Chlorophthalmidae: eyes large, with teardrop-shaped pupil, tapetum of eye brilliant green in freshly caught specimens; mouth moderate, upper jaw not extending behind midpoint of eye; adipose fin present; anal fin with 7 to 11 rays; pectoral fins with 15 to 19 rays, uppermost rays usually longest; pelvic fins with 8 or 9 rays; gill rakers normal, lath-like shape.

Ipnopidae: eyes always specialized, either minute (*Bathymicrops, Bathypterois, Bathytyphlops*), large (*Bathysauropsis*), or flat, directed dorsally, and lensless (*Ipnops*); mouth large, the upper jaw extending far behind eye; dorsal fin large, placed over or before middle of body, inserted before pelvic-fin insertion, with 8 to 16 rays; adipose fin present or absent; anal fin inserted under or well behind level of dorsal fin, with 7 to 19 rays; pelvic fins in anterior half of body, often elongate, with 7 to 9 rays; pectoral fin with 9 to 24 rays; caudal fin and paired fins with elongate specialised rays in *Bathypterois*; gill rakers normal, lath-like, or reduced to low rugose knobs.



Key to the species of Synodontidae occurring in the area

Note: The Atlantic species of *Synodus* and *Saurida* are in urgent need of revision and the key to species and nomenclature of these genera should be regarded as provisional.

1a. Pelvic fin rays 8, the inner rays distinctly longer than outermost rays (Fig. 1a) . . . . . → *2*

1b. Pelvic fin rays 9, the inner rays subequal or slightly longer than outer rays (Fig. 1b) . . . . . → *7*

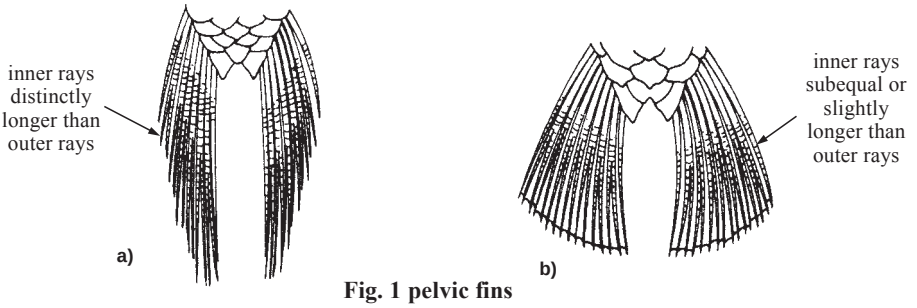


Fig. 1 pelvic fins

2a. Anal-fin rays 15 to 17; length of anal-fin base longer than dorsal-fin base (Fig. 2a); scales present on procurrent caudal-fin rays (Fig. 3a) . . . . . ***Trachinocephalus myops***

2b. Anal-fin rays 8 to 11; length of anal-fin base shorter than dorsal-fin base (Fig. 2b); no scales on procurrent caudal-fin rays (Fig. 3b) . . . . . → *3*

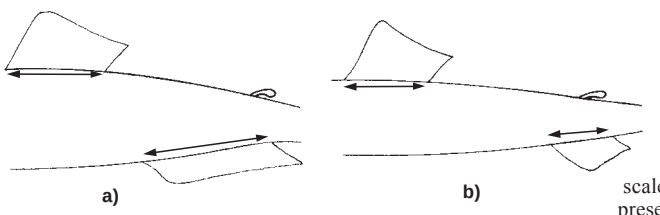


Fig. 2 lateral view of body

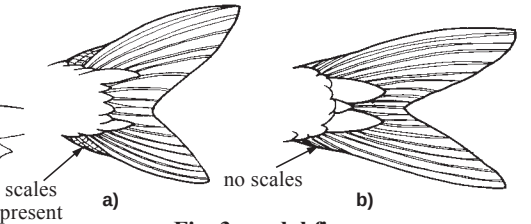


Fig. 3 caudal fin

3a. Scales in lateral line 43 to 50 (rarely 51 or 52) . . . . . → *4*

3b. Scales in lateral line 55 to 64 (rarely 54 or 65) . . . . . → *5*

4a. Dorsal fin with anterior rays not extending beyond, but occasionally extending to, tips of the succeeding rays when laid back; lower jaw rounded anteriorly, without fleshy knob; black patch on shoulder girdle under gill cover . . . . . ***Synodus intermedius***

4b. Dorsal fin with anterior rays extending to or usually beyond tips of succeeding rays when laid back; lower jaw ending in fleshy knob; no black patch on shoulder girdle under gill cover . . . . . ***Synodus poeyi***

5a. Three rows of complete scales between lateral line and base of dorsal fin . . . . . ***Synodus saurus***

5b. Four to 6 rows of complete scales between lateral line and base of dorsal fin . . . . . → *6*

6a. Snout triangular and sharply pointed, its length greater than diameter of eye; length of anal-fin base about equal to or usually longer than dorsal-fin base (rarely shorter); tip of pectoral fin falling short of or just reaching of pelvic-fin base; predorsal scales 20 to 30 . . . . . ***Synodus foetens***

6b. Snout rounded and blunt, its length less than diameter of eye; length of anal-fin base much shorter than dorsal-fin base; tip pectoral fin extending well beyond base of pelvic fin; predorsal scales 15 to 18 . . . . . ***Synodus synodus***

7a. Lower jaw shorter than upper jaw, not visible from above when mouth is closed . . . . ***Saurida normani***
7b. Lower jaw longer than upper jaw, distinctly visible from above when mouth is closed . . . . . → ***8***

8a. Scales in lateral line 40 to 50 . . . . . ***Saurida brasiliensis***
8b. Scales in lateral line 51 to 60 . . . . . → ***9***

9a. Three rows of complete scales between lateral line and base of dorsal fin; pectoral fin with tip reaching to or barely past origin of pelvic fin, its length 10.9 to 12.8% of standard length . . . . . ***Saurida suspicio***
9b. Four rows of complete scales between lateral line and base of dorsal fin; pectoral fin with tip reaching much beyond origin of pelvic fin, its length 17.5 to 20.0% of standard length . . . . . ***Saurida caribbaea***

List of species occurring in the area

The symbol is given when species accounts are included.

Saurida brasiliensis Norman, 1935.
Saurida caribbaea Breder, 1927.
Saurida normani Longley, 1935.
Saurida suspicio Breder, 1927.

Synodus foetens (Linnaeus, 1758).
Synodus intermedius (Spix, 1829).
Synodus poeyi Jordan, 1887.
Synodus saurus (Linnaeus, 1758).
Synodus synodus (Linnaeus, 1758).

Trachinocephalus myops (Forster, 1801).

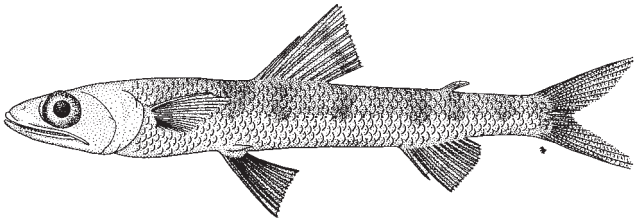
Reference

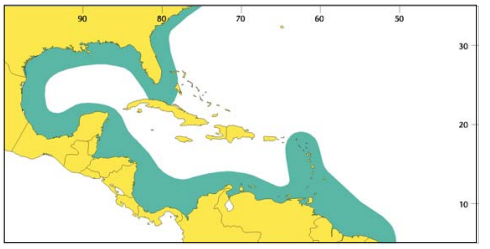
Anderson, W.W., Gehringer, J.W., and F.H. Berry. 1966. Family Synodontidae. In Fishes of the Western North Atlantic. *Mem. Sears Found. Mar. Res.*, 1(5):30-102.

Saurida brasiliensis Norman, 1935

En - Brazilian lizardfish (AFS: Largescale lizardfish); **Fr** - Anoli brasil; **Sp** - Lagarto Brasil.

Maximum size to 17 cm; commonly to 12 cm. Inhabits offshore bottom areas of open ocean in depths of 18 to 400 m, not found inshore at any size. Of no importance to fisheries. Occurs from North Carolina to northern Brazil (about 5°N), including the Gulf of Mexico and Caribbean Sea. Also recorded from off West Africa.

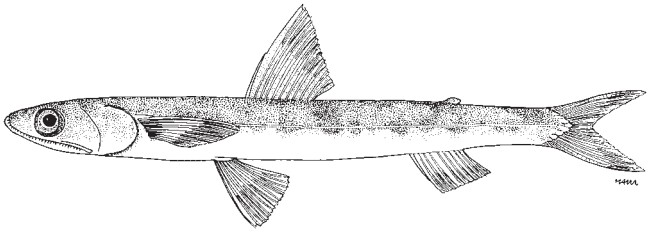


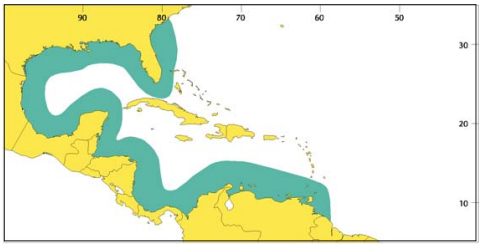


Saurida caribbaea Breder, 1927

En - Caribbean lizardfish (AFS: Smallscale lizardfish); **Fr** - Anoli des Caraïbes; **Sp** - Lagarto Caribeño.

Maximum size to 13 cm; commonly to 10 cm. Inhabits offshore bottom areas of the continental shelf and slope in depths of 10 to 450 m; occasionally occurs in shallow inshore waters. Of no importance to fisheries. Occurs from northeastern Florida to Venezuela (about 9°N), including the Gulf of Mexico and West Indies.

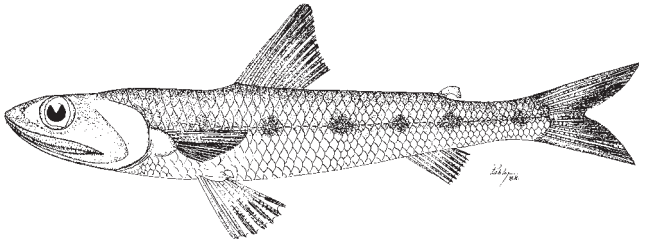


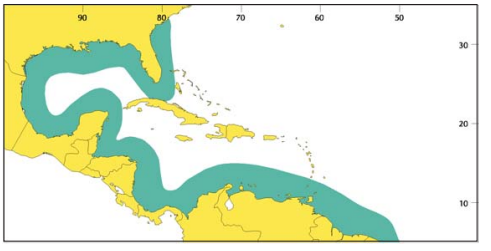


Saurida normani Longley, 1935

En - Shortjaw lizardfish; **Fr** - Anoli Norman; **Sp** - Lagarto dientón.

Maximum size to 33 cm; commonly to 30 cm. Inhabits offshore bottom areas of the continental shelf and slope in depths of 40 to 545 m; not found inshore at any size. Of minor importance to fisheries. Occurs from South Carolina to Suriname (about 7°N), including the Gulf of Mexico and Caribbean Sea.

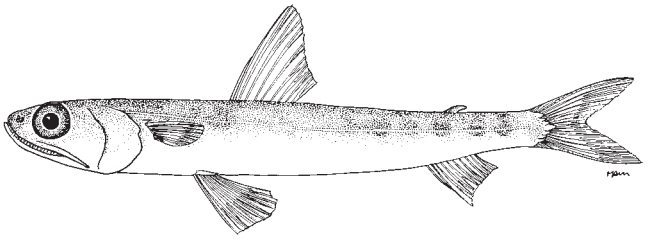


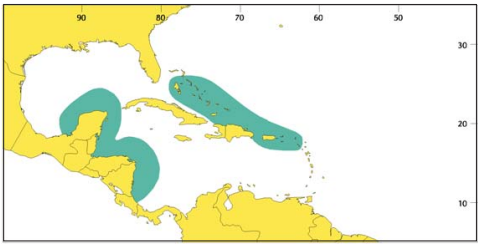


Saurida suspicio Breder, 1927

En - Doubtful lizardfish.

Maximum size to 7 cm. This rare species has only been taken near the surface or in shallow water near shore or over reefs. Of no importance to fisheries. Known only from the Bahamas and Caribbean Sea.

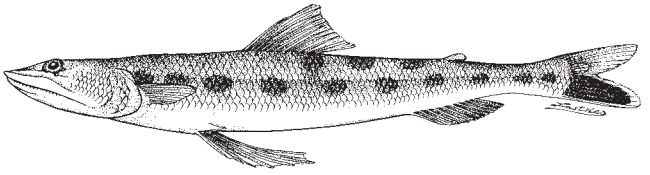


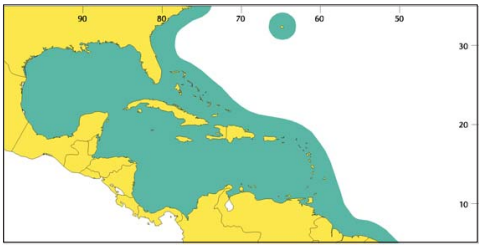


Synodus foetens (Linnaeus, 1758)

En - Inshore lizardfish; **Fr** - Anoli des plages; **Sp** - Lagarto playero.

Maximum size to about 40 cm; commonly to about 30 cm; world game record 0.9 kg. Inhabits shallow inshore waters in salt-water creeks, rivers, bays, and sounds and along open beaches on mud or sand bottoms; also ranges out over the continental shelf to depths of 180 m. A voracious predator that buries itself in the sand or mud to ambush prey; feeds mainly on fishes and small mobile invertebrates. Apparently a seasonal migrant in the northern part of its range. Of little importance to fisheries; taken incidentally in shrimp trawls and seldom marketed. Widely distributed along the Atlantic coast of the American continents from the vicinity of Cape Cod to Brazil, including Bermuda and the Caribbean Sea.

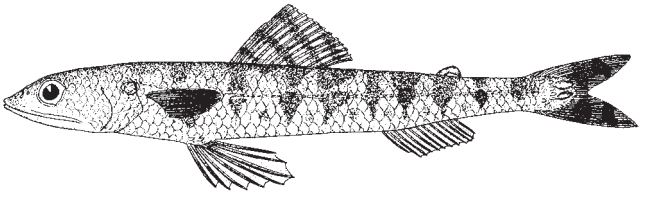


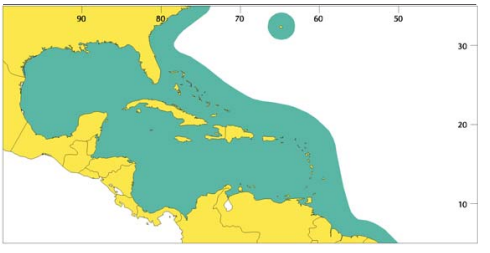


Synodus intermedius (Spix, 1829)

En - Sand diver; **Fr** - Anoli de sable; **Sp** - Lagarto mato.

Maximum size to about 40 cm; commonly to about 25 cm. Inhabits mainly inshore bottoms usually in depths of less than 35 m, but recorded as deep as 316 m. Habits similar to *S. foetens*. Of little importance to fisheries; taken only incidentally in a few areas. Marketed in Haiti as a poor foodfish. Widely distributed along the Atlantic coast of the American continents from North Carolina to Brazil, including Bermuda and the Caribbean Sea.

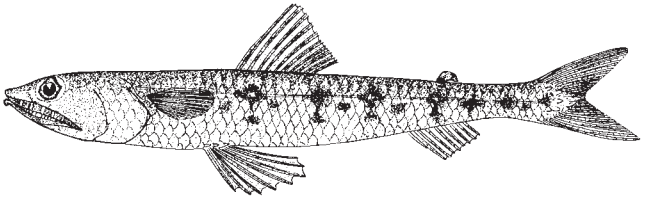


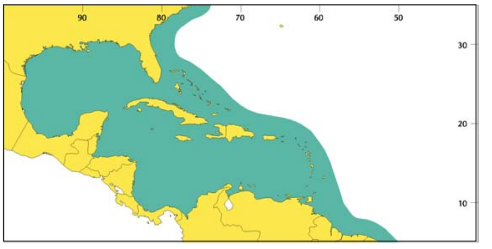


Synodus poeyi Jordan, 1887

En - Poey's lizardfish (AFS: Offshore lizardfish); **Fr** - Anoli Poey; **Sp** - Lagarto Poey.

Maximum size 20 cm. Inhabits offshore bottom areas in depths down to about 315 m, but more commonly found shallower than 180 m; not found inshore at any size. Of little importance to fisheries; taken incidentally with other catches and not utilized. Occurs from North Carolina to Suriname (about 7°N), including the Gulf of Mexico and Caribbean Sea.

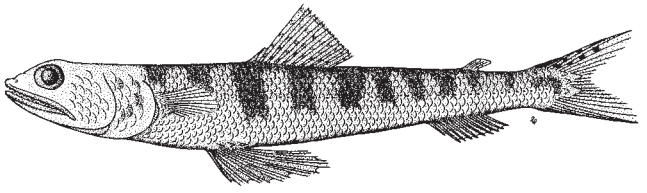


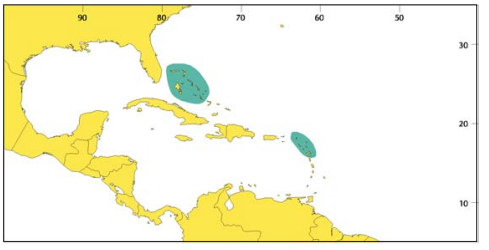


Synodus saurus (Linnaeus, 1758) SDR

En - Atlantic lizardfish (AFS: Bluestripe lizardfish); **Fr** - Anoli saury; **Sp** - Lagarto saury.

Maximum size about 40 cm; commonly to about 12 cm. Inhabits shallow bottom areas usually in depths less than 20 m. Of no importance to fisheries. An insular species, recorded only from the Bahamas and the Leeward islands, West Indies (records from Bermuda are not substantiated). Also occurs in the eastern Atlantic and Mediterranean Sea.

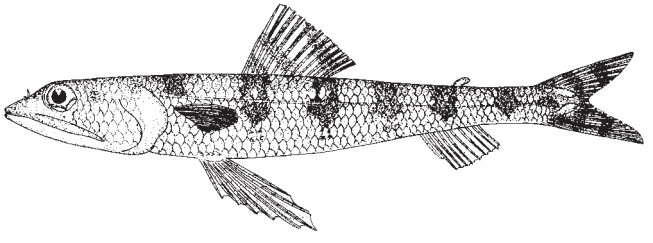


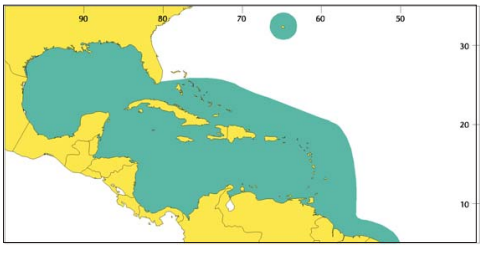


Synodus synodus (Linnaeus, 1758)

En - Redbarred lizardfish (AFS: Red lizardfish).

Maximum size about 30 cm; commonly 15 cm. Inhabits mainly inshore bottoms and shallower areas of the continental shelf down to about 90 m depth. Of little importance to fisheries. Occurs in Bermuda, and from the Gulf of Mexico through the West Indies, south to Uruguay. Also occurs in the eastern Atlantic.

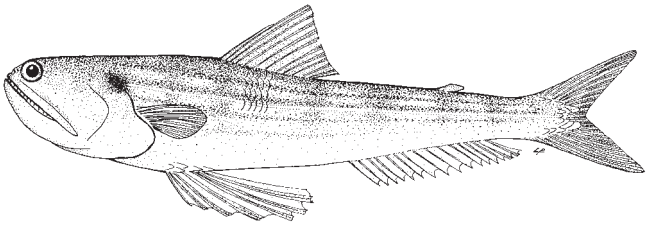


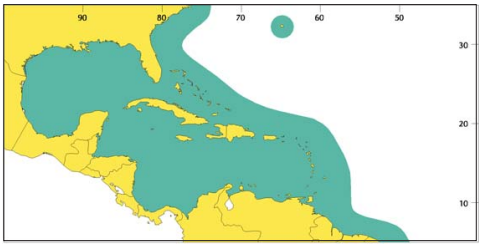


Trachinocephalus myops (Forster, 1801) TCY

En - Snakefish (=Bluntnose lizardfish); **Fr** - Anoli serpent; **Sp** - Lagarto ñato.

Maximum size about 25 cm. Inhabits inshore and offshore bottom areas in depths down to about 365 m, but more commonly found in midshelf areas in depths between 25 and 90 m. Of little importance to fisheries, sometimes taken incidentally with other catches. Pantropical with the exception of the eastern Pacific. In Area 31 it infrequently occurs as far north as Cape Cod, but more commonly southward from North Carolina to equatorial Brazil, including Bermuda, the Bahamas, and the Gulf of Mexico; also recorded from the mid-Atlantic islands of Ascension and St. Helena.



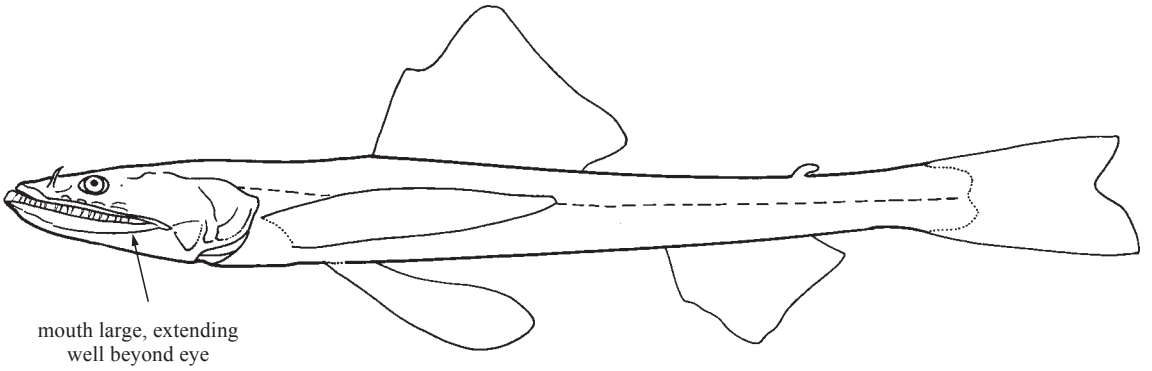


BATHYSAURIDAE

Deepsea lizardfishes

by B.C. Russell, Northern Territory Museum, Darwin, Australia

Diagnostic characters: Large (to 70 cm) aulopiform fishes, Head very depressed; eyes small, set well back from snout; **mouth very large, upper jaw extending well beyond rear end of eye**; dorsal fin about equal to head length, inserted shortly behind pelvic-fin insertion, with 15 to 18 soft rays; dorsal adipose fin present or absent; anal fin posterior, with 11 to 14 soft rays; pectoral fin with 15 to 17 soft rays, central ray or rays of pectoral fin usually prolonged; pelvic fin with 8 soft rays, inner rays slightly shorter than outer rays; **procurrent and principle rays of caudal fin with a row of scales**; branchiostegal rays 8 to 13; teeth present on vomer; **gill rakers reduced to patches of spines on the arches. Colour:** whitish, grey, or brown.



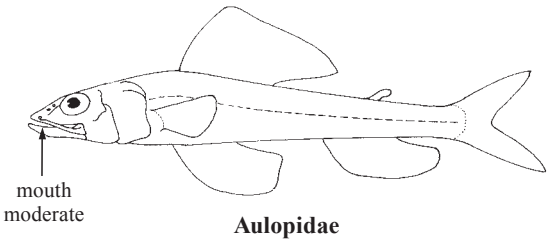
Habitat, biology, and fisheries: Bottom dwelling deep sea fishes of slope and abyss at depths below 1 000 m. Predominantly piscivorous, feeding on demersal and bathypelagic fishes, and occasional large benthic or nektonic crustacea. Synchronous hermaphrodites; post-larvae are pelagic. Typical deep sea fishes of no commercial importance.

Remarks: A single genus with 2 species, circumglobal in tropical and temperate latitudes (65° N to 40° S).

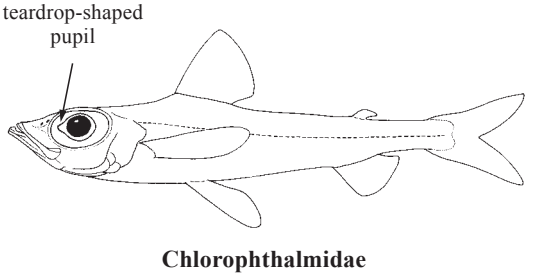
Similar families occurring in the area

Aulopidae: mouth moderate, upper jaw mostly not reaching rear end of eye; dorsal adipose fin present; pectoral fin with 11 to 14 soft rays, uppermost rays usually longest; pelvic fin with 9 soft rays; procurrent and principle rays of caudal fin without scales; branchiostegal rays about 16; gill rakers normal, lath-like shape; well-developed bony fulcral scale in front of caudal fin.

Chlorophthalmidae: eye large, with teardrop-shaped pupil, tagetum of eye brilliant green in freshly caught specimens; mouth moderate, upper jaw not extending behind midpoint of eye; dorsal adipose fin present; anal fin with 7 to 11 soft rays; pectoral fin with 15 to 19 soft rays, uppermost rays usually longest; pelvic fin with 8 or 9 rays; gill rakers normal, lath-like shape.



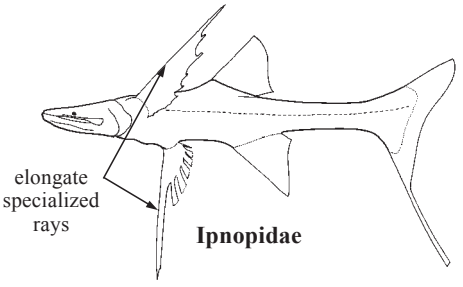
Aulopidae



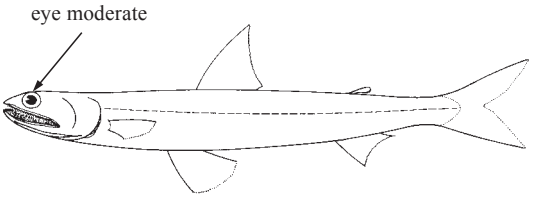
Chlorophthalmidae

Ipnopidae: eye always specialized, either minute (*Bathymicrops, Bathypterois, Bathytyphlops*), large (*Bathysauropsis*), or flat, directed dorsally, and lensless (*Ipnops*); mouth large, upper jaw extending far behind eye; dorsal fin large, placed over or before middle of body, inserted before pelvic-fin insertion, with 8 to 16 soft rays; dorsal adipose fin present or absent; anal fin under to far behind dorsal fin, with 7 to 19 soft rays; pelvic fin in anterior half of body, often elongate, with 7 to 9 soft rays, pectoral fin with 9 to 24 soft rays; caudal fin and paired fins with elongate specialized rays in *Bathypterois*; gill rakers normal, lath-like, or reduced to low rugose knobs.

Synodontidae: eye moderate, unspecialized; mouth large, upper jaw extending beyond rear end of eye; dorsal fin inserted in anterior half of body, behind pelvic-fin insertion, with 10 to 14 soft rays; dorsal adipose fin usually present; pelvic-fin soft rays 8 (*Synodus, Trachinocephalus*) or 9 (*Saurida*), inner rays subequal or slightly longer than outer rays (*Saurida*), or about 2 to 3 times longer than outermost rays (*Synodus, Trachinocephalus*); procurrent and principle rays of caudal fin with a row of scales (*Saurida*) or caudal fin without scales (*Synodus, Trachinocephalus*); branchiostegal rays 12 (*Trachinocephalus*) 13 (*Saurida*) or 15 to 18 (*Synodus*); gill rakers rudimentary or minute, spine-like.



Ipnopidae



Synodontidae

List of species occurring in the area

Bathysaurus ferox Günther, 1878. To 64 cm SL. Widespread temperate and tropical.

Bathysaurus mollis Günther, 1878. To 78 cm SL. Circumglobal temperate and tropical except E Pacific.

Reference

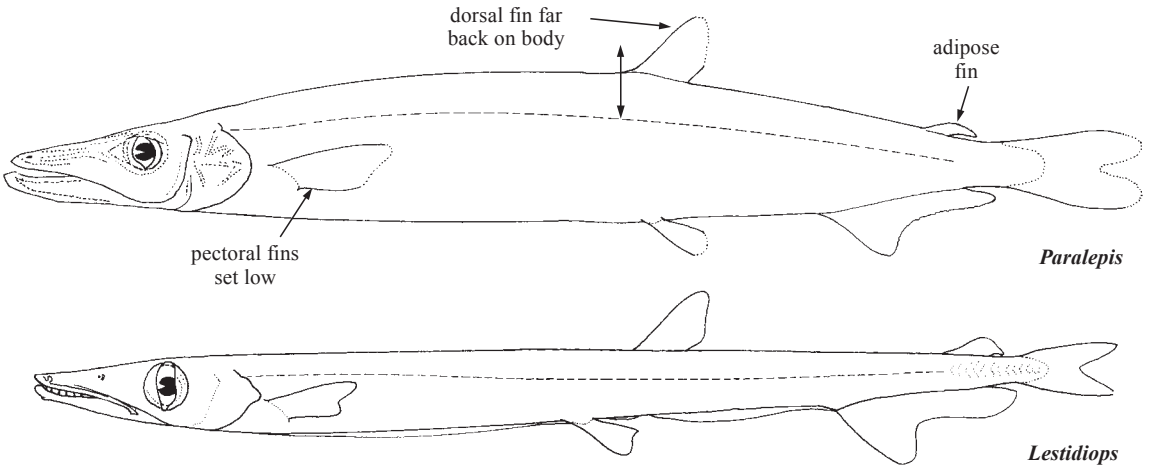
Sulak, K.J., C.A. Wenner, G.R. Sedberry, and L. Van Guelpen. 1985. The life history and systematics of deep-sea lizard fishes, genus *Bathysaurus* (Synodontidae). *Can. J. Zool.*, 63:623-642.

PARALEPIDIDAE

Barracudinas

By B.A. Thompson, Louisiana State University, USA (after Post, 1977)

Diagnostic characters: Small to medium-sized (6 to 56 cm), very elongate and slender aulopiform fishes; cross-section of body oval or compressed. Eye medium to large, nontubular, located on side of head; snout very long and pointed with terminal mouth, but lower jaw projects as fleshy process; mouth extends to front of eye or under middle of eye; teeth small; **alternately fixed and depressible fang-like teeth on lower jaw and roof of mouth**; single small supramaxilla on dorsal edge of maxilla. **Gill rakers reduced to small multiple spines set on bony plates**. Dorsal-fin origin at midpoint of body either above pelvic fins or over space between pelvic fins and anal fin; dorsal fin with 8 to 13 soft rays. Adipose fin located over rear part of anal fin and, in addition, several species possess a ventral adipose fin. Anal fin with 20 to 42 soft rays. Caudal fin deeply forked. Pectoral fins set low on body and slightly longer than or same length as pelvic fins, rarely pelvic fins are longer than pectoral fins; pectoral fin with 10 to 17 soft rays; pelvic fins with 8 or 9 soft rays. No elongate or modified fin rays. Specialized lateral-line scales covered with tympanum; usually only scales on body, but few species possess other body scales; 51 to 92 lateral-line scales when present. Swimbladder absent. **Colour:** iridescent silver, some species with spotted or blotched body pattern.



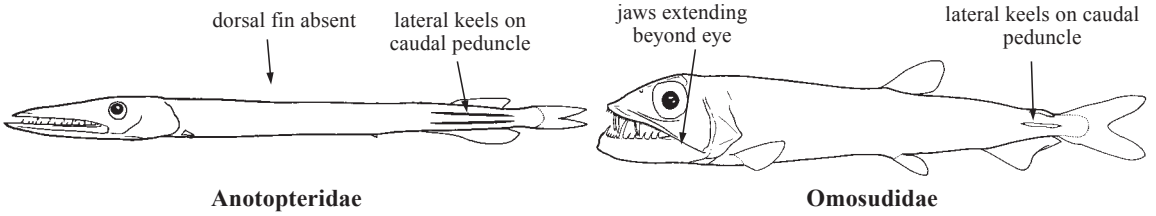
Habitat, biology, and fisheries: Found from polar regions to tropics worldwide, but most common in tropics. Generally meso- to bathypelagic, but can be found from the surface to about 800 m. Feeds on small fishes. Some species have separate sexes, others are synchronous hermaphrodites. No fishery.

Remarks: There remains some disagreement concerning the number of valid species and generic placement of members of this family, perhaps 12 genera and 50 to 55 species.

Similar families occurring in the area

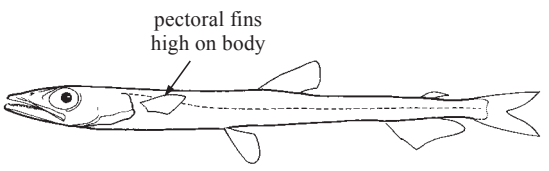
Anotopteridae: dorsal fin absent; lateral keels on caudal peduncle; no gill rakers; anal fin with 14 to 16 soft rays.

Omosudidae: jaws extending beyond eye; lateral keel on caudal peduncle; massive lower jaw; palatines with large fangs.

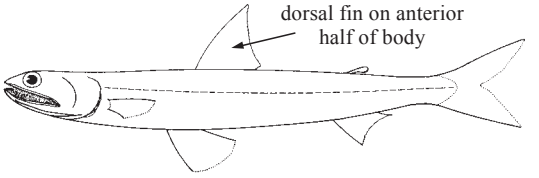


Notosudidae: gill rakers lath-like, not in the form of teeth or spines; pectoral fins fully lateral in position, set higher on body than in Paralepididae; anal fin moderately short, with 16 to 21 rays; branchiostegal rays 4 to 6 (8 in Paralepididae).

Chlorophthalmidae and Synodontidae: dorsal fin set on anterior half of body; anal fin short.



Notosudidae



Synodontidae

List of species occurring in the area

Note: All sizes are total length.

Arctozenus risso (Bonaparte, 1840). To 31 cm. Widespread in world oceans from Arctic to Antarctic.

Dolichosudis fuliginosa Post, 1969. To 40 cm. Tropical Atlantic, NE and W Pacific.

Lestidiops affinis (Ege, 1930). To 11 cm. Warm-temperate to tropical Atlantic.
Lestidiops jayakari (Boulenger, 1889). To 22 cm. Warm-temperate to tropical worldwide.
Lestidiops mirabilis (Ege, 1933). To 28 cm. Subtropical and tropical worldwide.

Lestidium atlanticum Borodin, 1928. To 21 cm. Temperate to tropical worldwide.

Lestrolepis intermedia (Poey, 1868). To 22 cm. Warm-temperate to tropical worldwide.

Macroparalepis affinis Ege, 1933. To 53 cm. Temperate N and S Atlantic, also S Pacific.
Macroparalepis brevis Ege, 1933. To 15 cm. Temperate N and S Atlantic.
Macroparalepis nigra (Maul, 1965). To 48 cm. Temperate Atlantic.

Magnisudis atlantica (Krøyer, 1868). To 48 cm. Widespread in Atlantic and Pacific oceans.

Paralepis brevirostris (Parr, 1928). To 25 cm. Temperate to tropical Atlantic.
Paralepis coregonoides Risso, 1820. To 29 cm. N Atlantic and Mediterranean.
Paralepis elongata (Brauer, 1906). To 20 cm. Warm-temperate to tropical Atlantic, Indian, and Pacific oceans.

Stemonosudis bullisi Rofen, 1963. To 7 cm. W Atlantic and Gulf of Mexico.
Stemonosudis gracilis (Ege, 1933). To 11 cm. Subtropical to tropical worldwide.
Stemonosudis intermedia (Ege, 1933). To 17 cm. W Atlantic, Gulf of Mexico, and Caribbean Sea.
Stemonosudis rothschildi Richards, 1967. To 25 cm. Atlantic, Indian, and Pacific Oceans.
Stemonosudis siliquiventer Post, 1970. To 18 cm. Tropical Atlantic.

Sudis atrox Rofen, 1963. To more than 9 cm. Temperate to tropical Atlantic and Pacific.
Sudis hyalina Rafinesque, 1810. To 42 cm. Temperate to tropical Atlantic and Mediterranean Sea.

Uncisudis advena (Rofen, 1963). To more than 7 cm. Warm-temperate W Atlantic.
Uncisudis quadrimaculata (Post, 1969). To 11 cm. Warm-temperate to tropical Atlantic.

References

McEachran, J.D. and J.D. Fechhelm. 1998. *Fishes of the Gulf of Mexico, Vol. 1*. Austin, University of Texas Press, pp 590-603.

Post, A. 1977. Paralepididae. In *FAO Species Identification Sheets, Western Central Atlantic (Fishing Area 31), Volume III*, edited by W. Fischer. Rome, FAO (unpaginated).

Post, A. 1984. Paralepididae (including Sudidae). In *Fishes of the North-eastern Atlantic and the Mediterranean, Vol. 1*, edited by P.J.P. Whitehead, M.L. Bauchot, J.C. Hureau, J. Nielsen and E. Tortonese. Paris, UNESCO, pp. 498-508.

Post, A. 1987. Results of the research cruises of FRV "Walther Herwig" to South America. LXVII. Revisiton of the subfamily Paralepidinae (Pisces, Aulopiformes, Alepisauroidei, Paralepididae) I. Taxonomy, morphology, and geographical distribution. *Archiv. feur Fischereiwissenschaft*, 38:75-131.

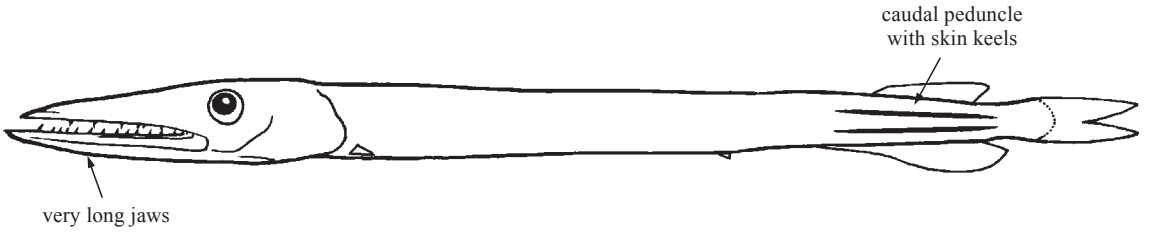
Rofen, R.R. 1966 Family Paralepididae. In *Fishes of the Western North Atlantic*, edited by W.W. Anderson et al. *Mem. Sears Found. Mar. Res.*, 1(5):205-461.

ANOTOPTERIDAE

Daggertooth

by B.A. Thompson, Louisiana State University, USA

Diagnostic characters: Large aulopiform fishes (to about 1 m), elongate, compressed anteriorly. **Head about 1/4 body length with very long jaws about 1/2 to 3/4 head length**; upper jaw shorter than lower jaw; gill rakers absent. **Dorsal fin absent**, small adipose fin located above anal fin; anal-fin soft rays 12 to 15; pectoral fins low on body and longer than pelvic fins which are located posterior to midline of body; pectoral-fin soft rays 13 to 15, pelvic-fin soft rays 7 to 10. Scales absent except for lateral line; **caudal peduncle with skin keels. Colour:** younger fish are silver turning black with maturity.



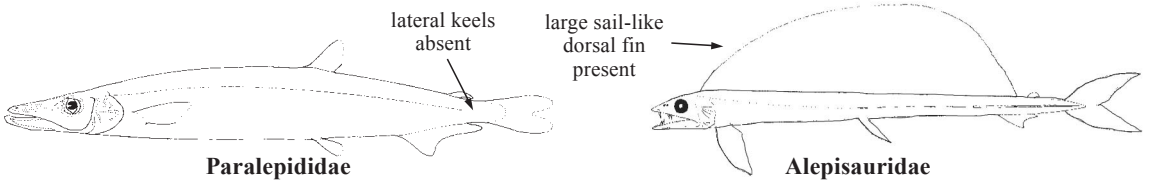
Habitat, biology, and fisheries: Found in the epipelagic and upper mesopelagic waters of the world's oceans north and south of about 20 . Piscivorous predators with distensible body wall and large stomachs. There is reduction in tooth number with growth. Thought to be synchronous hermaphrodites with semilparous reproduction. As gonads mature, stomach and intestines atrophy. No fishery.

Remarks: Included within family Paralepididae by Baldwin and Johnson (1996). Kukuev (1998) recognized 3 species in family.

Similar families occurring in the area

Paralepididae: dorsal fin present; lateral keels on caudal peduncle absent; anal fin with 20 or more rays.

Alepisauridae: large, sail-like dorsal fin present; jaws extending beyond eye.



List of species occurring in the area

Anotopterus pharao Zugmayer, 1911. To 1 m TL. N and temperate Atlantic waters.

References

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Heemstra, P.C. 1990. Anotopteridae. In *Fishes of the Southern Ocean*, edited by O. Gon and P.C. Heemstra. Grahamstown, South Africa, J.L.B. Smith Inst. Ichthy., pp. 142-143.

Hubbs, C.L., G.W. Mead, and N.J. Wilimovsky. 1953. The widespread, probably antitropical distribution and the relationship of the bathypelagic Iniomous fish *Anotopterus pharao*. *Bull. Scripps Inst. Oceanogr.*, 6:137-197.

Kukuev, E.I. 1998. Systematics and distribution in the world ocean of daggertooth fishes of the genus *Anotopterus* (Anotopteridae, Aulopiformes). *J. Ichthy.*, 38:716-729.

Rofen, R. 1966. Family Anotopteridae. In Fishes of the Western North Atlantic, edited by G.W. Mead, H.B. Bigelow, C.M. Breder, D.M.Cohen, D. Merriman, Y.H. Olsen, W.C. Schroeder, L.P. Schultz and J.Tee-Van. *Sears Found. Mar. Res. Mem.*, 1(5):498-510.

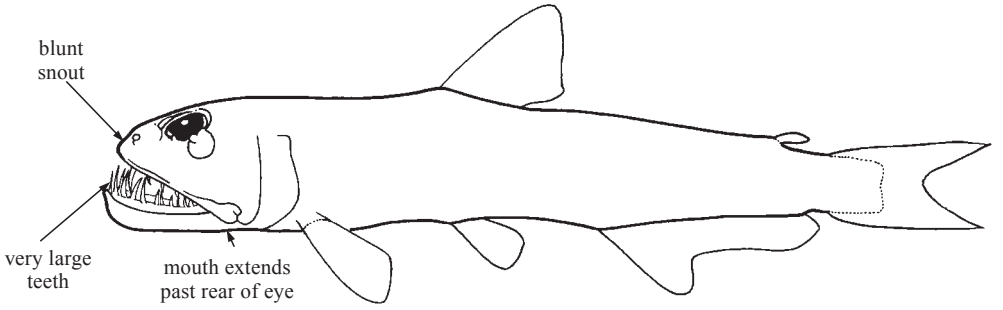
Templeman, W. 1970. Distribution of *Anotopterus pharao* in North Atlantic and comparison of specimens of *A. pharao* from Northwestern Atlantic with those from other areas. *J. Fish. Res. Bd. Can.*, 27:499-512.

EVERMANNELLIDAE

Sabertooth fishes

by B.A. Thompson, Louisiana State University, USA (after Johnson, 1986)

Diagnostic characters: Small (13 to 19 cm), elongate, slender, compressed aulopiform fishes. **Short head with short, blunt snout; eye may be tubular or nontubular** and varies in size; **mouth large, extending past rear of eye; upper jaw with single supramaxilla; very large teeth**, some barbed at tip. Dorsal fin inserts on anterior third of body, soft dorsal-fin rays 11 to 13; adipose fin located above rear part of anal fin; anal fin with more rays than dorsal fin, anterior rays longest, soft anal-fin rays 26 to 37; caudal fin deeply forked; pectoral fins located very low on body, short distance anterior to pelvic fins, soft pectoral-fin rays 11 to 13; pectoral fins longer than pelvic fins, soft pelvic-fin rays 9; no modified fin rays; no spines in any fins, luminous tissues in several species. **Colour:** variable, pale grey-white, brown, to brown-black.



Habitat, biology, and fisheries: Sabretooth fishes are found worldwide in warm-temperate to tropical oceans. Adults generally occupy the upper 800 to 1 000 m. They are predators on small fishes and squid. Family is reported to be synchronous hermaphrodites. No fishery.

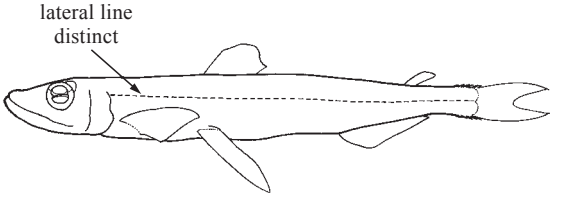
Remarks: Johnson (1982) recognized 6 species in 3 genera.

Similar families occurring in the area

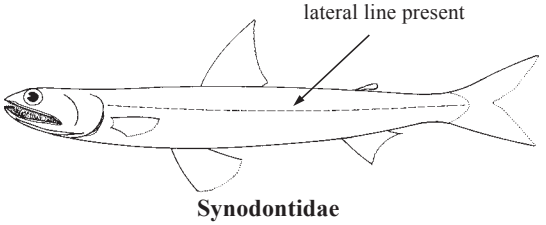
Scopelarchidae: large teeth on tongue; body scales present; lateral line distinct and made of large pored scales.

Synodontidae: no large fangs in jaws; body always scaled; lateral line present.

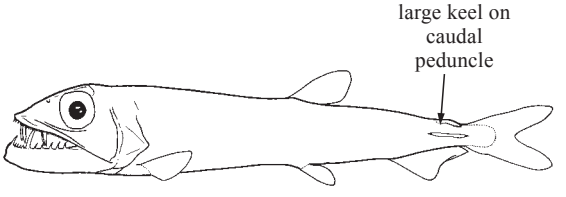
Omosudidae: lateral keel on caudal peduncle; massive lower jaw, somewhat truncated; dorsal fin behind midpoint of body.



Scopelarchidae



Synodontidae



Omosudidae

Key to the genera of Evermannellidae occurring in the area

1a. Eyes normal and lateral in position, not tubular; aperture in adipose eyelid less than lens diameter . . . . . ***Odontostomops***

1b. Eyes tubular or semi-tubular, directed at least somewhat dorsally; aperture in adipose eyelid greater than lens diameter . . . . . → ***2***

2a. Eyes semi-tubular, directed dorsolaterally; aperture in adipose eyelid slightly larger than lens diameter; jaw teeth without barbed tips . . . . . ***Coccorella***

2b. Eyes tubular, directed dorsally; aperture in adipose eyelid greatly exceeds lens diameter; at least some jaw teeth with barbed tips . . . . . ***Evermannella***

List of species occurring in the area

Coccorella atlantica (Parr, 1928). To 20 cm. Worldwide in warm-temperate to tropical oceans.

Evermannella balbo (Risso, 1820). To 17 cm. Worldwide in warm-temperate to tropical oceans.
Evermannella indica Brauer, 1906. To 14 cm. Worldwide in warm-temperate to tropical oceans.

Odontostomops normalops (Parr, 1928). To 14 cm. Worldwide in warm-temperate to tropical oceans.

References

Johnson, R.K. 1982. Fishes of the families Evermannellidae and Scopelarchidae: systematics, morphology, interrelationships, and zoogeography. *Fieldiana: Zoology, New Ser.*, 12:1-252.

Johnson, R.K. and G.S. Glodek. 1975. Two new species of *Evermannella* from the Pacific Ocean, with notes on other midwater species endemic to the Pacific Central or the Pacific equatorial water masses. *Copeia*, 1975:715-730.

McEachran, J.D. and J.D. Fechhelm. 1998. *Fishes of the Gulf of Mexico*, Vol. 1. Austin, University of Texas, pp. 584-587.

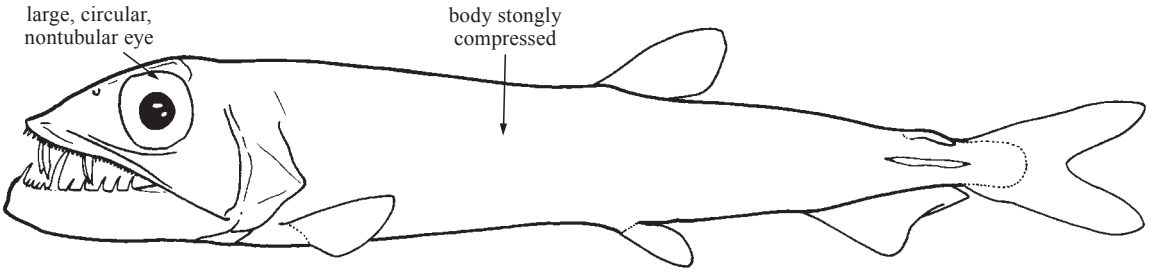
Rofen, R.R. 1966. Family Evermannellidae. In Fishes of the Western North Atlantic, edited by G.W. Mead, H.B. Bigelow, CM. Breder, D.M.Cohen, D. Merriman, Y.H. Olsen, W.C. Schroeder, L.P. Schultz and J.Tee-Van. *Sears Found. Mar. Res. Mem*., 1(5):511-565.

OMOSUDIDAE

Omosudid

by B.A. Thompson, Louisiana State University, USA

Diagnostic characters: Small aulopiform fishes (to 25 cm); moderately elongate and **strongly compressed**. Head large; **large, circular, nontubular eye placed laterally on head**; mouth very large, extending posterior to back of eye; **massive lower jaw**, somewhat truncated; **greatly enlarged teeth** on both dentaries and palatines. Dorsal fin located just posterior to midbody with fewer soft rays than anal fin, dorsal-fin soft rays 9 to 11; small adipose fin located over middle of anal fin; anal-fin soft rays 13 or 14; caudal fin deeply forked; pectoral fin located low on body, pectoral-fin soft rays 11 to 13; pelvic fins located about midway between pectoral fins and anal fin; scales absent, pelvic-fin soft rays 8; **midlateral keel below adipose fin**; no spines present in any fins; swimbladder absent. **Colour:** iridescent silver body, darker dorsally, black peridoneum visable.



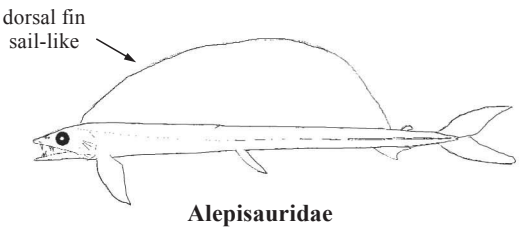
Habitat, biology, and fisheries: This monotypic family is worldwide in tropical and warm-temperate oceans, reported from 700 to 1 650 m. Predators on small fishes and squids, often consumming prey larger than themselves. They are reported to be synchronous hermaphrodites. No fishery.

Remarks: Included within family Alepisauridae by Baldwin and Johnson (1996).

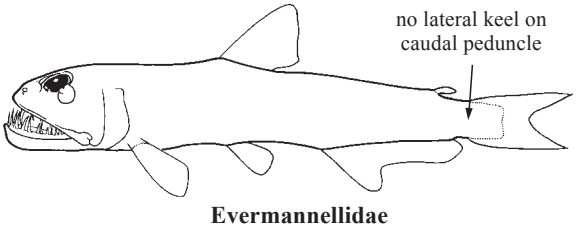
Similar families occurring in the area

Alepisauridae: dorsal fin large, sail-like.

Evermannellidae: no lateral keel on caudal peduncle; dorsal fin slightly anterior to middle of body; teeth present on tongue; anal fin long with 26 to 37 rays.



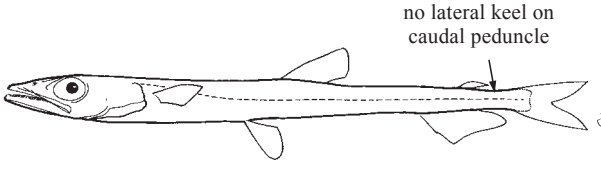
Alepisauridae



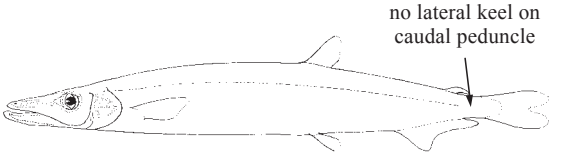
Evermannellidae

Notosudidae: no lateral keel on caudal peduncle; no fangs in jaws; scales present; lower jaw not deep.

Paralepididae: no lateral keel on caudal peduncle; adults with lateral line; jaws shorter, not extending past eye; anal fin long with 20 to 50 rays.



Notosudidae



Paralepididae

List of species occurring in the area

Omosudis lowei Günther 1887. To 25 cm. Worldwide in tropical and warm-temperate oceans.

References

Ege, V. 1958. *Omosudis* Günther, bathypelagic genus of fish. *Dana Rept*., 47:1-19.

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Rofen, R.R. 1966. Family Omosudidae. In Fishes of the Western North Atlantic, edited by G.W. Mead, H.B. Bigelow, CM. Breder, D.M.Cohen, D. Merriman, Y.H. Olsen, W.C. Schroeder, L.P. Schultz and J.Tee-Van. *Sears Found. Mar. Res. Mem.*, 1(5):462-481.

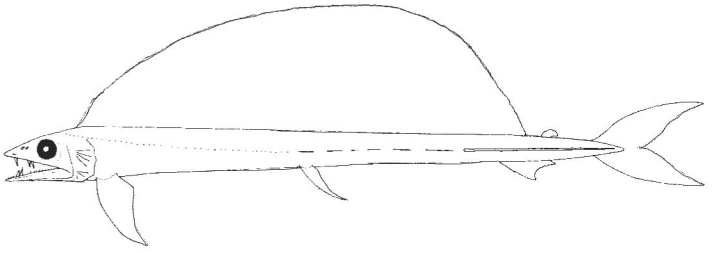
ALEPISAURIDAE

Lancetfishes

by B.A. Thompson, Louisiana State University, USA (after Gibbs and Wilimovsky, 1966 and Gibbs 1981)

Diagnostic characters: Large (to 2 m) aulopiform fishes, very elongate, slender and compressed body. Head also compressed; mouth large extending behind eye with large palatine teeth. **Dorsal fin nearly as long as body and sail-like**; small adipose fin above posterior part of anal fin; **pectoral fins set very low on body and longer than pelvic fins** which are located about midbody; dorsal-fin rays 32 to 48, anal-fin rays 13 to 18, pectoral-fin rays 12 to 15, pelvic-fin rays 8 to 10; no spines present in any fins. Scales absent; **caudal peduncle with midlateral adipose keel. Colour:** body iridescent blue-black above, grey-silver below; dorsal fin blue-black.

Habitat, biology, and fisheries: Alepisaurids are found from surface to below 1 000 m in warm temperate to tropical waters of world oceans with few cold-water records. They are predators known to eat cephalopods, crustaceans, and fishes. They are hermaphroditic. Commonly caught on long-line gear but with no fishery interest probably due to their soft, flabby flesh.



Similar families occurring in the area

None. The conspicuous sail-like dorsal fin distinguishes the Alepisauridae from all other aulopiform families and deep-sea fishes.

Key to the species of Alepisauridae occurring in the area

1a. Snout long, 1/3 to 1/2 head length; head long, greater than 17% standard length; dorsal fin high in front with free rays present; dorsal-fin rays 32 to 45; dorsal-fin origin over or slightly posterior to pectoral-fin origin . . . . . ***Alepisaurus ferox***

1b. Snout short, 1/4 to 1/3 head length; head short, less than 17% standard length; dorsal fin low in front; no free rays, dorsal-fin rays 40 to 48; dorsal-fin origin distinctly in front of pectoral-fin origin . . . . . ***Alepisaurus brevirostris***

List of species occurring in the area

Alepisaurus brevirostris Gibbs, 1960. To 1 m TL. Temperate and warm-temperate Atlantic, Pacific, and Indian oceans.

Alepisaurus ferox Lowe, 1833. To 2 m TL. Temperate and warm-temperate Atlantic, Pacific, and Indian oceans.

References

Francis, M.P. 1981. Meristic and morphometric variation in the lancet fish, *Alepisaurus*, with notes on the distribution of *A. ferox* and *A. brevirostris*. *N.Z.J. Zool.*, 8:403-408.

Gibbs, R.H. 1960. *Alepisaurus brevirostris*, a new species of lancetfish from the Western North Atlantic. *Breviora*, 123:1-14.

Gibbs, R.H. 1981. Alepisauridae. *FAO Species Identification Sheets Eastern Central Atlantic, Fishing Areas 34, 47(in part),* edited by W. Fisher and G. Bianchi. Vol I. Ottawa, Canada. Dept. of Fish and Oceans Canada.

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Gon, O. 1990. Alepisauridae. In *Fishes of the Southern Ocean*, edited by O. Gon and P.C. Heemstra. Grahamstown, South Africa, J.L.B. Smith Inst. Ichthy., pp. 144-145.

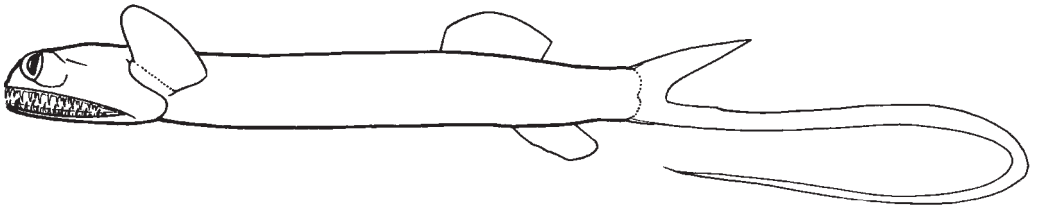
Heemstra, P.C. and M.M. Smith. 1986. Family Alepisauridae. In *Smiths' Sea Fishes*, edited by M.M. Smith and P.C. Heemstra. New York, Springer-Verlag, pp. 280-281.

GIGANTURIDAE

Telescope fishes

by B.A. Thompson, Louisiana State University, USA

Diagnostic characters: Small (18 to 23 cm) aulopiform fishes with elongate, slender bodies. Snout very short; **tubular eyes**, directed anteriorly, placed far forward on head; **very large mouth extending to middle of pectoral-fin base**; many long, recurved, and depressible teeth. All fin rays are unsegmented; dorsal fin with more rays than anal fin; caudal fin deeply forked, lower rays greatly elongated; **pectoral-fin base horizontal, high on body; adults lack many structures (adipose fin, pelvic girdle and fin, branchiostegal rays, gill rakers, and most gill arches) present in younger stages**; scaleless; swimbladder absent; dorsal fin with 16 to 19 rays, anal fin with 8 to 14 rays, pectoral fin with 30 to 42 rays. **Colour:** fresh specimens silver, fading to brown and black.



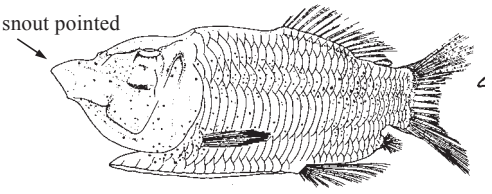
Habitat, biology, and fisheries: Worldwide in tropical oceans. Usually taken from mesopelagic and bathypelagic depths. They undergo a remarkable transformation from larvae to adults. Predators on pelagic fishes, often consuming prey larger than themselves. Family reported as synchronous hermaphrodites. No fishery.

Remarks: Johnson and Bertelsen (1991) recognized 2 species in a single genus. Young stages formerly considered genus *Rosaura*.

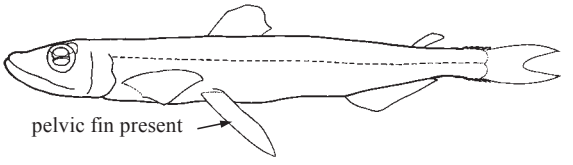
Similar families occurring in the area

Opisthoproctidae: also has tubular eyes, but body more robust; snout pointed; lower caudal lobe not elongate; pelvic fins present in adults; lateral line present; body with scales; adipose fin present.

Scopelarchidae: also has tubular eyes, but large teeth present on tongue; pelvic fins present in adults, lower caudal lobe not elongate; lateral line present; body with scales; adipose fin present.



Opisthoproctidae



Scopelarchidae

List of species occurring in the area

Gigantura chuni Brauer, 1901. To 20 cm. Widespread in tropical and subtropical waters worldwide.
Gigantura indica Brauer, 1901. To 25 cm. Widespread in tropical and subtropical waters worldwide.

References

Johnson, R.K. and E. Bertelsen. 1991. The fishes of the family Giganturidae: systematics, development, distribution and aspects of biology. *Dana Rept*., 91:1-45.

McEachren, J.D. and J.D. Fechhelm. 1998. *Fishes of the Gulf of Mexico, Vol. 1*. Austin, University of Texas Press, pp. 549-552.

Walters, V. 1961. A contribution to the biology of the Giganturidae with description of a new genus and species. *Bull. Mus. Comp. Zool*., 125:297-319.

Walters, V. 1964. Order Giganturoidei. In Fishes of the Western North Atlantic, edited by H.B. Bigelow, D.M. Cohen, M.M. Dick, R.H. Gibbs Jr., M. Grey, J.E.M. Morrow Jr., L.P. Schultz and V. Walters. *Sears Found. Mar. Res. Mem*., 1(4):566-577.

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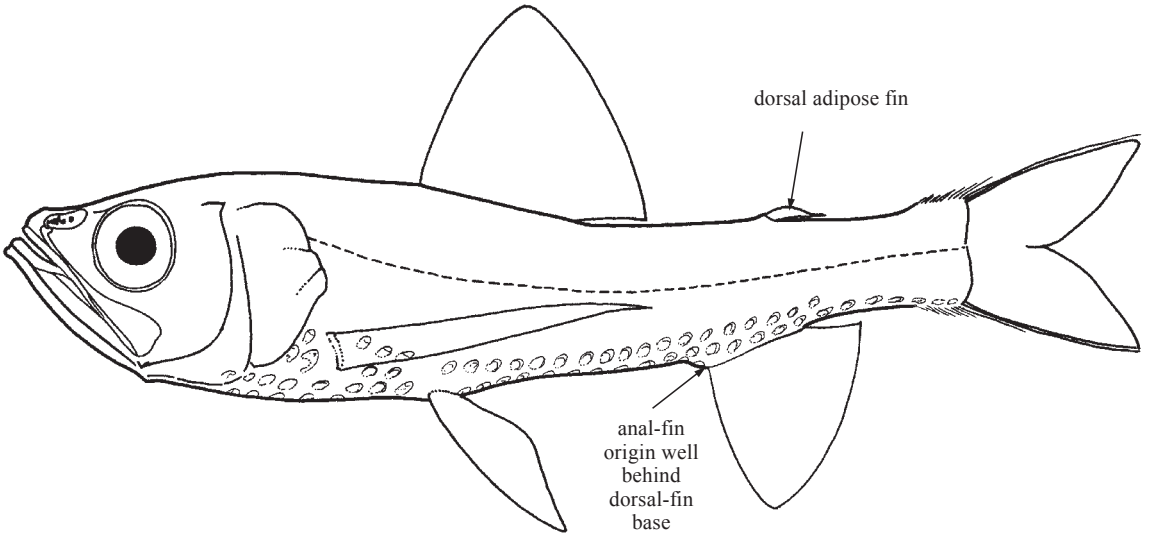
Order MYCTOPHIFORMES

NEOSCOPELIDAE

Neoscopelids

By K.E. Hartel, Harvard University, Massachusetts, USA and
J.E. Craddock, Woods Hole Oceanographic Institution, Massachusetts, USA

Diagnostic characters: Small fishes, usually 15 to 30 cm as adults. Body elongate with no photophores (*Scopelengys*) or with 3 rows of large photophores when viewed from below (*Neoscopelus*). Eyes variable, small to large. Mouth large, extending to or beyond vertical from posterior margin of eye; **tongue with photophores around margin in *Neoscopelus***. Gill rakers 9 to 16. Dorsal fin single, its origin above or slightly in front of pelvic fin, **well in front of anal fins**; 11 to 13 soft rays. **Dorsal adipose fin** over end of anal fin. **Anal-fin origin well behind dorsal-fin base**, anal fin with 10 to 14 soft rays. Pectoral fins long, reaching to about anus, anal fin with 15 to 19 rays. Pelvic fins large, usually reaching to anus. Scales large, cycloid, and deciduous. **Colour:** reddish silvery in *Neoscopelus*; blackish in *Scopelengys*.

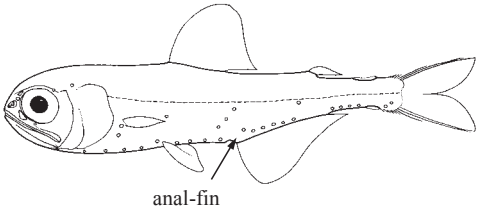


Habitat, biology, and fisheries: Large adults of *Neoscopelus* usually benthopelagic below 1 000 m, but subadults mostly in midwater between 500 and 1 000 m in tropical and subtropical areas. *Scopelengys* meso- to bathypelagic. No known fisheries.

Remarks: Three genera and 5 species with *Solivomer* not known from the Atlantic. All Atlantic species probably circumglobal .

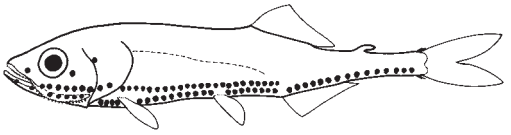
Similar families in occurring in area

Myctophidae: photophores arranged in groups not in straight horizontal rows (except *Taaningichthys paurolychnus* which lacks photophores). Anal-fin origin under posterior dorsal-fin base.



Myctophidae

Gonostomatidae, Phosichthyidae, Sternoptychidae: certain genera with similar body form to, and might be confused with, neoscopleids. Almost all with 1 or 2 horizontal rows of photophores on body but lack median ventral row. Lack edentulate maxilla that is expanded posteriorly.



Phosichthyidae

Key to the species of Neoscopelidae in the area

1a. Photophores present; eye large, about 1 in snout; upper jaw extending to about posterior margin of eye (Fig. 1) . . . ***(Neoscopelus)*** → ***3***

1b. Photophores absent; eye small, about 3 in snout; upper jaw extending at least 1 eye diameter beyond eye (Fig. 2) . ***Scopelengys tristis***

2a. Upper lateral series of photophores extends well past midpoint of anal-fin base (Fig. 1); gill rakers usually 14 (rarely 15 or 16) . . . . . ***Neoscopelus microchir***

2b. Upper lateral series of photophores extends only to about anus (Fig. 3); gill rakers usually 11 (rarely 12 to 14) . . . . . ***Neoscopelus macrolepidotus***

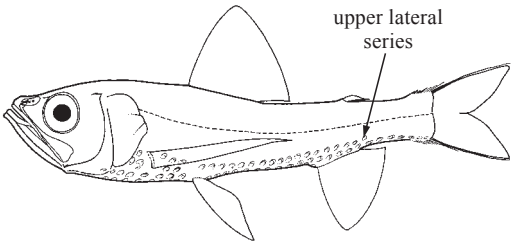


Fig. 1 ***Neoscopelus microchir***

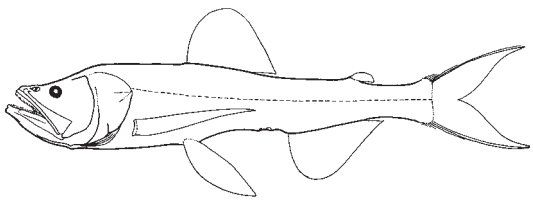


Fig. 2 ***Scopelengys tristis***

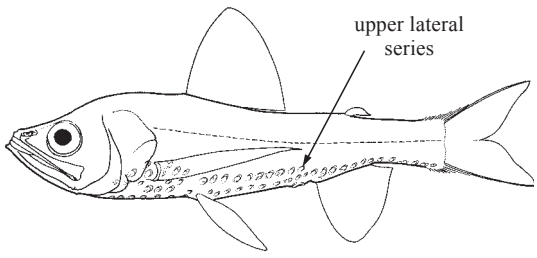


Fig. 3 ***Neoscopelus macrolepidotus***

List of species occurring in the area

Neoscopelus macrolepidotus Johnson, 1863. To 23 cm. Tropical-subtropical.
Neoscopelus microchir Matsubara, 1943. To 30 cm. Tropical-subtropical.

Scopelengys tristis Alcock, 1890. To 20 cm. Tropical-subtropical.

References

Burgess, G.H. and S. Branstetter. 1985. Status of *Neoscopelus* (Neoscopelidae) in the Gulf of Mexico with distributional notes on *Caulolatilus chrysops* (Branchiostegidae) and *Etelis oculatus* (Lutjanidae). *Northeast Gulf Sci.*, 7(2):157-162.

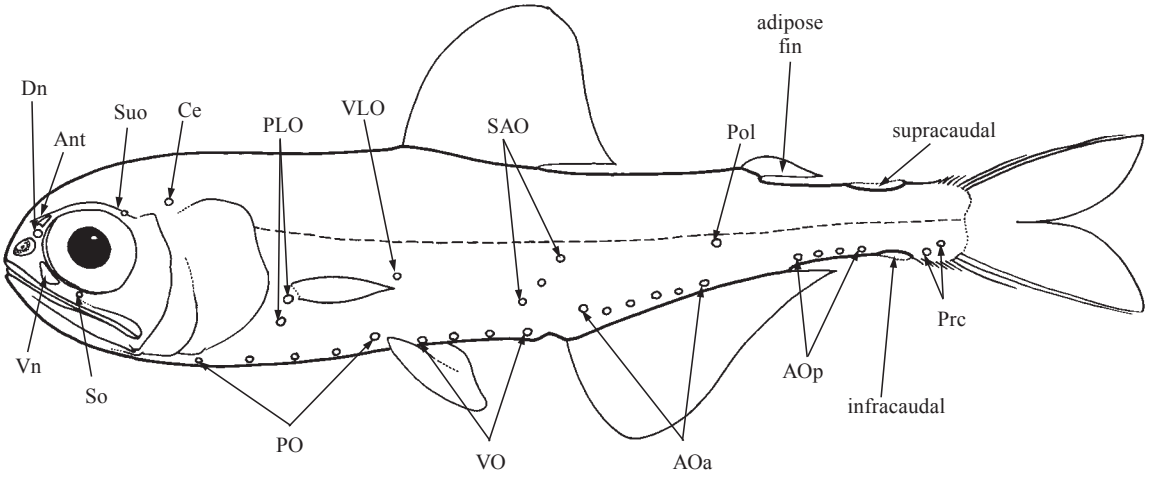
Nafpaktitis, B.G. 1977. Family Neoscopelidae. In Fishes of the western North Atlantic, edited by R.H. Gibbs, Jr. *Mem. Sears Found. Mar. Res.,* 1(7):1-12.

MYCTOPHIDAE

Lanternfishes

By J.E. Craddock, Woods Hole Oceanographic Institution, Massachusetts, USA and
K.E. Hartel, Harvard University, Massachusetts, USA

Diagnostic characters: Small fishes, from 2 to 30 cm as adults. Body typically elongate although 2 area species, *Electrona risso* and *Myctophum selenops*, quite deep-bodied. Head large with jaws reaching posterior margin of eye and beyond. Eye large. Small teeth in bands on the premaxillaries and dentaries, sometimes flattened but seldom enlarged. Gill rakers well developed but absent in *Centrobranchus*. **Dorsal-fin base at midbody**, fin sometimes relatively high; posterior dorsal-fin base nearly above or behind anal-fin origin; 10 to 26 soft rays. **Dorsal adipose fin present**. Anal fin under or just behind base of dorsal fin;12 to 27 soft rays. Principal caudal-fin rays 10 + 9 = 19. Pectoral fins rudimentary to very long; 10 to 18 soft rays. Pelvic fins under or just before anterior base of dorsal fin; pelvic-fin soft rays usually 8 but 6 in *Notolychnus* and sometimes 7 in *Gonichthys*. Scales deciduous. Photophores present in groups on head and body in all but 1 area species, *Taaningichthys paurolychnus*. Additional **luminous tissue** may be found on head, scales, fins, and as **glands on the upper and/or lower caudal peduncle. Colour:** mainly brown to black in deeper water species, silvery in shallower water species; often with metalic blue or green scales.



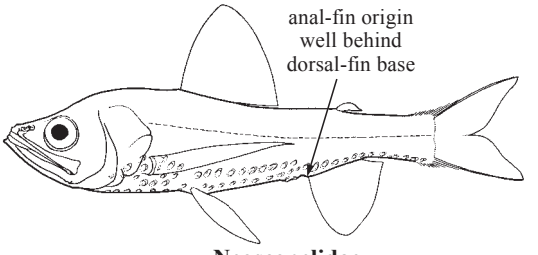
Dn	-	dorso-nasal	Vn	-	ventronasal
And	-	antorbital	So	-	suborbital
Suo	-	supraorbital	PO	-	thoracic
Ce	-	cervical	VO	-	ventral
PLO	-	suprapectoral	AOa	-	anterior anal
VLO	-	supraventral	AOp	-	posterior anal
SAO	-	supra-anal	Prc	-	precaudal

general distribution and terminology of the luminous organs (photophores)

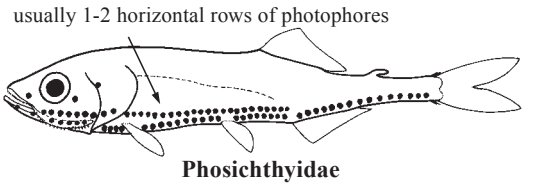
Habitat, biology, and fisheries: Typically, myctophids are pelagic fishes of the open ocean. Most species are found in the upper 1 000 m of the water column (mesopelagic). A few species live deeper than 1 000 m (bathypelagic). Some species are associated with continental and island slopes (pseudoceanic). Daily vertical migrations from about 400 to 1 000 m during the day into the upper 200 m at night are common; some species reach the surface. The light produced by the various light-producing organs is the result of relatively simple oxidation of luciferin in the presence of the enzyme luciferase. Myctophids are abundant in some areas, making up a large portion of the total biomass. Many myctophid species are found in Area 31 because it includes elements of tropical, sub-tropical, and even temperate faunas. Myctophids are very important food for larger

fishes, sea birds, and marine mammals. The only myctophid fisheries have been in the South Atlantic, Gulf of Oman, and Persian Gulf.

Remarks: Thirty-three genera and at least 240 species worldwide; 20 genera and 77 species in the area. It is possible that certain species with wide distributions are, in fact, species complexes. The life histories of many lanternfish species are poorly known, especially of those species larger than 10 cm. Distributions given in the list of species apply only to the Atlantic; space does not allow discussion of extra-Atlantic occurrences.



Neoscopelidae



Phosichthyidae

Similar families occurring in area

Separated from most other families in the area by a lack of photophores and a dorsal adipose fin. Further distinguishing characters of these families are the following:

Neoscopelidae: posterior dorsal-fin base well in advance of the anal-fin origin. *Neoscopelus* as large photophores in 3 longitudinal rows on body and along edge of tongue. *Scopelengys* lacks photophores and has a very small eye.

Gonostomatidae, Phosichthyidae (Photichthyidae), Sternoptychidae: teeth conical or needle-like on both premaxilla and maxilla, never in bands. Almost all have 1 or 2 horizontal rows of photophores on body. None with a set of 3 photophores (SAO) at midbody, elaborate head photophores (Ant, Dn, Vn), or the supra- or infracaudal glands of myctophids.

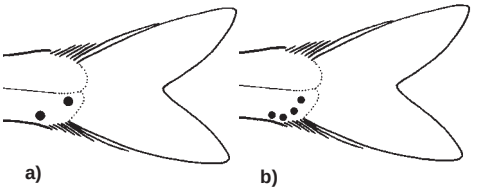


Fig. 1 Prc photophores

Key to the genera and monotypic species of Myctophidae occurring in the area

Note: Identification and taxonomy of Myctophidae are based heavily on the arrangement of the various photophore groups as shown above. Care must be taken in identifying the location and number of photophores. Photophores are often lost or damaged in nets so identification may be impossible.

1a. Two Prc photophores (Fig. 1a) . . . . . → ***2***

1b. Three or more Prc (1 may be at or above lateral midline at base of caudal peduncle) or none in *Taaningichthys paurolychnus* (Fig. 1b) . . . . . → ***12***

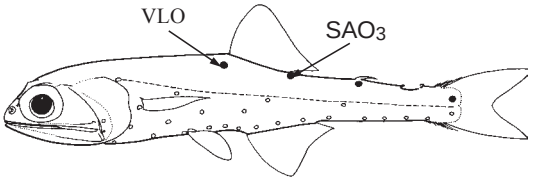


Fig. 2 *Notolychnus*

2a. Four photophores (VLO, SAO_3, Pol, Prc_2) well above the midlateral line (Fig. 2); specimens usually skinned and photophores often lost; small species, never over 2.5 cm . . . . . ***Notolychnus valdiviae***

2b. No photophores above lateral line. . . . . → ***3***

3a. AO in a single uninterrupted series (Fig. 3, 4); Pol absent . . . . . → ***4***

3b. AO divided into 2 groups, AOa and AOp (Fig. 5); Pol present (Fig. 5) . . . . . → ***5***

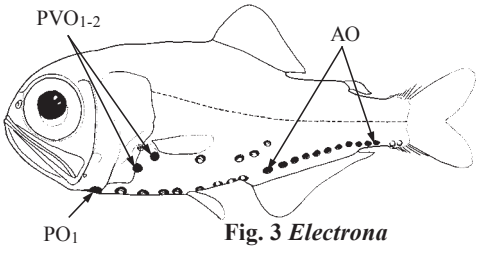


Fig. 3 *Electrona*

4a. PVO_{1-2} inclined, in line with PO_1 (Fig. 3); interorbital wide; eye normal, pointing laterally . . . . . ***Electrona risso***

4b. PVO_{1-2} in an almost horizontal line (Fig. 4), a line through them markedly above PO_1; interorbital very narrow; eyes pointed upward, almost telescopic . . . . . ***Protomyctophum arcticum*** (not in Area 31)

5a. Mouth terminal, snout not projecting (Fig. 5); jaws short, extending less than 1/2 eye diameter behind orbit . . . . . → ***6***

5b. Mouth subterminal, snout projecting (Fig. 10); jaws moderate, extending 1/2 eye diameter behind orbit . . . . . → ***10***

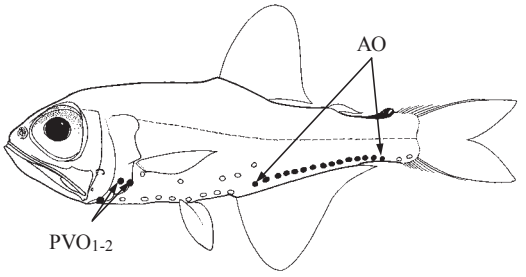


Fig. 4 ***Protomyctophum arcticum***

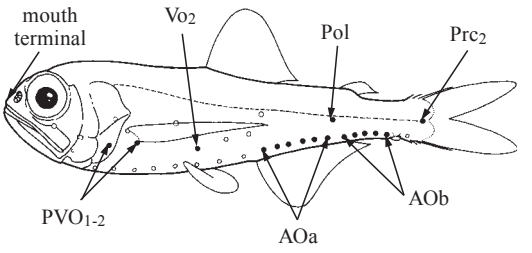


Fig. 5 ***Benthosema***

6a. PVO_{1-2} in a horizontal line (Fig. 5); VO_2 elevated . . . . . → ***7***

6b. PVO_{1-2} in an inclined line (Fig. 7), with PVO_2 usually more than 1 photophore diameter above PVO_1; all VO level (Fig. 7) . . . . . → ***8***

7a. Prc_2 high, from 1 to 2 photophore diameters below, or on, midlateral line (Fig. 5); teeth simple, never hooked . . . . . ***Benthosema***

7b. Prc_2 low, level with Prc_1 (Fig. 6); outer dentary teeth flattened and hooked forward . . . . . ***Diogenichthys atlanticus***

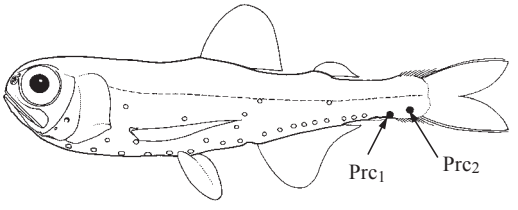


Fig. 6 ***Diogenichthys atlanticus***

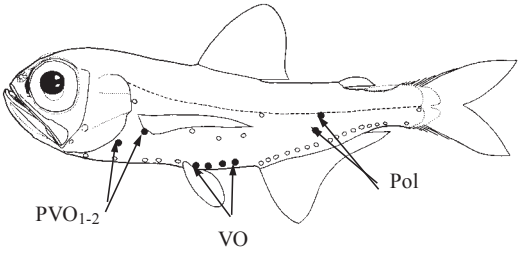


Fig. 7 ***Hygophum***

8a. Two Pol (Fig. 7) . . . . . ***Hygophum***

8b. One Pol (Fig. 8) . . . . . → ***9***

9a. SAO forming an almost right angle with SAO_1 over or in advance of VO_3 (Fig. 8) . . . ***Symbolophorus***
9b. SAO in an almost straight or slightly angled line with SAO_1 well behind VO_3 (Fig. 9) . . . ***Myctophum***

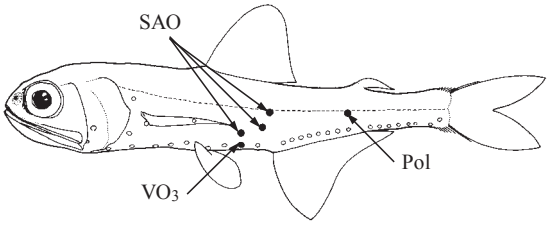


Fig. 8 ***Symbolophorus***

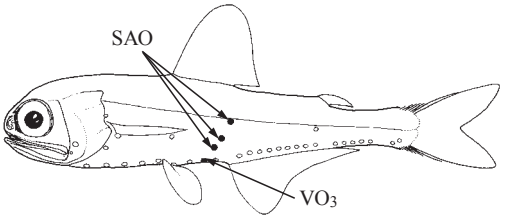


Fig. 9 ***Myctophum***

10a. Gill rakers absent (Fig. 10)
. . . . . ***Centrobranchus nigroocellatus***
10b. Gill rakers present . . . . . → ***11***

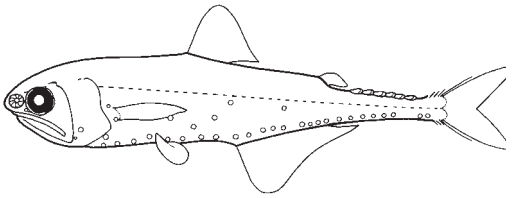


Fig. 10 ***Centrobranchus nigroocellatus***

11a. AOp 7 or fewer, at most 1 over anal base (Fig. 11); anal-fin origin about under middle of dorsal-fin base . . . . . ***Loweina***
11b. AOp 10 or more, with 5 to 7 over anal-fin base (Fig. 12); anal-fin origin under end of dorsal-fin base . . . ***Gonichthys cocco***

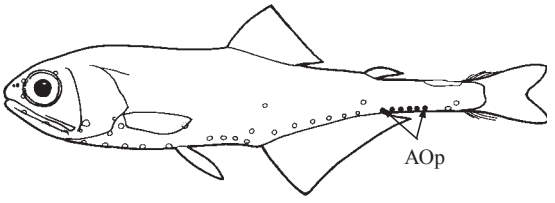


Fig. 11 ***Loweina***

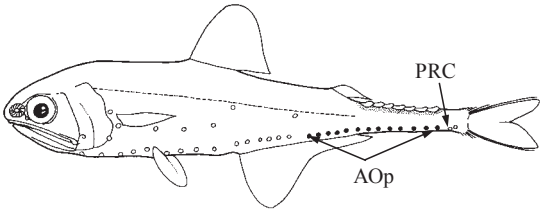


Fig. 12 ***Gonichthys***

12a. Dn absent; VO and Pol never arranged as in 12b . . . . . → ***13***
12b. Dn present; either 2 horizontal Pol (Fig. 13) near lateral line or VO_{1-3} on a straight ascending line with VO_{4-5} level (Fig. 14). . . . . → ***19***

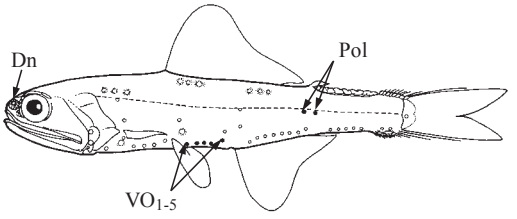


Fig. 13 ***Notoscopelus***

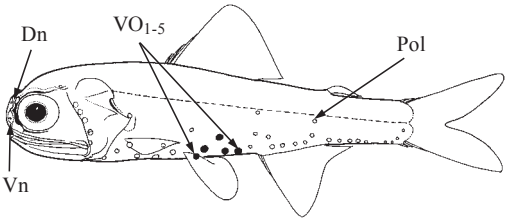


Fig. 14 ***Diaphus***

13a. Supra- and infracaudal glands single organs bordered by heavy jet-black pigment (Fig. 15a) . . . . . → ***14***

13b. Supra- and infracaudal glands overlapping scale-like plates, never bordered by jet-black pigment (Fig. 15b) . . . . . → ***15***

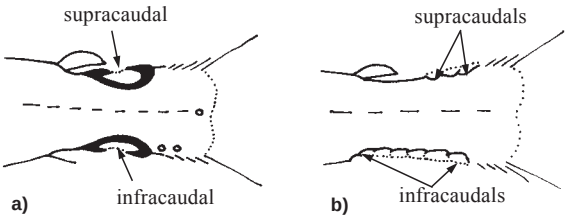


Fig. 15 caudal peduncle

14a. A large white crescent on posterior half of eye; dorsal-fin origin behind base of pelvic fin; only 1 SAO (at midbody) or none in *T. paurolychnus* (Fig. 16) . . . . . ***Taaningichthys***

14b. No large white crescent on posterior half of eye; dorsal-fin origin over or slightly in front of pelvic fin; 3 SAO (Fig. 17) . . . . . ***Lampadena***

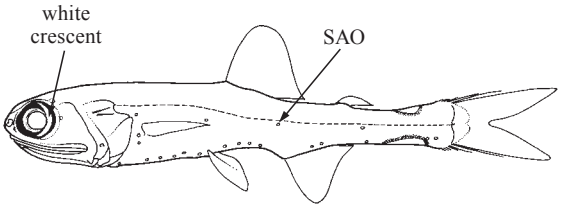


Fig. 16 ***Taaningichthys***

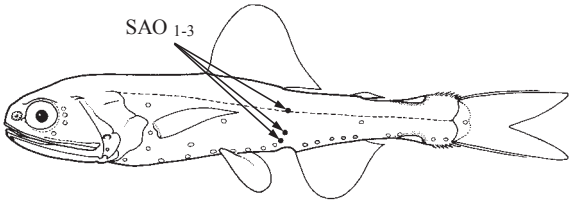


Fig. 17 ***Lampadena***

15a. Luminous tissue restricted to caudal luminous glands and occasionally at base of adipose fin (Fig. 18) . . . . . → ***16***

15b. Luminous tissue over base of anal or dorsal fins and on other portions of body (Figs. 19, 20, 21) . . . . . → ***17***

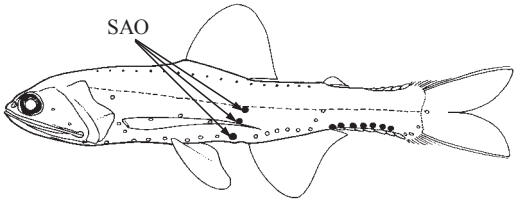


Fig. 18 ***Lampanyctus***

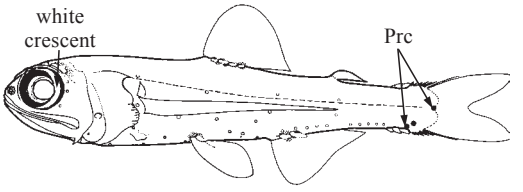


Fig. 19 ***Bolinichthys***

16a. Pectoral fin long, at least reaching SAO photophores, often to anterior anal fin. (Fig. 18) . . . . . ***Lampanyctus***

16b. Pectoral fin rudimentary or short, seldom reaching PO_4 (note that *L. macdonaldi* is the only Atlantic *Lampanyctus* with a short pectoral fin but it has 21 or more gill rakers vs. fewer than 21 in all *Nannobrachium*) . . . . . ***Nannobrachium***

17a. Three (2+1) Prc; a whitish crescent on posterior half of eye; luminous tissue above eyes in some species (Fig. 19) . . . . . ***Bolinichthys***

17b. Four (3+1) Prc; eye without whitish crescent; no luminous tissue above eyes (Figs. 20, 21) . . . . → ***18***

18a. PO_4 elevated; VO_2 elevated (Fig. 20); no medial luminous tissue either at bases of pelvic fins or between pelvic fins and anal-fin origin; pectoral fin long, reaching adipose origin . ***Lepidophanes***

18b. PO_4 not elevated; VO only slightly arched (Fig. 21); medial luminous tissue present at bases of pelvic fins or between pelvic fins and anal-fin origin; pectoral fins moderate, not reaching adipose fin . . . . . ***Ceratoscopelus***

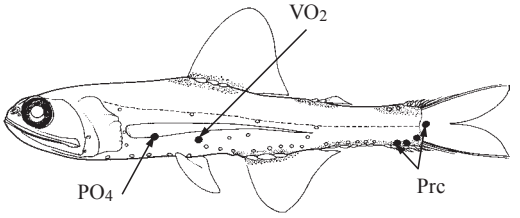


Fig. 20 ***Lepidophanes***

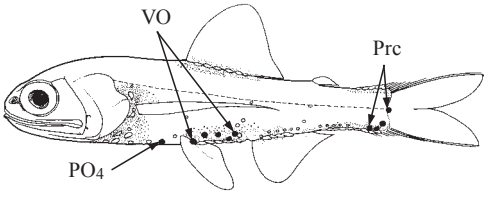


Fig. 21 ***Ceratoscopelus***

19a. VO_{1-5} level; both supra- and infracaudal glands present in both sexes; 2 horizontal Pol near lateral line (Fig. 22) . . . . . ***Notoscopelus***

19b. VO_{1-3} on a straight, inclined, ascending line with VO_{4-5} level (Figs 23, 24); no caudal glands (*Diaphus*) or only 1 caudal gland (*Lobianchia*); 1 Pol . . . . . → ***20***

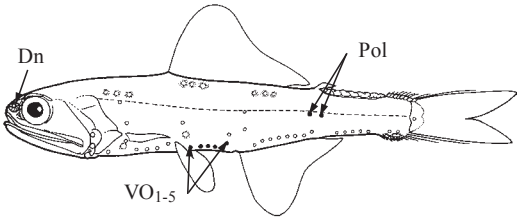


Fig. 22 ***Notoscopelus***

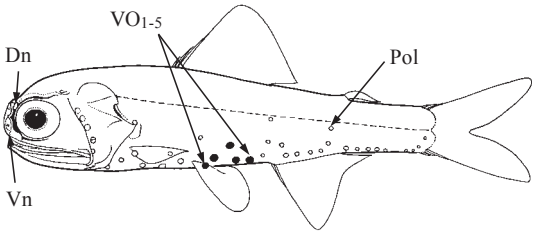


Fig. 23 ***Diaphus***

20a. Caudal glands absent; more than 1 pair of luminous glands on head (Ant, Dn, Vn, or So); usually a luminous scale at PLO (Fig. 23) . . . ***Diaphus***

20b. Supracaudal (males) and infracaudal (females) well developed; 1 pair (Dn) of luminous organs on head; luminous scale at PLO absent (Fig. 24) . . . . . ***Lobianchia***

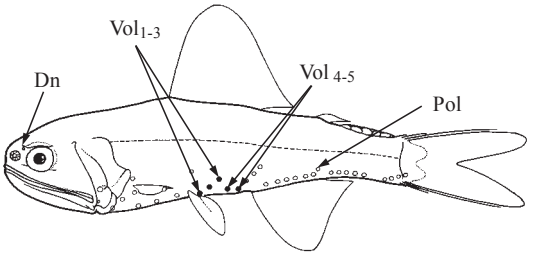


Fig. 24 ***Lobianchia***

List of species occurring in the area

Note: All are mesopelagic unless otherwise stated. Species list based on MCZ database with *D. adenomus* and *T. paurolychnus* from Nafpaktitis et al. (1977). *L. gemmifer* Goode and Bean 1896 was suggested for the Atlantic population of *L. crocodilus* by Stephnescu et al. (1994) who restricted *L. crocodilus* to the Mediterranean Sea.

Benthosema glaciale (Reinhardt, 1837). To 7 cm. Subarctic S to N31.
Benthosema suborbitale (Gilbert, 1913). To 3.8 cm. Widespread, tropical to temperate.

Bolinichthys distofax Johnson, 1975. To 8.5 cm. Rare, tropical and S subtropical.
Bolinichthys indicus (Nafpaktitis and Nafpaktitis, 1969). To 4.5 cm. Bipolar subtropical.
Bolinichthys photothorax (Parr, 1928). To 6.5 cm. Tropical-subtropical, rarely N to Slope Water (SW21).
Bolinichthys supralateralis (Parr, 1928). To 11 cm. Widespread, tropical to temperate.

Centrobranchus nigroocellatus (Günther, 1873). To 5 cm. Widespread, tropical to temperate.

Ceratoscopelus maderensis (Lowe, 1839). To 7 cm. N temperate S to N 31.
Ceratoscopelus warmingii (Lütken, 1892). To 7.5 cm. Widespread, tropical to temperate.

Diaphus adenomus Gilbert, 1905. To 18 cm. Rare, pseudoceanic, W31 (and SE27).
Diaphus anderseni Tåning, 1932. To 3 cm. S subtropical, rare to SE31.
Diaphus bertelseni Nafpaktitis, 1966. To 8 cm. Rare, tropical-subtropical.
Diaphus brachycephalus Tåning, 1928. To 6 cm. Tropical-subtropical.
Diaphus dumerilii (Bleeker, 1856). To 8.6 cm. Tropical, common N to Slope Water (SW21).
Diaphus effulgens (Goode and Bean, 1896). To 15 cm. Bipolar subtropical.
Diaphus fragilis Tåning, 1928. To 9 cm. Tropical, rare N to Slope Water (SW31).
Diaphus garmani Gilbert, 1906. To 6 cm. Tropical, possibly pseudoceanic as adult.
Diaphus lucidus (Goode and Bean, 1896). To 12 cm. Tropical, rare N to Slope Water (SW21).
Diaphus luetkeni (Brauer, 1904). To 6 cm. Tropical, rare N to Slope Water (SW21).
Diaphus metopoclampus (Cocco, 1829). 7.5 cm. Bipolar temperate-subtropical.
Diaphus minax Nafpaktitis, 1968. To 6.6 cm. Extremely rare, pseudoceanic, only W31.
Diaphus mollis Tåning, 1928. To 6 cm. Widespread.
Diaphus perspicillatus (Ogilby, 1898). To 7 cm. Tropical, N to Slope Water (SW21).
Diaphus problematicus Parr, 1928. To 9 cm. Tropical.
Diaphus rafinesquii (Cocco, 1838). To 9 cm. Temperate, rare S to Gulf of Mexico.
Diaphus roei Nafpaktitis, 1974. To 11 cm. Rare, pseudoceanic, only 31.
Diaphus splendidus (Brauer, 1904). To 5.5 cm. Tropical-subtropical.
Diaphus subtilis Nafpaktitis, 1968. To 8.5 cm. Uncommon, tropical-subtropical.
Diaphus taaningi Norman, 1930. To 7 cm. Pseudoceanic, W31, Slope Water and off Africa.
Diaphus termophilus Tåning, 1928. To 7.5 cm. Tropical.

Diogenichthys atlanticus (Tåning, 1928). To 3 cm. Widespread, tropical to temperate.

Electrona risso (Cocco, 1829). To 8 cm. E Atlantic but rare stray to SE31.

Gonichthys cocco (Cocco, 1829). To 6 cm. Widespread, tropical to temperate.

Hygophum benoiti (Cocco, 1838). To 5.5 cm. N temperate-subtropical.
Hygophum hygomii (Lütken, 1892). To at least 6 cm. Bipolar temperate-subtropical.
Hygophum macrochir (Günther, 1864). To 6 cm. Tropical and S subtropical.
Hygophum reinhardtii (Lütken, 1892). To at least 5 cm. Probably tropical-subtropical.
Hygophum taaningi Bekker, 1965. To 5 cm. N tropical-subtropical.

Lampadena anomala Parr, 1928. To 15 cm. Rare, bathypelagic, tropical-subtropical.
Lampadena chavesi Collett 1905. To 7.5 cm. Bipolar subtropical.
Lampadena luminosa (Garman, 1899). To 18 cm. Tropical-subtropical.
Lampadena speculigera Goode and Bean, 1896. To 13 cm. Bipolar temperate to N31.
Lampadena urophaos atlantica Maul, 1969. To 23 cm. N subtropical.

Lampanyctus alatus Goode and Bean ,1896. To 6 cm. Widespread, mostly tropical.
Lampanyctus crocodilus (Risso, 1810). To 30 cm. N temperate to N31 and E 34.
Lampanyctus festivus Tåning, 1928. To 12 cm. Bipolar subtropical.
Lampanyctus intricarius Tåning, 1928. To 17 cm. Bipolar temperate, extremely rare N31.
Lampanyctus macdonaldi (Goode and Bean, 1896). To 14 cm. Bipolar temperate rare to N31.

Lampanyctus nobilis Tåning, 1928. To 11 cm. Tropical.
Lampanyctus photonotus Parr, 1928. To 7 cm. Widespread, tropical to temperate.
Lampanyctus pusillus (Johnson, 1890). To 4.3 cm. Bipolar, temperate-subtropical.
Lampanyctus tenuiformis (Brauer, 1906). To 12 cm. Tropical.
Lampanyctus vadulus Hully, 1981. To 9.9 cm. E tropical, W to SE31.

Lepidophanes gaussi (Brauer, 1906). To 4.8 cm. Bipolar subtropical.
Lepidophanes guentheri (Goode and Bean, 1896). To 7 cm. Widespread, tropical to temperate.

Lobianchia dofleini (Zugmayer, 1911). To 5 cm. Bipolar temperate-subtropical.
Lobianchia gemellarii (Cocco, 1838). To 11 cm. Tropical-subtropical.

Loweina interrupta (Tåning, 1928). To 3.9 cm. Extremely rare, temperate-subtropical.
Loweina rara (Lütken, 1892). To 4.5 cm. Rare, widespread.

Myctophum affine (Lütken, 1892). To 8 cm. Tropical, N in Slope Water.
Myctophum asperum Richardson, 1845. To 8.5 cm. Tropical, rare to Slope Water.
Myctophum nitidulum Garman, 1899. To 9.9 cm. Widespread, tropical to temperate.
Myctophum obtusirostre Tåning, 1928. To 9 cm. Tropical, rare to Slope Water.
Myctophum punctatum Rafinesque, 1810. To 10 cm. N subpolar-temperate.
Myctophum selenops Tåning, 1928. To 7.5 cm. Widespread, usually tropical-subtropical.

Nannobrachium atrum (Tåning, 1928). To 14 cm. Bipolar, temperate-subtropical.
Nannobrachium cuprarium (Tåning, 1928). To 11 cm. Bipolar, subtropical.
Nannobrachium isaacsi (Wisner, 1974). To 13 cm. E tropical to SE31.
Nannobrachium lineatum (Tåning, 1928). To 24 cm. Tropical-subtropical.

Notolychnus valdiviae (Brauer, 1904). To 2.5 cm. Widespread, tropical to temperate.

Notoscopelus caudispinosus (Johnson, 1863). To 14 cm. Tropical-subtropical.
Notoscopelus resplendens (Richardson, 1845). To 7.7 cm. Widespread, tropical to temperate.

Symbolophorus rufinus (Tåning, 1928). To 8.7 cm. Tropical-subtropical.
Symbolophorus veranyi (Moreau, 1888). To 5.8 cm. N temperate, rare to N31.

Taaningichthys bathyphilus (Tåning, 1928).To 8 cm. Bathypelagic, tropical-subtropical.
Taaningichthys minimus (Tåning, 1928). To 6.5 cm. Tropical-subtropical.
Taaningichthys paurolychnus Davy 1972. To 9.5 cm. Extremely rare, bathypelagic.

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Order LAMPRIDIFORMES

LAMPRIDAE

Opahs

by B.B. Collette, National Marine Fisheries Service, National Museum of Natural History, Washington, D.C., USA

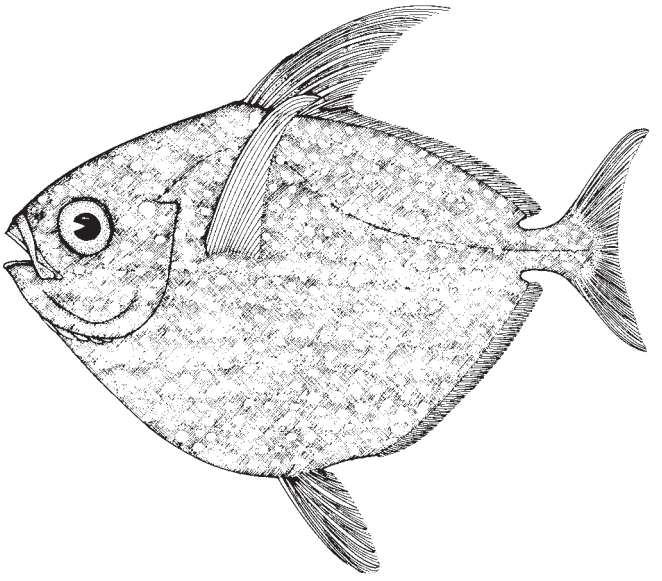
A single species occurring in the area.

Lampris guttatus (Brünnich, 1788) LAG

Frequent synonyms / misidentifications: *L. regius* (Bonnaterre, 1788), *L. luna* (Gmelin, 1789) / None.

FAO names: En - Opah; **Fr** - Opa; **Sp** - Opa.

Diagnostic characters: A large, deep, compressed and oval-shaped fish. Mouth small and toothless. **Dorsal and anal fins long and single, both retractable into deep grooves, the first with a high anterior lobe**; caudal fin moderately forked; **pectoral fins long and sickle-shaped, placed high on sides**, their bases horizontal; pelvic fins large and placed on ventral margin of body, posterior to pectoral-fin origin. Body covered with very small, smooth scales. Lateral line strongly arched over pectoral-fin base. **Colour:** back steel blue to bottle green, upper sides bluish or greenish with reflections of purple and gold, **lower sides and belly rose-red; entire body covered with small round silvery spots; jaws and fins bright scarlet.**



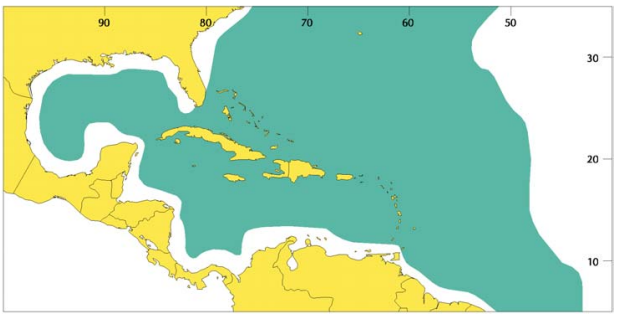
Similar families occurring in the area

No other large marine fish has the typical body shape and wing-like pectoral fins of *Lampris guttatus*.

Size: Maximum to at least 185 cm and 220 to 275 kg; common to 120 cm. The IGFA all-tackle game fish record is 73.93 kg.

Habitat, biology, and fisheries: Comparatively uncommon; found from the surface to depths of about 200 m; apparently solitary, mainly an inhabitant of warm water, but wandering far north in summer months. Normal cruising is accomplished by pectoral swimming employing the large red adductor and abductor muscles attached to the massive shoulder girdle. Feeds chiefly on small cuttlefishes, crustaceans, shellfishes, and young fishes. Taken incidentally in offshore waters. Caught with longlines. An excellent foodfish, flesh red, tender, full of oil and of delicate flavour. Occasionally marketed fresh. Separate statistics are not collected for this species.

Distribution: Worldwide in tropical and temperate waters; within the area reported from Cuba and from the Caribbean Sea south to Puerto Rico; probably scattered occurrence throughout the area.



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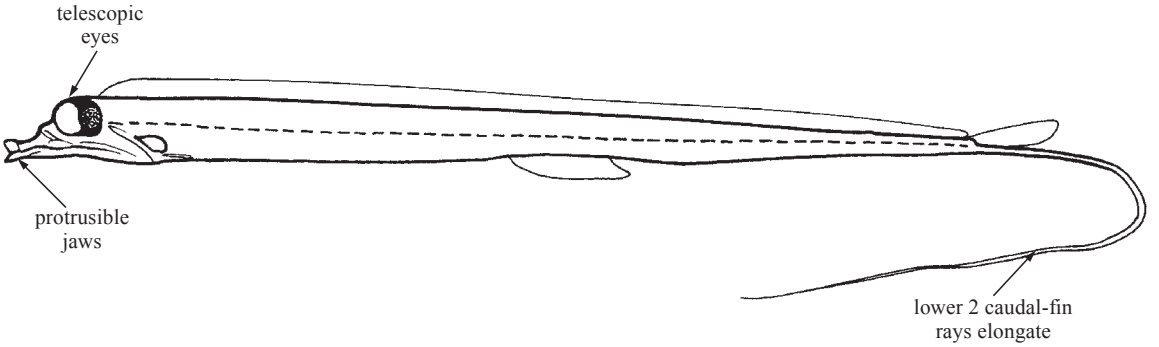
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STYLEPHORIDAE

Tube-eyes

by J.E. Olney, Virginia Institute of Marine Science, USA

Diagnostic characters: Small to moderate-sized lampridiform fishes (usually under 30 cm); body slender, elongate, somewhat compressed. **Eyes conspicuous, telescopic, directed forward and somewhat upward. Jaws highly protrusible, mouth small and tubular** (head tilted backward when jaws protruded, with a membranous pouch stretching from head to mouth, and volume of mouth cavity increasing dramatically); teeth absent. Dorsal-fin base long, extending from nape to caudal fin; first 2 dorsal-fin elements elongate, especially in small specimens; total dorsal-fin soft rays 115 to 124. Anal-fin base short, inserted at midbody; total anal-fin soft rays 14 to 17. **Caudal fin highly modified into 2 separate parts; lower-most 2 caudal-fin soft rays extremely elongate, forming a projection that equals or exceeds body length in undamaged specimens**; upper caudal-fin lobe with 5 or 6 short rays. Pectoral fins with 10 or 11 soft rays; fin base obliquely rotated. Pelvic fins inserted below pectoral-fin base, with 1 soft ray, often broken and inconspicuous. Total vertebrae about 53; first 2 vertebrae highly reduced; second vertebra without neural spine and with neural arch m-shaped. **Colour:** body silver; head darkly pigmented; dorsal fin, anal fin, and upper caudal-fin lobe may be tinted red.



Habitat, biology, and fisheries: The only known species in this family, *Stylephorus chordatus*, is meso- or bathypelagic (captured at depths of 300 to 800 m) and rare. It feeds on small crustaceans, and is thought to capture prey while swimming in a vertical, head-up position. Worldwide in tropical and temperate waters; reported to occur in surface waters of the Florida current in large numbers on rare occasions; presumably found throughout the area. Little is known of its habits or reproduction. There is no fishery for the species.

Similar families occurring in the area

None. *S. chordatus* is easily distinguished by the conspicuous telescopic eyes, protrusible jaws, and the highly modified caudal fin with extremely elongate lower fin rays.

List of species occurring in the area

Note: A single species in the family.

Stylephorus chordatus Shaw, 1791. To 32 cm, excluding elongate caudal filament. Circumglobal.

References

Olney, J.E. 1984. Lampridiformes: development and relationships. In *Ontogeny and systematics of fishes*, edited by H.G. Moser, W.J. Richards, D.M. Cohen, M.P. Fahay, A.W. Kendall, Jr, and S.L. Richardson. American Society of Ichthyologists and Herpetologists, Publication 1, pp. 368-379.

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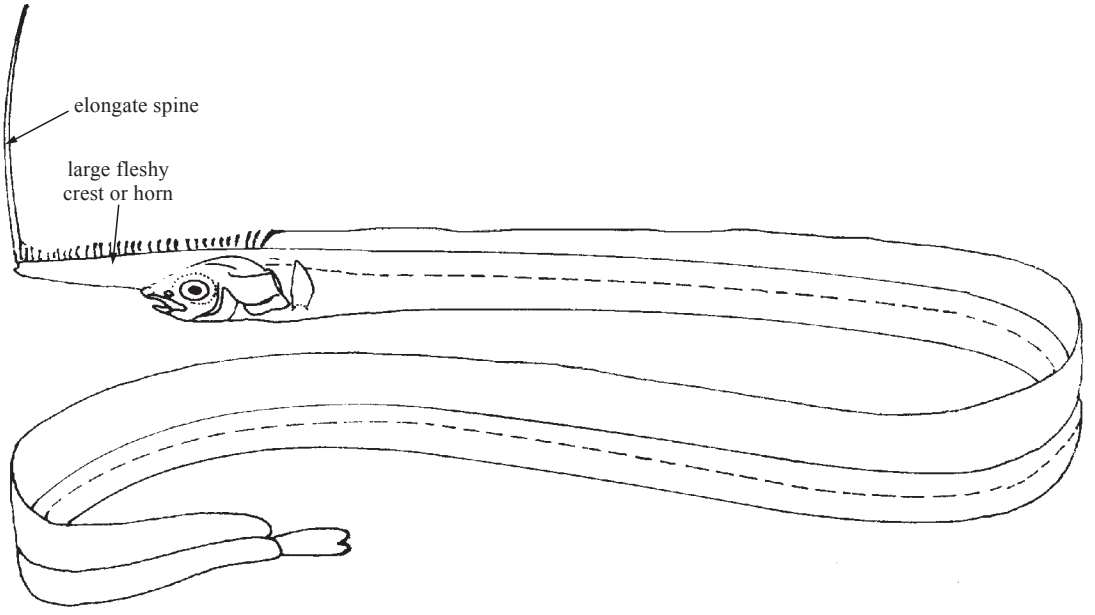
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LOPHOTIDAE

Crestfishes

by J.E. Olney, Virginia Institute of Marine Science, USA

Diagnostic characters: Large-sized, ribbon-like lampridiform fishes (to 2 m); body elongate and compressed. **Head bears a large, fleshy crest or horn that extends forward to tip of jaw in *Lophotus*, and protrudes far forward of jaw in *Eumecichthys*; crest or horn bears an elongate spine and supports multiple dorsal-fin soft rays**. Upper jaw protrusible; small conical teeth present on jaws and vomer. Dorsal fin long, with 2 spines (first spine short, second spine elongate) inserting well forward of eye; total dorsal-fin soft rays 204 to 390. Anal fin short, posteriorly placed; total anal-fin soft rays 5 to 20. Caudal fin somewhat reduced, with 12 to 17 soft rays. Pectoral fins with 13 to 17 soft rays, its base almost horizontal. Pelvic fins absent or small, with 3 to 6 soft rays, inserted posterior to pectoral-fin base. **Scales absent, except for tubular lateral-line scales**. Total vertebrae, 124 to 200 (56 thoracic in *Eumecichthys*). In lophotids (and all lampridiforms), the anterior palatomaxillary ligament and palatine prong are absent, as a result, maxilla is free to extend, along with the premaxilla, well away from the ethmo-vomerine region during jaw protrustion. Other anatomical features of lophotids (and all lampridiforms): first dorsal-fin pterygiophore inserts anterior to first neural spine; elongate ascending processes of premaxilla and a large rostral cartilage insert into a frontal vault or cradle; mesethmoid posterior to lateral ethmoids. In lophotids (and radiicephalids), the supraoccipital bears an anteriorly directed process that is well developed and stout in lophotids, projects over the frontal arch, and supports the fleshy crest on the head. **Colour:** body silver with multiple dark vertical bands in *Eumecichthys*; body blue dorsally, grading to silver ventrally in *Lophotus*, lacking vertical bands, and having multiple white or silver spots; dorsal fin, pectoral fins, pelvic fins (when present), and caudal fin reddish in lophotids (and most other lampridiforms).

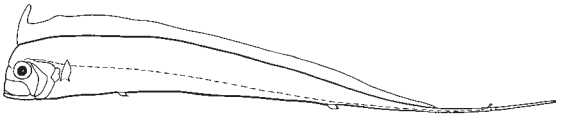


Habitat, biology, and fisheries: Lophotids are rare mesopelagic fishes that occur in most oceans. *Lophotus* consumes squids and small fishes. Eggs and larvae have been described, but little else is known of their habits and reproductive ecology. As in the Radiicephalidae, lophotids possess a tubular gland that overlies the hind gut, and discharges a black ink-like fluid through a vent near the anus in an alarm response. No fishery exists for them.

Remarks: There may be only 2 species in this family, *Lophotus lacepede* (crestfish) and *Eumecichthys fiski* (unicornfish), although some authors recognize additional species that are not treated here. The family is in need of revision.

Similar families occurring in the area

Radiicephalidae: fewer dorsal-fin elements (152 to160 versus 206 to 392); no conspicuous cranial crest or horn; anus situated near caudal fin (situated at midbody in lophotids).



Radiicephalidae

Key to the species of Lophotidae occurring in the area

1a. Crest on top of head extends forward to the tip of jaw (Fig. 1); dorsal fin with fewer than 300 rays. . . . . ***Lophotus lacepede***

1b. Crest on top of head protrudes far forward of the jaw (Fig. 2); dorsal fin with more than 300 rays . . . . . ***Eumecichthys fiski***

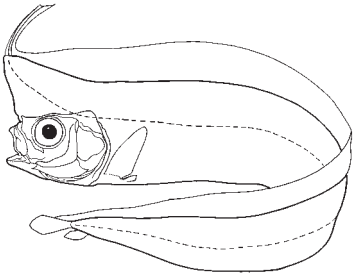


Fig. 1 ***Lophotus lacepede***

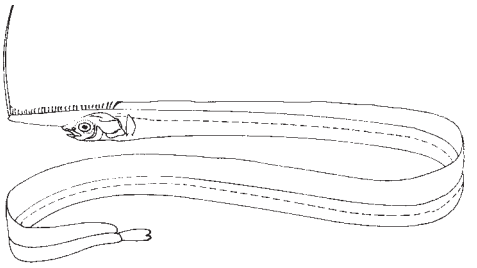


Fig. 2 ***Eumecichthys fiski***

List of species occurring in the area

Eumecichthys fiski (Günther, 1890). To 130 cm. Mesopelagic in most oceans.

Lophotus lacepede Bosc, 1817. To 200 cm. Mesopelagic in most oceans.

References

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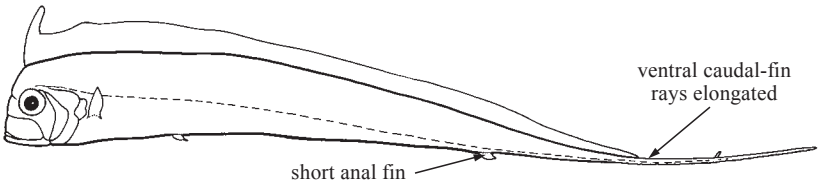
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RADIICEPHALIDAE

Tapertails

by J.E. Olney, Virginia Institute of Marine Science, USA



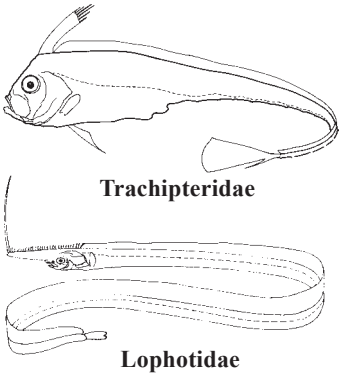
Diagnostic characters: Small to moderate-sized lampridiform fishes; body slender, elongate, compressed, its depth gradually decreasing from the head to caudal peduncle. Upper jaw highly protrusible; jaw teeth absent; 1 to several teeth on roof of mouth. Dorsal fin long, its first rays inserting over eye; anterior dorsal-fin rays somewhat elongate; total dorsal-fin soft rays 150 to 160. Anal fin short, inconspicuous, posteriorly placed near caudal peduncle; total anal-fin soft rays 6 or 7. Caudal fin highly modified into separate parts; **ventral caudal-fin soft rays (these total approximately 6 or 7) elongate, forming a caudal projection that may equal the body length in undamaged specimens**; upper caudal-fin lobe with 4 or 5 short rays. Pectoral fins with 9 or 10 soft rays; fin base obliquely rotated. Pelvic fins with 9 soft rays in small specimens, often damaged or inconspicuous in adults; pelvic fins inserted well posterior to pectoral-fin base. **Scales absent except for tubular lateral-line scales**. Total vertebrae 114 to 121 (36 to 39 thoracic, 77 to 79 abdominal); **fourth, fifth, and sixth preural centra with elongate haemal spines that pierce ventral margin of body** (unique among fishes). In radiicephalids (and all lampridiforms), the anterior palatomaxillary ligament and the palatine prong are absent, as a result, the maxilla is free to extend, along with the premaxilla, well away from the ethmo-vomerine region during jaw protrusion. Other anatomical features of radiicephalids (and all lampridiforms): first dorsal-fin pterygiophore inserts anterior to first neural spine; elongate ascending processes of premaxilla and a large rostral cartilage insert into a frontal vault or cradle; mesethmoid posterior to lateral ethmoids. In radiicephalids (and lophotids), the supraoccipital bears an anteriorly directed process (a weak spine in radiicephalids, but broader and well-developed in lophoitids). **Colour:** body silver; dorsal, pectoral and caudal fins may be tinted red.

Habitat, biology and fisheries: A single, very rare species, *Radiicephalus elongatus* is known from a few small, immature specimens captured by research nets in the area. Usually attains 60 to 75 cm in length. Meso- or bathypelagic; little is known of its habits or reproduction. Like the Lophotidae, it possesses a gland that discharges a black, ink-like fluid through a vent near the anus in an alarm response. There is no fishery for the species.

Similar families occurring in the area

Lophotidae: more dorsal-fin soft rays (206 to 392 versus 152 to 160); head with conspicuous flesh crest or horn; anus situated near caudal fin (situated at mid-body in Radiicephalidae)

Trachipteridae: anal fin absent



List of species occurring in the area

A single species in the family.

Radiicephalus elongatus Osório, 1917. Usually under 80 cm. Mesopelagic in most oceans.

References

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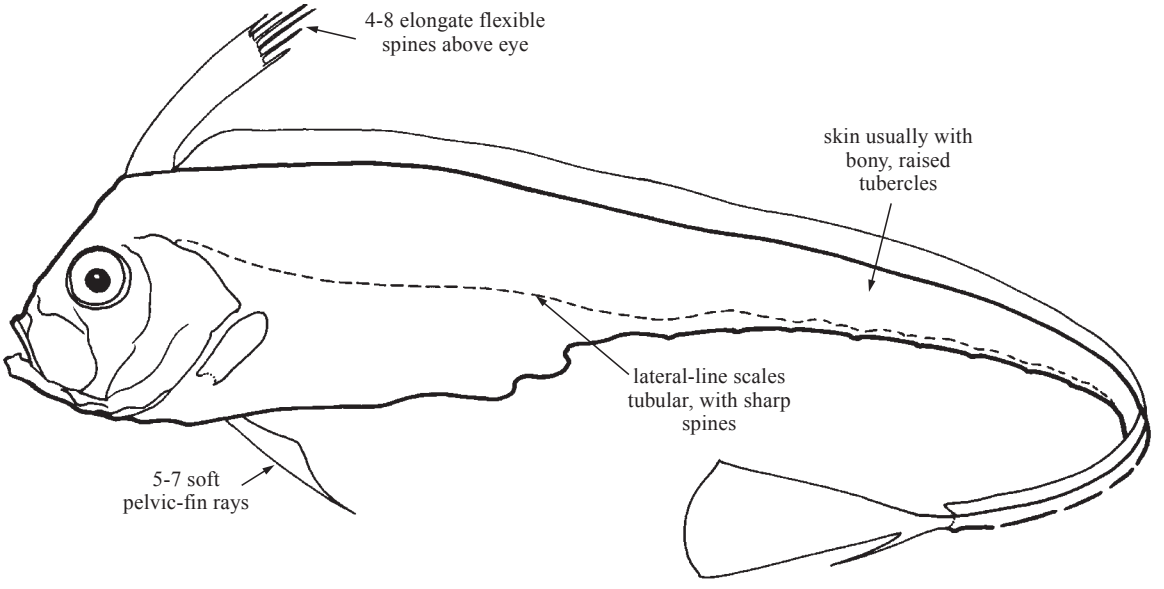
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TRACHIPTERIDAE

Ribbonfishes (dealfishes)

by J.E. Olney, Virginia Institute of Marine Science, USA

Diagnostic characters: Large-sized lampridiform fishes (to 2 m); body elongate, ribbon-like, compressed. In most species, body depth gradually decreasing from head to caudal peduncle. Upper jaw highly protrusible, maxilla broad; usually recurved, pointed teeth on jaws, vomer, and palatines; bones of head and jaws thin and fragile. Dorsal fin very long, extending along entire body length to tail; **anterior dorsal-fin elements consisting of 4 to 8 elongate, flexible spines that insert above eye**; total dorsal-fin elements 120 to 197; dorsal-fin rays bear strong lateral spinules that tend to interlock with adjacent soft rays and strengthen the fin. Anal fin absent. Caudal fin with 2 lobes; upper lobe sometimes upturned, conspicuous, and fan-like; total caudal-fin soft rays usually 13 to 18; usually 5 to 9 soft rays in lower fin lobe, some of which are elongate; usually 5 to 7 soft rays in the upper fin lobe, all of which are elongate in *Zu*. **Pelvic fins with 5 to 7 soft rays; often elongate in juveniles; sometimes lost at metamorphosis. Skin usually covered with bony, raised, bump-like tubercles. Scales absent, except for lateral-line scales that are tubular and bear sharp spines**. (Scalloped ribbonfish, *Zu cristatus*, with distinctive scalloped or wavy ventral margin, and possessing small deciduous scales). Total vertebrae, 62 to 102; thoracic vertebrae, 18 to 40. In trachipterids (and all lampridiforms), the anterior palatomaxillary ligament and palatine prong are absent; as a result, the maxilla is free to extend, along with premaxilla, well away from the ethmo-vomerine region during jaw protrusion. Other anatomical features of the trachipterids (and all lampridiforms): first dorsal-fin pterygiophore inserts anterior to first neural spine; elongate ascending processes of premaxilla and a large rostral cartilage insert into a front vault or cradle; mesethmoid posterior to lateral ethmoids. In trachipterids (and regalecids), the dorsal-, caudal-, and pelvic-fin rays bear spinules that project laterally; in trachipterids, the parapophyses of each thoracic vertebra are well developed, but ribs are lacking. **Colour:** head and body usually silver with oblique dusky bars or with dark spots; fins deep crimson-red.



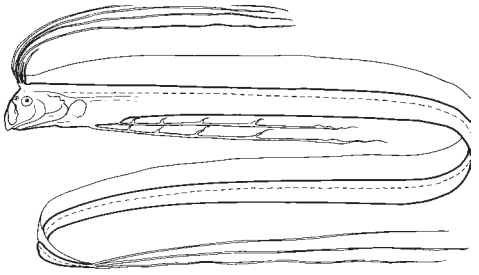
Habitat, biology, and fisheries: Trachipterids are rare mesopelagic fishes that occur in all oceans. They consume pelagic crustaceans, small fishes, and squids. Eggs free-floating, large, and red. Very little is known of their habits and reproductive ecology. There is no fishery for the group.

Remarks: Trachipterids are distributed worldwide in tropical and temperate waters. There are approximately ten species in 3 genera (*Trachipterus, Zu*, and *Desmodema*), at least 3 of which are known from the area. There are a number of other nominal species whose validity is not widely recognized by all authors. In addition, there may be undescribed species in the area. The family is in need of revision.

Similar families occurring in the area

Regalecidae: also lacking anal fin, but with more dorsal-fin soft rays (260 to 412 versus 120 to 200), and attaining a far larger size.

All other lampridiform families possess an anal fin.



Regalecidae

Key to the species of Trachipteridae occurring in the area

1a. Caudal fin without 2 lobes and not sharply upturned; no long spines or bony tubercles along ventral edge of tail; dorsal fin with 120 to 124 elements . . . . . ***Desmodema polystictum***

1b. Caudal fin with 2 lobes, the upper lobe sharply upturned; ventral edge of tail bears long spiny plates or bony tubercles; dorsal fin usually with more than 124 elements . . . . . → ***2***

2a. Posterior portion of lateral line runs along ventral edge of tail as a series of sharp spines that point in alternating directions; wavy or scalloped ventral body margin; dorsal fin with less than 150 elements . . . . . ***Zu cristatus***

2b. Posterior portion of lateral line runs well above the ventral edge of tail; lateral line spines project laterally, and do not point in alternating directions; wavy or scalloped ventral body margin; dorsal fin with more than 150 elements . . . . . ***Trachipterus arcticus***

List of species occurring in the area

Desmodema polystictum (Ogilby, 1898). To about 100 cm. Mesopleagic in all oceans.

Trachipterus arcticus (Brünnich, 1788). To about 250 cm. Mesopelagic in all oceans.

Zu cristatus (Bonelli, 1819). To about 120 cm. Mesopelagic in all oceans.

References

Olney, J.E. 1984. Lampridiformes: development and relationships. In *Ontogeny and systematics of fishes*, edited by H.G. Moser, W.J. Richards, D.M. Cohen, M.P. Fahay, A.W. Kendall, Jr, and S.L. Richardson. American Society of Ichthyologists and Herpetologists, Publication 1, pp. 368-379.

Olney, J.E., G.D. Johnson, and C.C. Baldwin. 1993. Phylogeny of lampridiform fishes. *Bull. Mar. Sci.*, 52:137-169.

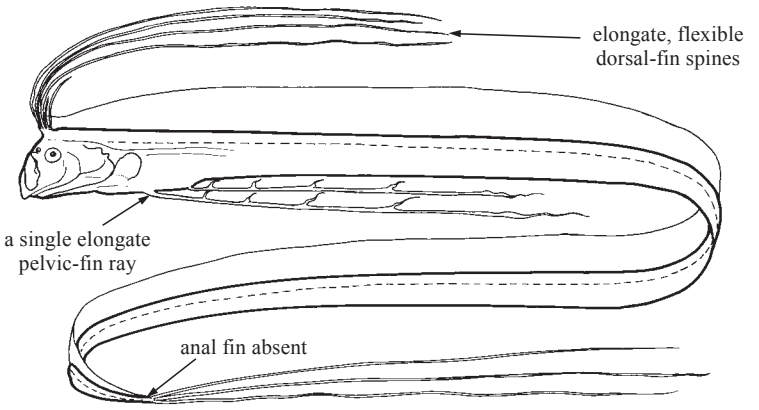
Palmer, G. 1961. The dealfishes (Trachipteridae) of the Mediterranean and north-east Atlantic. *Bull. Brit. Mus. (Nat. Hist.) Zool.*, 7(7):337-351.

Robins, C.R., G.C. Ray and J. Douglas. 1986. *A field guide to Atlantic coast fishes North America*. Boston, Houghton Mifflin Co., 354 p.

REGALECIDAE

Oarfishes

by J.E. Olney, Virginia Institute of Marine Science, USA



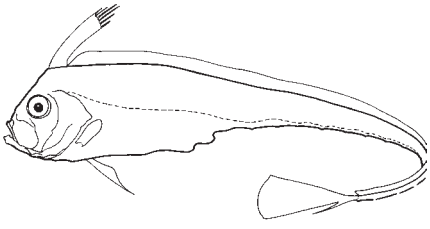
Diagnostic characters: Giant ribbon-like lampridiform fish; body extremely elongate, compressed. Upper jaw highly protrusible, maxilla broad; teeth minute in both jaws; bones of head and jaws thin and fragile. Dorsal fin very long, extending along the entire body length to the tail; **first 8 to 10 dorsal-fin elements (and the single pelvic-fin soft ray) extremely elongate** flexible spines; total dorsal-fin elements 260 to 412. **Anal fin absent**. Caudal fin usually absent in large specimens; usually with 5 rays in small specimens, the middle 3 rays stout and elongate. Pelvic fins with 1 stout ray with fleshy tabs, and 1 small splint-like element. **Scales absent, except for tubular lateral-line scales**. Total vertebrae 143 to 170. In oarfishes (and all lampridiforms), the anterior palatomaxillary ligament and the palatine prong are absent; as a result, the maxilla is free to extend, along with the premaxilla, well away from the ethmo-vomerine region during jaw protusion. Other anatomical features of oarfishes (and all lampridiforms): first dorsal-fin pterygiophore inserts anterior to first neural spine; elongate ascending processes of premaxilla and a large rostral cartilage insert into a frontal vault or cradle; mesethmoid posterior to lateral ethmoids. In regalecids (and trachipterids), the dorsal-, caudal-, and pelvic-fin rays bear spinules that project laterally; in oarfishes, the spinules are very weakly developed, and reduced to nubbins. **Colour:** body brilliant silver with oblique dusky bars; head blue; fins deep crimson red, elongate dorsal-fin elements, and the single pelvic-fin ray, ornamented with fleshy tabs, and crimson red.

Habitat, biology, and fisheries: Regalecids are rare, mesopelagic fishes that occur in all oceans. Sightings at surface, or strandings on shore usually related to storm events. There are 2 monotypic genera (*Regalecus* and *Agrostichthys*) but only *R. glesne* occurs in the area. *R. glesne* is the longest of all bony fishes, and is thought to be responsible for many historical sightings of sea monsters. Regalecids feed on deep-sea shrimps (euphausiids), small fishes, and squids. Eggs free-floating, large, and red. Very little is known of their habits and reproductive ecology. There is no fishery for regalecids.

Remarks: There may be only a single species of *Regalecus* with worldwide distribution although some authors recognize other species.

Similar families occuring in the area

Trachipteridae: also lacking anal fin, but much smaller maximum size and with fewer dorsal-fin soft rays (166 to 190 versus 260 to 412). All other lampridiform families possess an anal fin.



Trachipteridae

List of species occurring in the area

Regalecus glesne Ascanius, 1772. To 17 m. Circumglobal.

References

Olney, J.E. 1984. Lampridiformes: development and relationships. In *Ontogeny and systematics of fishes*, edited by H.G. Moser, W.J. Richards, D.M. Cohen, M.P. Fahay, A.W. Kendall, Jr, and S.L. Richardson. American Society of Ichthyologists and Herpetologists, Publication 1, pp. 368-379.

Olney, J.E., G.D. Johnson, and C.C. Baldwin. 1993. Phylogeny of lampridiform fishes. *Bull. Mar. Sci.*, 52:137-169.

Robins, C.R., G.C. Ray and J. Douglas. 1986. *A field guide to Atlantic coast fishes North America.* Boston, Houghton Mifflin Co., 354 p.

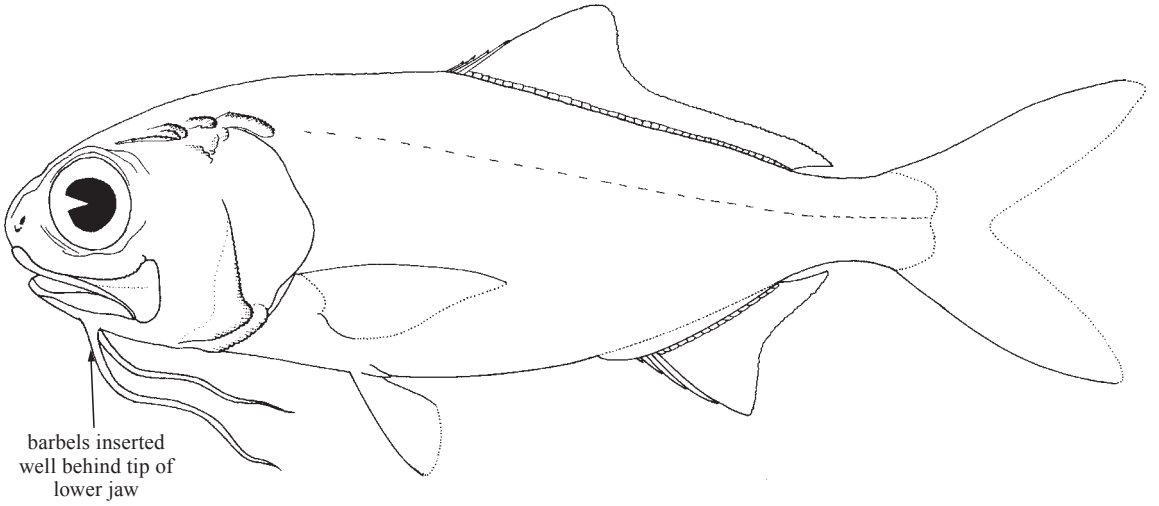
Order POLYMIXIIFORMES

POLYMIXIIDAE

Beardfishes

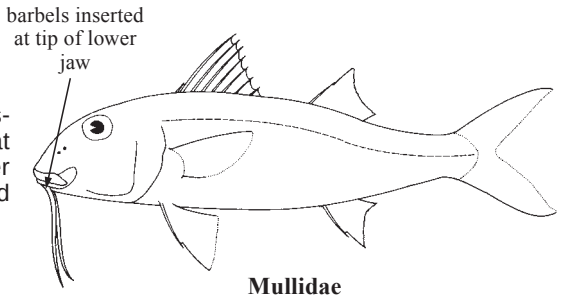
by J.A. Moore, Florida Atlantic University, USA

Diagnostic characters: Small to moderate-sized (to about 48 cm total length) acanthomorph (spiny-finned) fishes. Body elongate and laterally compressed. Head moderate-sized. Eye large, equal to or larger than snout length. **Snout rounded and prominent**. Mouth extending to posterior margin of eye; **2 supramaxillae. Teeth villiform, in bands on jaws, vomer, palatines, ectopterygoids, and endopterygoids (roof of the mouth)**. No deep sensory canals separated by bony ridges, scales extending across nape to area over eye; no spines on preopercle or opercle; **pair of long chin barbels originating from hyoid, behind symphysis of lower jaw. Seven branchiostegal rays, first 3 minuscule, supporting the hyoid barbel, only last 4 externally visible**. Single dorsal fin long, with 4 to 6 spines and 26 to 38 soft rays; anal fin with 3 to 4 spines and 15 to 18 soft rays; caudal fin forked; pectoral fin with 14 to 18 soft rays; pelvic fin with 1 spine and 6 soft rays. Scales spinoid and moderately large; lateral line with 31 to 37 pored scales; 48 to 62 transverse scale rows; scales completely cover cheek and opercle. Pyloric caecae about 27 to 108. **Colour:** body and head bluish or greenish silver to violet-brown along dorsal surface, sides completely silver; dark distal tips to anterior rays in dorsal fin, dark posterior tips of caudal fin.



Habitat, biology, and fisheries: Occurring in tropical and subtropical waters over the outer continental shelf and slope, also found around islands, mostly between depths of 150 to 700 m. Feeds on benthic invertebrates and small fish. Observed swimming with barbels in constant contact with bottom sediments. Of relatively minor importance to fisheries in the area, but considered good food fishes elsewhere.

Remarks: One genus with 10 species.



Mullidae

Similar families occurring in the area

Mullidae (goatfishes): superficially similar due to presence of long chin barbels, but these are located at symphysis of lower jaw; 2 separate dorsal fins; smaller eye and longer snout; most species brightly coloured shallow reef inhabitants.

Key to the species of Polymixiidae occurring in the area

1a. Dorsal-fin soft rays 26 to 32; total number of gill rakers on first arch14 to 22; pyloric caecae about 27 to 31 . . . . . ***Polymixia lowei***

1b. Dorsal-fin soft rays 34 to 38; total number of gill rakers on first arch10 to 13; pyloric caecae around 108 . . . . . ***Polymixia nobilis***

List of species occurring in the area

Polymixia lowei Günther, 1859.
Polymixia nobilis Lowe, 1838.

References

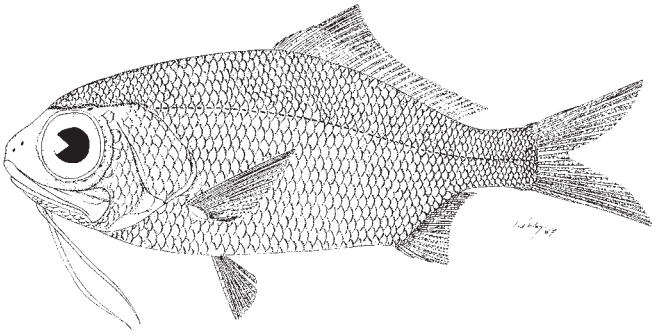
Kotlyar, A.N. 1992. A new species of the genus *Polymixia* (Polymixiidae, Beryciformes) from submarine Kyushu-Palau Ridge and notes on other members of the genus. *Vopr. Ikhtiol*., 32(6):11-26. [in Russian, English translation in *J. Ichthyol*., 1993, 33(3):30-49].

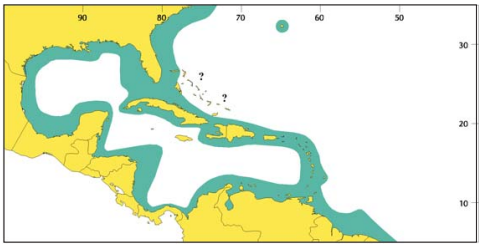
Woods, L.P. and P. Sonoda. 1973. Order Berycomorphi (Beryciformes). In Fishes of the western North Atlantic. *Mem. Sears Found. Mar. Res*., 1(6):263-396.

Polymixia lowei Gunther, 1859

En - Beardfish; **Fr** - Poisson chèvre; **Sp** - Chivato.

Maximum size to 200 mm standard length; common to 150 mm. Known throughout the area on the shelf and upper slope of continents and islands. Found over soft bottoms between depths of 50 to 650 m, but more commonly below 150 m. Taken as bycatch in trawl fisheries. Occasionally taken in large numbers. Typically not marketed because of small size.

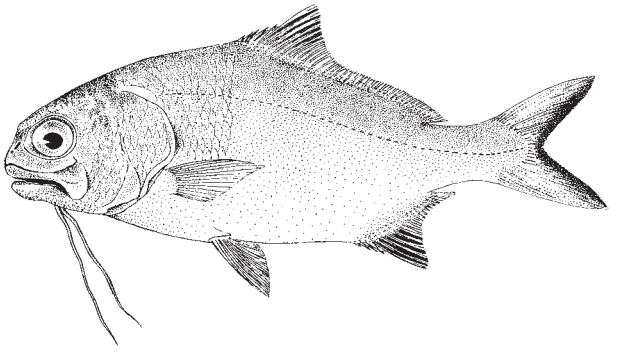


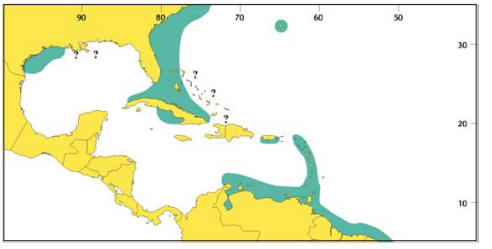


Polymixia nobilis Lowe, 1838

En - Stout beardfish; **Fr** - Poisson chèvre robuste; **Sp** - Chivato de fondo.

Maximum size to 430 mm standard length; common to 250 mm. Known from isolated records off northern South America, Greater Antilles, northern Gulf of Mexico, Bahamas, southeastern US Atlantic coast, and Bermuda. Probably more widespread in the area. Found over soft to semi-hard bottoms between depths of 70 to 800 m. Taken as bycatch in trawl and hook-and-line fisheries, but never in large quantities. Of only minor interest to fisheries.





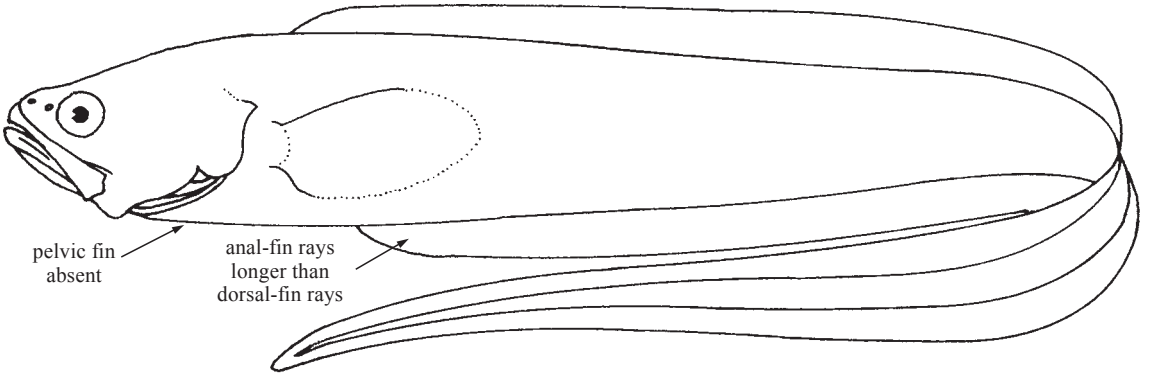
Order OPHIDIIFORMES

CARAPIDAE

Pearlfishes

by J.E. Olney, Virginia Institute of Marine Science, USA

Diagnostic characters: Small to moderate-sized, eel-like fishes; scales absent; body elongate and usually cylindrical, its depth gradually decreasing from the head to a slender tail tip; head length (tip of snout to edge of gill covers) about 10 to 15% of total length; upper jaw teeth either fang-like or small, heart-shaped; lower jaw teeth fang-like in some species; 1 to several teeth on roof of mouth. Dorsal-fin rays anterior to the thirtieth vertebra 19 to 53; **anal-fin rays longer than opposing dorsal-fin rays; anal-fin origin and anus positioned far forward, usually under the pectoral fin**; anal-fin rays anterior to the thirtieth vertebra 36 to 63; caudal fin and associated skeleton absent in most species; pectoral-fin rays 13 to 30 (pectoral fin absent in one species); **pelvic fins absent** in all but 1 genus (*Pyramodon*, not in area); **larvae possess a long, ornamented predorsal filament** that is lost at metamorphosis; eggs are deposited in a floating mucous mat. **Colour:** not brightly coloured; usually tan or cream with small black spots scattered over the body or larger black spots concentrated on top of head and along the dorsal and ventral margins of body; some species have more conspicuous black saddles of pigment along body margins and body midline.



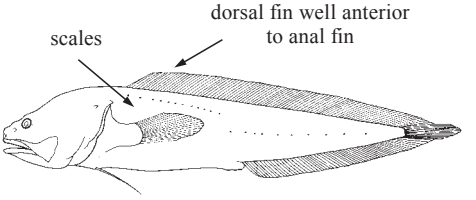
Habitat, biology, and fisheries: Widely distributed throughout tropical and temperate seas. While some species are free living, adults of most pearlfish species exhibit the highly specialized behaviour of living within the body cavities of invertebrate hosts such as sea cucumbers, clams, sea squirts, and sea stars. Some of these species exit their host at night to feed on small fishes and shrimps. Other species are parasitic, never leaving the host and feeding on its internal organs. There are 31 species in 7 genera; 3 species in the area but these are rarely collected. Pearlfishes in the area include a deep-sea species (*Snyderidia canina*) that is free living; a shallow-water species (*Carapus bermudensis*) that lives inside sea cucumbers (especially the genera *Actinopyga* and *Holothuria*); and a shallow-water species (*Echiodon dawsoni*) that is probably free living but may associate with colonies of tube worms. There is no fishery for pearlfishes, although some species in the Pacific and Indian Oceans are a bycatch of some invertebrate fisheries such as pearl oysters and sea cucumbers (bêche de mer).

Similar families occurring in the area

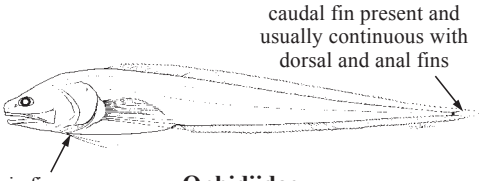
Bythitidae: most species have scales; caudal fin present although sometimes continuous with dorsal- and anal-fin rays; pelvic fins usually present; dorsal fin well anterior of anal fin; anal- and dorsal-fin rays about equal in length; viviparous (live bearing) fishes; males with externally visible intromittent organs.

Ophidiidae: caudal fin present and usually continuous with dorsal- and anal-fin rays; dorsal-fin rays equal in length or longer than anal fin rays; pelvic fins usually present.

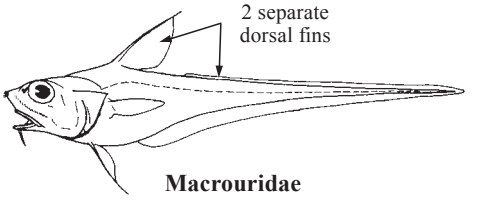
Steindachneriidae and Macrouridae (especially young stages): 2 separate dorsal fins; pelvic fins present; abdominal area often darkly pigmented.



Bythitidae



Ophidiidae



Macrouridae

Key to the species of Carapidae occurring in the area

1a. The first ray of the dorsal fin is anterior to the first ray of the anal fin . . . . . ***Snyderidia canina***

1b. The first ray of the dorsal fin is well posterior to the first ray of the anal fin . . . . . → ***2***

2a. The upper jaw has 1 or 2 pairs of large fangs and no small, heart-shaped teeth; usually found free living and not associated with sea cucumbers (holothurians). . . . . ***Echiodon dawsoni***

2b. The upper jaw lacks large fangs and there are many small, heart-shaped teeth; found inside the body cavity of sea cucumbers (holothurians) . . . . . ***Carapus bermudensis***

List of species occurring in the area

Carapus bermudensis (Jones, 1874). 11 to 37 cm TL. W shores of the Atlantic, Bermuda, and Caribbean Sea S to Brazil.

Echiodon dawsoni Williams and Shipp, 1982. 8 to 11 cm TL. W shores of the Atlantic, Bermuda, and Caribbean Sea S to Brazil.

Snyderidia canina Gilbert, 1905. 15 to 27 cm TL. Deep waters throughout the area and other tropical seas.

References

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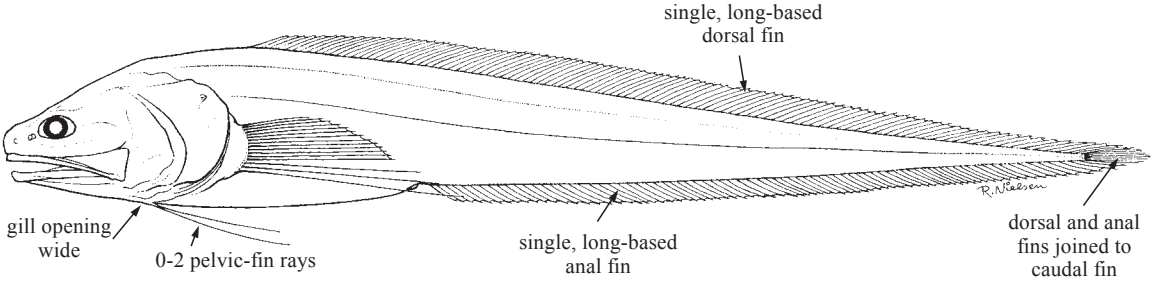
Williams, J.T. and R.L. Shipp. 1982. A new species of the genus *Echiodon* (Pisces: Carapidae) from the eastern Gulf of Mexico. *Copeia*, 1982:845-851.

OPHIDIIDAE

Cusk-eels

by J.G. Nielsen, Zoological Museum, University of Copenhagen, Denmark. and C.R. Robins, Lawrence, Kansas, USA

Diagnostic characters: Moderately elongate ophidiiform fishes (size from about 10 to 200 cm). **Anterior nostril placed midway between upper lip and posterior nostril**. Supramaxilla present. Teeth usually small, densely distributed, and blunt-tipped. **Very seldom fewer than 7 long gill rakers on anterior gill arch (except in Ophidiini). Dorsal and anal fins long, joined to caudal fin; dorsal-fin rays normally longer than opposing anal-fin rays; pelvic-fin rays 0 to 2. Scales present**. A well-developed spine on opercle usually present. **Anus placed posterior to tip of pectoral fin except in species with prolonged pectoral fins. Colour:** very variable, some with horizontal or vertical bars and eye spots.

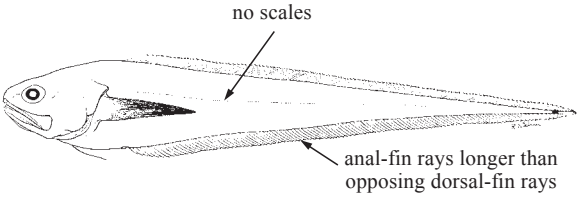


Habitat, biology and fisheries: With the exception of a few species which occur pelagically at great depths, cusk eels are bottom-living, found from shallow waters to a depth of 8 370 m the depth record for fishes; oviparous with pelagic larvae; no specialized larval stage (except for *Brotulotaenia* with rubaniform stage and *Lamprogrammus* with exterillium stage - Fahay and Nielsen in ms); a few species of commercial importance.

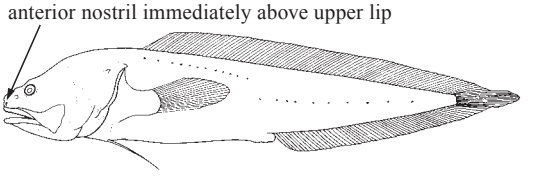
Similar families occuring in the area

Carapidae: scales absent; anal-fin rays longer than opposing dorsal-fin rays; anus placed below pectoral fins.

Bythitidae: anterior nostril placed immediately above upper lip: very seldom more than 7 long gill rakers on anterior gill arch.

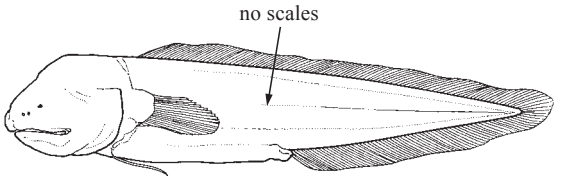


Carapidae

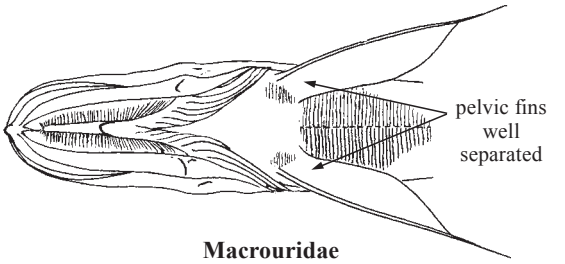


Bythitidae

Aphyonidae: no scales; skin loose and gelatinous; eyes small and indistinct.
Macrouridae: pelvic fins well separated from each other, with more than 2 rays.

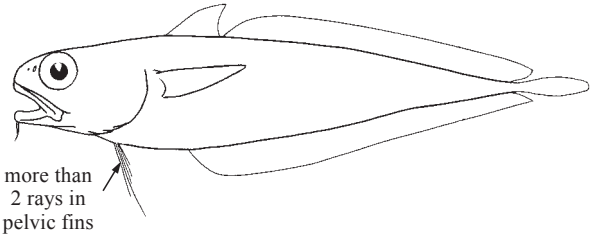


Aphyonidae



Macrouridae

Gadidae, Moridae, and Phycidae: pelvic fins well separated from each other; dorsal and anal fins not joined to caudal fin.



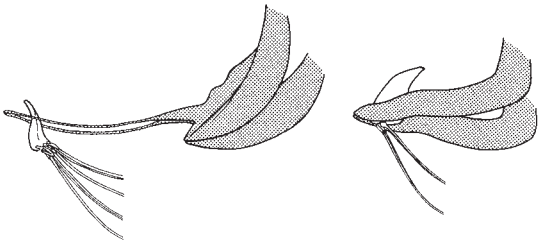
Moridae

Key to subfamilies of Ophidiidae occurring in the area

1a. Barbels present on snout and chin . . . . . **Brotulinae**
1b. No barbels on snout and chin . . . . . → *2*

2a. Scales in form of small, non-imbricate prickles . . . . . **Brotulotaeniinae**
2b. Scales cycloid . . . . . → *3*

3a. Main body of ventral arm of cleithrum meeting its mate at about level of preopercle, but a slender, elongate filament of bone extends anteriorly to pelvic fins (Fig. 1a) inserted beneath eye; median basibranchial tooth patches present or absent . . . . . **Ophidiinae**
3b. Ventral arm of cleithrum meeting its mate and terminating at about level of preopercle or farther anteriorly, but the anteriorly directed bony filament is absent (Fig. 1b); pelvic-fin insertion variable in position but most often well posterior to eye, fin absent in a few species; 1 or more median basibranchial tooth patches (except absent in *Apagesoma* spp. and in *Barathritis iris*)(for key to genera see Nielsen et al., 1999) . . . . . **Neobythitinae**



a) Ophidiinae **b) Neobythiinae**

Fig. 1 ventral arm of cleithrum

Key to species of Brotulotaeniinae occurring in the area

1a. Head length 5.3 to 9.9 in standard length; dorsal-fin rays 113 to 134; anal-fin rays 91 to 108; total vertebrae 88 to 96 . . . . . → ***2***

1b. Head length 3.2 to 4.5 in standard length; dorsal-fin rays 79 to 91; anal-fin rays 58 to 72; total vertebrae 67 to 72 . . . . . ***Brotulotaenia brevicauda***

2a. Head length 9.2 to 9.9 in standard length; dorsal-fin rays 113 to 115; anal-fin rays 91 to 94 . . . . . ***Brotulotaenia nigra***

2b. Head length 5.3 to 8.5 in standard length; dorsal-fin rays 119 to 134; anal-fin rays 98 to 108 . . . . . ***Brotulotaenia crassa***

Key to tribes of Ophidiinae occurring in the area

1a. All body scales in regularly overlapping rows; posterior part of head extensively scaled (only 1 genus in region, *Lepophidium*) . . . . . ***Lepophidiini***

1b. At least some scales (frequently all) non overlapping, arranged in a basketweave (anguilloid) fashion. Head entirely naked except for top of head in *Parophidion schmidti* . . ***Ophidiini***

Key to the genera of Ophidiini ocurring in the area

1a. Two pelvic-fin rays equal in length or very nearly so; top of head with large scales (1 species, *P. schmidti*, in area) . . . . . ***Parophidion***

1b. Two pelvic-fin rays unequal in length; head entirely naked . . . . . → ***2***

2a. Rostral spine stout, projecting upward at an oblique angle . . . . . ***Otophidium***

2b. Rostral spine absent or much reduced or long and projecting forward toward tip of snout . . ***Ophidion***

Key to the species of *Otophidium* occurring in the area

1a. Body boldly marked with black spots; 1 large dark humeral spot . . . . . ***Otophidium omostigmum***

1b. Body without dark marks . . . . . → ***2***

2a. Rostral spine strong, ending in a broad squarish process; no pores behind eye; pectoral-fin rays usually 17 (rarely 16) . . . . . ***Otophidium chickcharney***

2b. Rostral spine shorter, ending in a blunt point; 2 pores behind eye; pectoral-fin rays usually 16 (rarely 15) . . . . . ***Otophidium dormitator***

List of species occurring in the area

The symbol is given when species accounts are included.

Subfamily BROTULINAE

Brotula barbata (Bloch and Schneider, 1801).

Subfamily BROTULOTAENIINAE

Brotulotaenia brevicauda Cohen, 1974. 35 cm. Tropical Atlantic and Indian Oceans.
Brotulotaenia crassa Parr, 1934. 85 cm. Atlantic and Indian Oceans.
Brotulotaenia nigra Parr, 1933. 30 cm. Tropical Atlantic Ocean.

Subfamily OPHIDIINAE

Note: There are an additional 8 undescribed species of *Lepophidium* from the western Atlantic, all of them in Fishing Area 31. Their descriptions are in preparation. Pending their description, a key to the species of *Lepophidium* in the area is impractical. Lea and Robins have completed a manuscript describing 4 new species of *Ophidion* from the tropical western Atlantic. All occur in Area 31. *Ophidion* is very likely paraphyletic and the relations of the various clades to each other and to *Otophidium* is unclear at this time.

Lepophidium aporrhox Robins, 1961. 19 cm. Honduras to Suriname.

Lepophidium brevibarbe (Cuvier, 1829).

Lepophidium jeannae Fowler, 1941. 28 cm. SE US to S Florida and Gulf of Mexico.

Lepophidium kallion Robins, 1960. 17 cm. Puerto Rico and Greater Antilles to Barbados.

Lepophidium marmoratum (Goode and Bean, 1885). 22 cm. Bahamas, Cuba, and Yucatan to Nicaragua and Virgin Islands.

Lepophidium pheromystax Robins, 1960. 27 cm. Puerto Rico and Colombia to NE Brazil.

Lepophidium profundorum (Gill, 1863). 25 cm. Georges Bank to N Florida and Gulf of Mexico.

Lepophidium staurophor Robins, 1959. 27 cm. S Gulf of Mexico to W Caribbean Sea.

Ophidion grayi Fowler, 1948. 27 cm. South Carolina and N Gulf of Mexico to Mexico.

Ophidion holbrookii (Putnam, 1874).

Ophidion josephi Girard, 1858. 21 cm. Georgia to NE Florida and N Gulf of Mexico. (*Ophidion welshi* is a junior synonym.)

Ophidion lagocheila (Böhlke and Robins, 1959). 8 cm. Bahamas and Bermuda.

Ophidion marginatum (DeKay, 1842). 21 cm. New York to NE Florida.

Ophidion nocomis Robins and Böhlke, 1959. 8 cm. Bahamas to Puerto Rico.

Ophidion robinsi Fahay. 1992. 13 cm. New Jersey to South Carolina.

Ophidion selenops Robins and Böhlke, 1959. 10 mm. South Carolina to the Florida Keys and the SE Gulf of Mexico.

Otophidium chickcharney Böhlke and Robins, 1959. 10 cm. Bahamas.

Otophidium dormitator Böhlke and Robins, 1959. 7 cm. S Florida and Bahamas to Yucatan, Mexico and the Lesser Antilles.

Otophidium omostigma (Jordan and Gilbert, 1882). 12 cm. North Carolina and N Gulf of Mexico to S Florida and Lesser Antilles.

Parophidion schmidti (Woods and Kanazawa, 1951) 9 cm. Bermuda, Bahamas, and S Florida to N South America.

Subfamily NEOBYTHITINAE

Abyssobrotula galatheae Nielsen, 1977. 18 cm. Circumtropical.

Acanthonus armatus Günther, 1878. 38 cm. Circumtropical.

Apagesoma delosommatus (Hureau, Staiger and Nielsen, 1979). 60 cm. Tropical Atlantic.

Apagesoma edentatum Carter, 1983. 75 cm. Tropical W Atlantic.

Barathrites iris Zugmayer, 1911. 50 cm. Probably circumtropical.

Barathrites parri Nybelin, 1957. 25 cm. NW Atlantic.

Barathrodemus manatinus Goode and Bean, 1883. 20 cm. Tropical NW Atlantic.

Bassogigas gillii Goode and Bean, 1896. 85 cm. FAO Area 31 and 41.

Bassozetus compressus (Günther, 1878). 62 cm. Atlantic and off the Philippines.

Bassozetus levistomatus Machida, 1989. 80 cm. Circumtropical.

Bassozetus normalis Gill, 1883. 28 cm. NW Atlantic.

Bassozetus robustus Smith and Radcliffe, 1913. 64 cm. Circumtropical.

Bassozetus taenia (Günther, 1887). 25 cm. N Atlantic.

Bathyonus laticeps (Günther, 1878). 20 cm. Atlantic.

Bathyonus pectoralis Goode and Bean, 1885. 22 cm. W Atlantic and E Indian Oceans.

Benthocometes robustus (Goode and Bean, 1885). 12 cm. Tropical Atlantic and Mediterranean.

Dicrolene intronigra Goode and Bean, 1883. 22 cm. FAO Areas 21, 31, 34, and 47.

Dicrolene kanazawai Grey, 1958. 40 cm. Tropical W Atlantic.

Eretmichthys sp. 25 cm. Probably undescribed species from tropical W Atlantic.

Holcomycteronus profundissimus (Roule, 1913). 25 cm. Probably circumtropical.
Holcomycteronus squamosus (Roule, 1916). 25 cm. Atlantic.

Lamprogrammus brunswigi (Brauer, 1906). 95 cm. Circumtropical.
Lamprogrammus shcherbachevi Cohen and Rohr, 1993. 200 cm. In all oceans.

Leucicorus atlanticus Nielsen, 1975. 15 cm. Tropical W Atlantic.

Luciobrotula corethromycter Cohen, 1964. 50 cm. Tropical Atlantic.

Monomitopus agassizii (Goode and Bean, 1896). 14 cm. Tropical W Atlantic.
Monomitopus magnus Carter and Cohen, 1985. 54 cm. FAO Area 31.

Neobythites braziliensis Nielsen, 1999. 15 cm. Off NE Brazil.
Neobythites elongatus Nielsen and Retzer, 1994. 14 cm. Caribbean and Gulf of Mexico.
Neobythites gilli Goode and Bean, 1885. 15 cm. Gulf of Mexico.
Neobythites marginatus Goode and Bean, 1886. 22 cm. North Carolina to Trinidad in Caribbean and Gulf of Mexico.
Neobythites monocellatus Nielsen, 1999. 15 cm. Off N South America.
Neobythites multidigitatus Nielsen, 1999. 8 cm. Bahamas.
Neobythites ocellatus Günther, 1887. 16 cm. W Indies excluding Gulf of Mexico.
Neobythites unicolor Nielsen and Retzer, 1994. 13 cm. Caribbean and Gulf of Mexico.

Penopus microphthalmus (Vaillant, 1888). 32 cm. Tropical Atlantic and off Cape Town.

Petrotyx sanguineus (Meek and Hildebrand, 1928). 20 cm. W Indies.

Porogadus catena (Goode and Bean, 1885). 24 cm. W Atlantic and Gulf of Panama.
Porogadus miles Goode and Bean, 1885. 30 cm. Circumtropical.
Porogadus silus Carter and Sulak, 1984. 18 cm. Bahamas and Caribbean.

Spectrunculus grandis (Günther, 1877). 130 cm. In all oceans.

Xyelacyba myersi Cohen, 1961. 46 cm. Circumtropical.

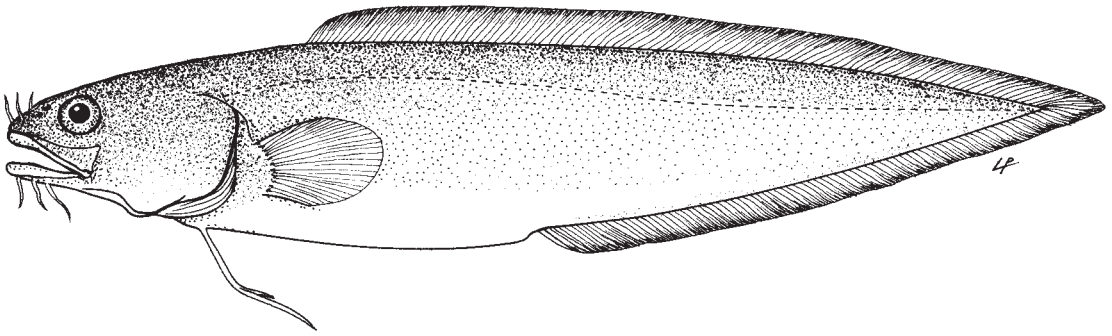
Reference

Nielsen, J.G., D.M. Cohen, D.F. Markle, and C.R. Robins. 1999. FAO Species Catalogue. Vol. 18. Ophidiiform fishes of the world (order Ophidiiformes). An annotated and illustrated catalogue of pearlfishes, cusk-eels, brotulas and other ophidiiform fishes known to date. *FAO Fish. Synop*., (125)18:178 p.

Brotula barbata (Bloch and Schneider, 1801) BRD

Frequent synonyms / misidentifications: None / None.

FAO names: En - Bearded brotula; **Fr** - Brotula barbé; **Sp** - Brótula de barbas.

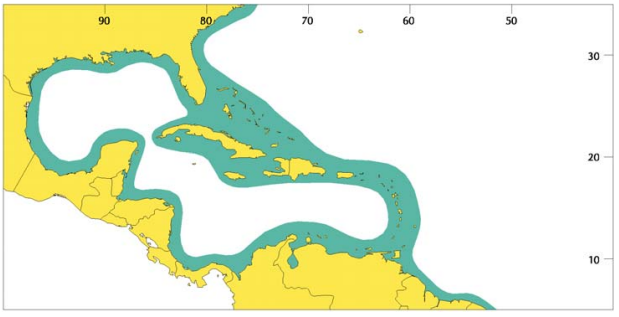


Diagnostic characters: Barbels present on snout (6) and chin (6). Developed gill rakers on first arch 4 or fewer. Pelvic fins each with 2 rays, inserted at about level of preopercle, well behind eye. Body completely covered with small, imbricate, cycloid scales. **Colour:** brownish.

Size: Maximum length about 1 m.

Habitat, biology, and fisheries: Adults live on or near the bottom down to 650 m and juveniles common on reefs. Small silvery specimens are taken far out to sea in surface waters.

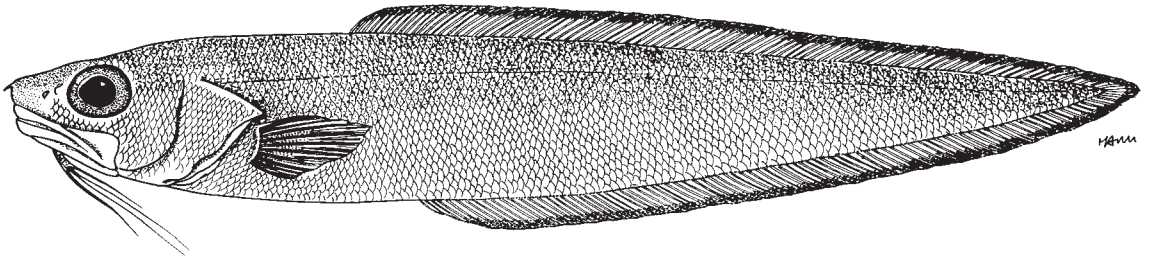
Distribution: In tropical parts of both the western and eastern Atlantic.



Lepophidium brevibarbe (Cuvier, 1829)

Frequent synonyms / misidentifications: *Lepophidium graellsi* (Poey,1861) / *Lepophidium profundorum*.

FAO names: En - Shortbeard cusk-eel (Blackedge cusk-eel); **Fr** - Brotule barbiche; **Sp** - Perla barbacorta.

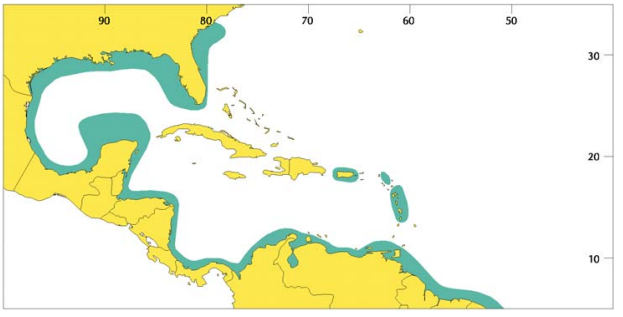


Diagnostic characters: Gill rakers usually 3 (rarely 2 or 4) rudiments on upper limb of first arch, 4 (very rarely 5) developed rakers on lower limb. Dorsal-fin rays 124 to 134; anal-fin rays 99 to 110. Precaudal vertebrae 15 (occasionally 14); caudal vertebrae 54 to 56 (rarely 57); total vertebrae 69 to 72 (rarely 73) . **Colour:** head and body tan, unmarked except for dark margin to dorsal fin and, to a lesser extent, anal fin.

Size: At least 270 mm.

Habitat, biology, and fisheries: Benthic from waters edge to 75 m. Common. Of minor economic importance. Sometimes harvested as bycatch of the shrimp trawling fishery in Colombia and is marketed under the local name of "perla."

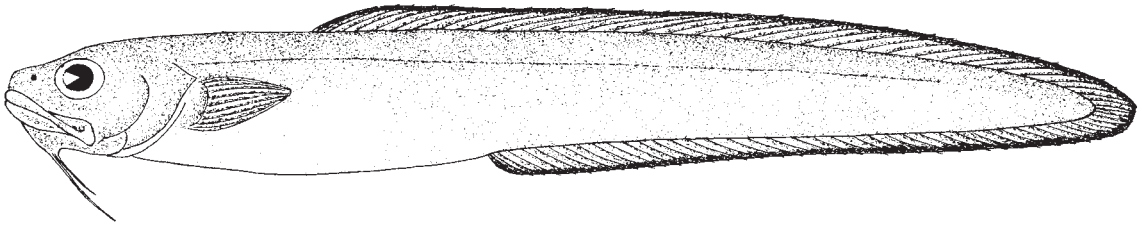
Distribution: Southeastern United States and northern Gulf of Mexico to southern Brazil.



Ophidion holbrookii (Putnam, 1877)

Frequent synonyms / misidentifications: *Ophidion beani* (Jordan and Gilbert, 1883) / None.

FAO names: En - Bank cusk-eel.

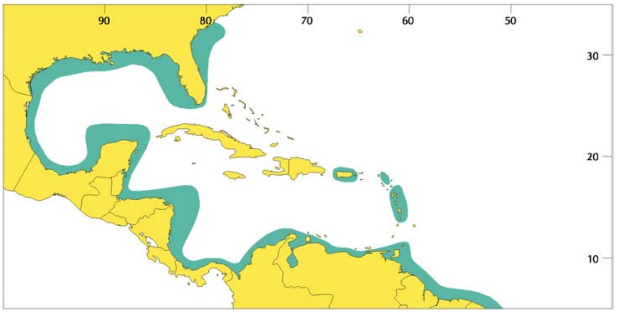


Diagnostic characters: Body distinctly deepest at dorsal-fin origin, slab-sided. Mouth subterminal. Dorsal profile nearly straight from snout to dorsal-fin origin (not arched). **Gill rakers on first arch: 2 rudiments on upper limb** and 4 developed rakers on lower limb. Pelvic rays long, extending below opercle. **Colour:** head and body tan, unmarked except for dark margin to dorsal fin and, occasionally, anal fin.

Size: At least 300 mm.

Habitat, biology, and fisheries: Benthic from coastal bays to 75 m. Common. Landed as a bycatch of the shrimp trawling fishery. Marketed in Colombia under the local name of “perla.”

Distribution: North Carolina and northern Gulf of Mexico to southeastern Brazil. Absent from the Bahamas.

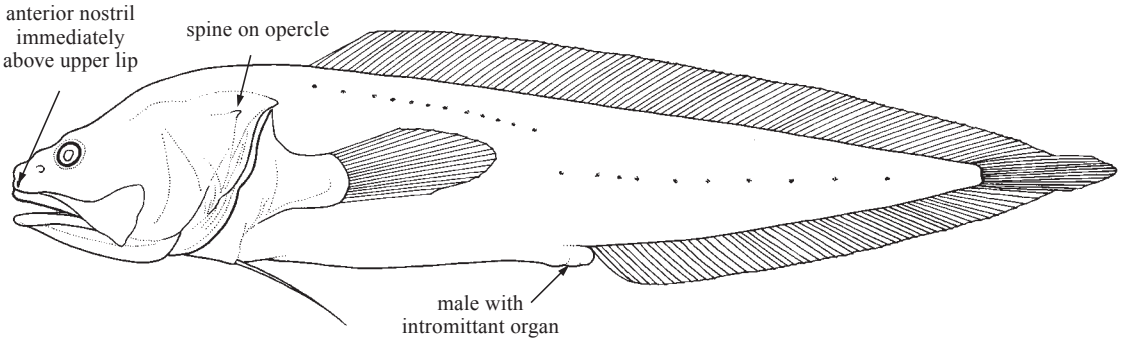


BYTHITIDAE

Viviparous brotulas

by J.G. Nielsen, Zoological Museum, University of Copenhagen, Denmark

Diagnostic characters: Body of varying shapes (size from 5 to about 100 cm). Eyes distinct (excpet in some *Lucifuga* species and in *Typhliasina*). **Anterior nostril immediately above upper lip** (except for *Dinematichthys* with anterior nostril midway between posterior nostril and upper lip). **Basibranchial tooth patches absent. Seldom more than 7 long gill rakers on anterior gill arch**. Dorsal and anal fins long joined to (subfamily Bythitinae) or free from (subfamily Brosmophycinae) caudal fin; dorsal-fin soft rays normally longer than opposing anal-fin soft rays; pelvic-fin soft rays 0 to 2. **Scales present in all but a few species**. Opercle with well-developed spine. Swimbladder present; **males with intromittant organ. Precaudal vertebrae 9 to 22. Colour:** brownish to whitish.



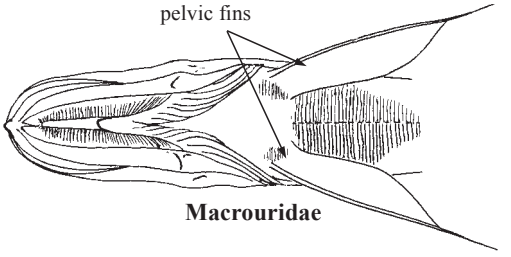
Habitat, biology and fisheries: Occur in fresh-water caves and in marine water from a few to about 2 000 m. Viviparous; no importance to fisheries.

Similar families occurring in the area

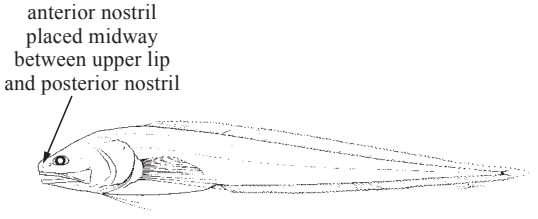
Ophidiidae: anterior nostril placed midway between upper lip and posterior nostril; rarely less than 7 long gill rakers on anterior arch.

Aphyonidae: no scales; skin loose and gelatinous; eyes small or indistinct.

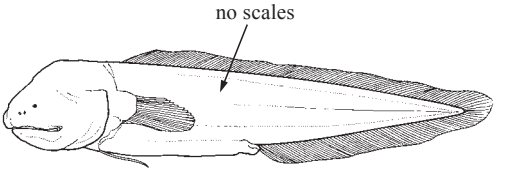
Gadidae, Macrouridae, Moridae, Phycidae, and Steindachneriidae: pelvic fins well separated from each other.



Macrouridae



Ophidiidae



Aphyonidae

List of species occurring in the area

Note: See Nielsen *et al*. (1999) for a key to genera.

Subfamily BYTHITINAE

Bellottia apoda Giglioli, 1883. To 7 cm. Tropical Atlantic and Mediterranean.

Bythites gerdae Nielsen and Cohen, 1973. To 6 cm. Straits of Florida.

Calamopteryx goslinei Böhlke and Cohen, 1966. To 6 cm. Tropical NW Atlantic.
Calamopteryx robinsorum Cohen, 1973. To 5 cm. Tropical NW Atlantic.

Cataetyx laticeps Koefoed, 1927. At least 50 cm. N and SE Atlantic and Mediterranean.

Diplacanthopoma brachysoma Günther, 1887. To 20 cm. Tropical W Atlantic.

Grammonus claudei (Torrey Huerta, 1930). To 9 cm. Tropical NW Atlantic; marine caves and reefs.

Saccogaster melanomycter Cohen, 1981. To 7 cm. Caribbean Sea off Colombia.
Saccogaster rhamphidognatha Cohen, 1987. To 6 cm. N Gulf of Mexico.
Saccogaster staigeri Cohen and Nielsen, 1972. To 9 cm. Off Florida and Gulf of Mexico.

Stygnobrotula latebricola Böhlke, 1957. To 7 cm. Tropical W North Atlantic.

Subfamily BROSMOPHYCINAE

Note: The description of 4 new species of *Ogilbia* and 2 new genera each with 2 new species are in preparation (Møller, Schwarzhans, and Nielsen).

Dinematichthys minyomma Sedor and Cohen, 1987. To 8 cm. Off Honduras.

Gunterichthys longipenis Dawson, 1966. To 6 cm. N Gulf of Mexico.

Lucifuga dentata Poey, 1858. To 12 cm. In caves in Cuba.
Lucifuga simile Nalbant, 1981. To 8 cm. In caves in Cuba.
Lucifuga spelaeotes Cohen and Robins, 1970. To 11 cm. Bahamas.
Lucifuga subterranea Poey, 1858. To 11 cm. In caves in Cuba.
Lucifuga teresinarum Diaz Perez, 1988. To 9 cm. In caves in Cuba.

Ogilbia cayorum Evermann and Kendall, 1898. To 8 cm. Florida Keys.

Typhliasina pearsei (Hubbs, 1938). To 10 cm. Freshwater caves in Yucatan.

Reference

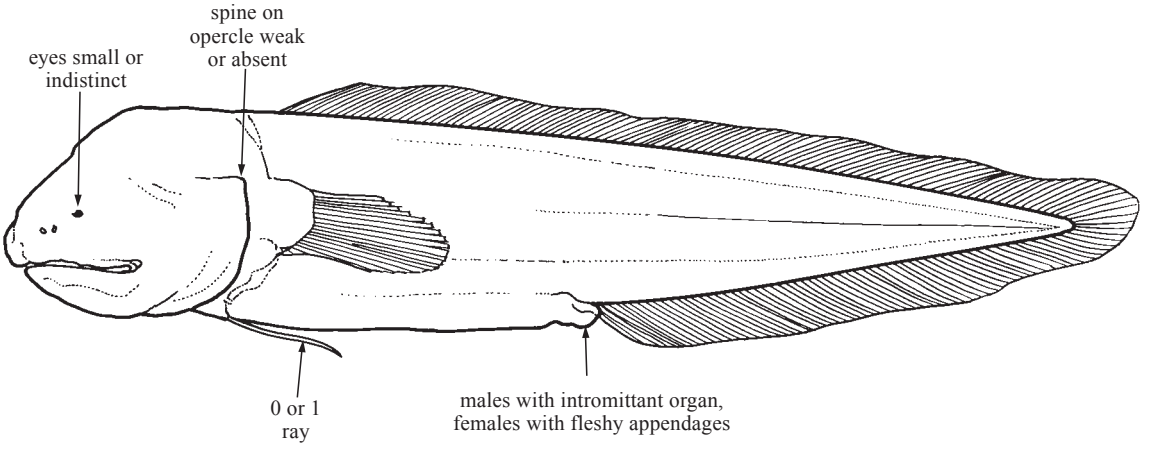
Nielsen, J.G., D.M. Cohen, D.F. Markle, and C.R. Robins. 1999. FAO Species Catalogue. Vol. 18. Ophidiiform fishes of the world (order Ophidiiformes). An annotated and illustrated catalogue of pearlfishes, cusk-eels, brotulas and other ophidiiform fishes known to date. *FAO Fish. Synop*., (125)18:178 p.

APHYONIDAE

Aphyonids

by J.G. Nielsen, Zoological Museum, University of Copenhagen, Denmark

Diagnostic characters: Elongate ophidiiform fishes (size from 5 to 25 cm). **Skin loose, transparent, and gelatinous. Eyes small or indistinct**. Basibranchial tooth patches absent. Opercular spine weak or absent. Long gill rakers present or absent. **Long dorsal- and anal-fin bases joined to caudal fin; pelvic fins with 0 or 1 ray. Scales absent. Precaudal vertebrae 26 to 50. Swimbladder absent. Viviparous, males with intromittant organ**, females often with fleshy appendages around genital opening. Except for *Barathronus*, adult aphyonids have retained many larval characters such as cylindrical shaped vertebral centra, slightly ossified bones, and poorly developed musculature, gill rakers, and gill filaments. **Colour:** brownish to whitish.

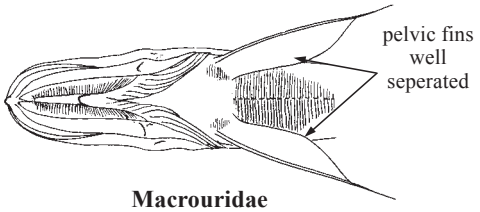


Habitat, biology and fisheries: Rarely caught fishes which occur near the bottom at depths between about 250 and 5 600 m. Found at lower latitudes in all oceans. Viviparous with relatively few, large eggs and consequently large larvae. Except for larvae of *Barathronus,* aphyonid larvae most probably remain near the bottom. No importance to fisheries.

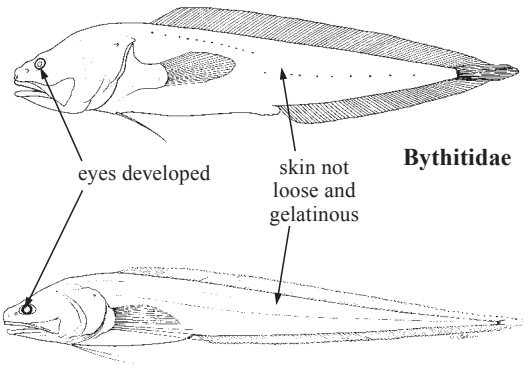
Similar families occurring in the area

Bythitidae and Ophidiidae: eyes developed (except in the cave dwelling *Lucifuga* and *Typhliasina* and in the deep-sea genus *Leucicorus* with rudimentary eye lens), skin not loose and gelatinous.

Gadidae, Moridae and Phycidae: pelvic fins well separated from each other; dorsal and anal fins not joined to caudal fin.



Macrouridae



Bythitidae

Ophidiidae

List of species occuring in the area

Note: See Nielsen *et al*. for key to genera.

Aphyonus gelatinosus Günther, 1878. To 25 cm. Circumtropical.
Aphyonus rassi Nielsen, 1975. To 7 cm. Caribbean.

Barathronus bicolor Goode and Bean, 1886. To 12 cm. Gulf of Mexico and Caribbean.
Barathronus unicolor Nielsen, 1984. To 11 cm. Off Florida and Morocco.

Meteoria erythrops Nielsen, 1969. To 8 cm. Atlantic between 28°N and 42°N.

Nybelinella erikssoni (Nybelin, 1957). To 10 cm. Atlantic between 45°N and 27°S.

Parasciadonus brevibrachium Nielsen, 1984. To 7 cm. C Atlantic.

Sciadonus jonassoni (Nybelin, 1957). 6 cm. Atlantic between 9°N and 31°N.

References

Nielsen, J.G. 1969. Systematics and biology of the Aphyonidae (Pisces, Ophidioidea). *Galathea Report*, (10):7-90.

Nielsen, J.G., D.M. Cohen, D.F. Markle, and C.R. Robins. 1999. FAO Species Catalogue. Vol. 18. Ophidiiform fishes of the world (order Ophidiiformes). An annotated and illustrated catalogue of pearlfishes, cusk-eels, brotulas and other ophidiiform fishes known to date. *FAO Fish. Synop*., (125)18:178 p.

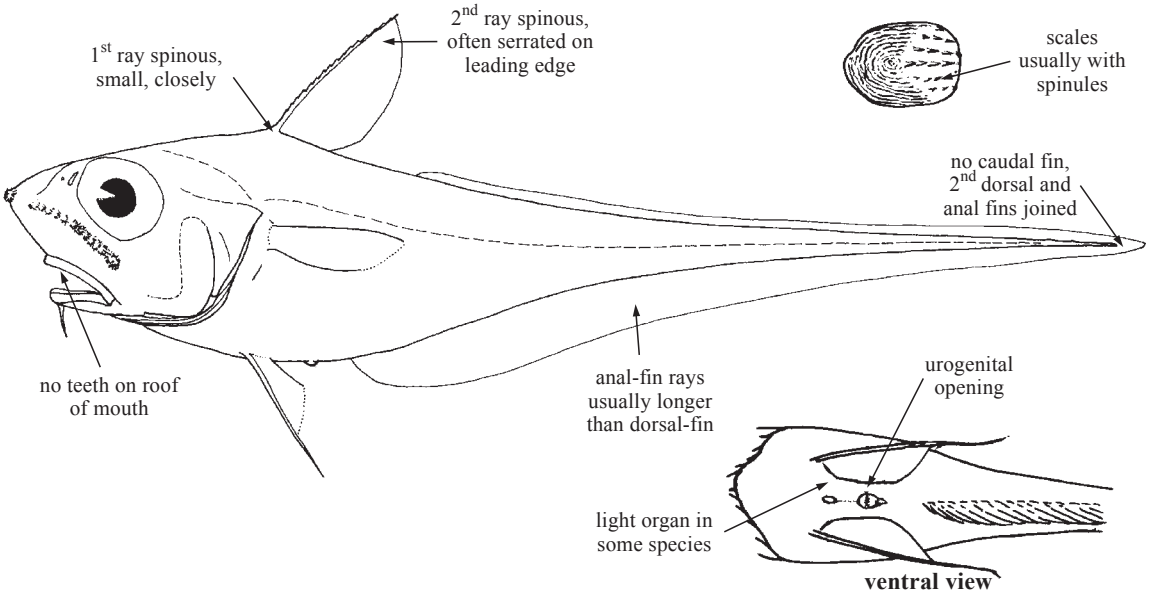
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Order GADIFORMES
MACROURIDAE
Grenadiers (rattails)

by T. Iwamoto, California Academy of Sciences, USA

Diagnostic characters: Small to medium-sized (to about 110 cm in Area 31, commonly between 20 and 60 cm) with laterally compressed body and long, strap-like tail tapering to a slender point. Eye large, 20 to 40% or more of head length; snout in most species prominent, protruding; mouth small to moderately large, jaws subterminal to inferior. Jaw teeth well developed, of variable size and arrangement; **no teeth on roof of mouth**. Branchiostegal rays 6 or 7. **Gill rakers tubercular; outer gill slit greatly restricted by opercular membrane** connected to upper and lower reaches of gill arch. **Two dorsal fins, the first short-based and high, with second ray spinous; second dorsal fin long-based, confluent with anal fin at end of tail; anal fin usually with much longer rays than second dorsal fin; no caudal fin**; pelvic fin usually situated forward of pectoral-fin origin, 7 to 14 rays in species from Area 31. Exposed field of scales in almost all species covered with spinules; many with modified, thick, spiny scales at tip of snout and over ridges of head. **Colour:** variably brown, black, grey, bluish, often silvery along sides of head and body.

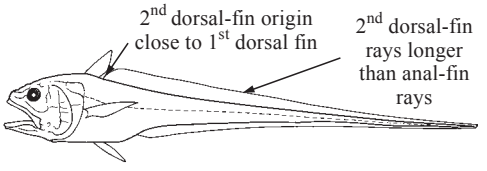


Habitat, biology, and fisheries: Benthopelagic fishes of continental slope and rise, in about 250 to more than 4 000 m (a few species pelagic, but none in the area). Food predominantly bottom invertebrates, free-swimming crustaceans, fish, and cephalopods. Spawning probably prolonged in most species, eggs often of multiple sizes in ovaries; eggs and larvae pelagic, young develop rapidly and descend to bottom. Biology of Area 31 species virtually unknown. A few species in cold-temperate waters attain large size and form important commercial fisheries, but in Area 31 none commercially utilized, although some species taken in quantity as bycatch of deep-water shrimp trawlers.

Remarks: Family often treated as including 4 subfamilies: Macrourinae, Macrouroidinae, Bathygadinae, and Trachyrincinae.

Similar families occurring in the area

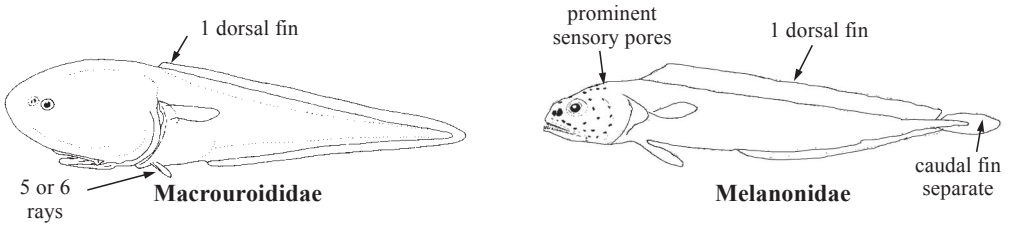
Bathygadidae: mouth large, essentially terminal; first and second dorsal fins closely approximated, without a distinct gap between; second dorsal fin with much longer rays than anal fin.



Bathygadidae

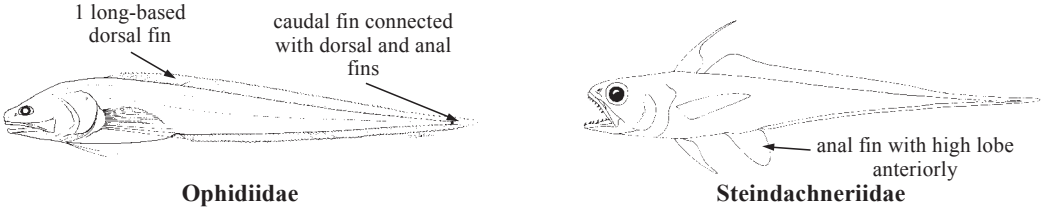
Macrouroididae: mucous chambers of head enormously developed, giving inflated, rounded shape to head; outer gill arch not restricted by opercular membrane; chin barbel absent; outer gill rakers long, slender; 1 long-based, short-rayed dorsal fin; pelvic fin small, of 5 or 6 rays (absent in 1 species not found in area).

Melanonidae: 1 long-based dorsal fin (anterior section sometimes appearing as separate fin), 1 long-based anal fin, each separated from caudal fin; prominent sensory pores and ridge-like rows of free neuromasts on head; teeth on vomer and palatines.



Ophidiidae: 1 long-based dorsal fin; caudal fin connected with dorsal and anal fins; bases of pelvic fins close together, without a broad scaled space between.

Steindachneriidae: anal fin with high lobe anteriorly, rays weak and short over remainder of fin; anus and urogenital opening widely separated; vomerine teeth present.



Key to the species of Macrouridae occurring in the area

1a. Anus not surrounded by a broad margin of naked black skin (Fig. 1a), located immediately anterior to anal fin (separated by 1 or 2 rows of scales at most); branchiostegal rays 6 or 7 . . . . . → *2*

1b. Anus surrounded by a broad margin of naked skin (Fig. 1b) or far removed from anal fin (Fig. 1c); branchiostegal rays 7 . . . . . → *18*

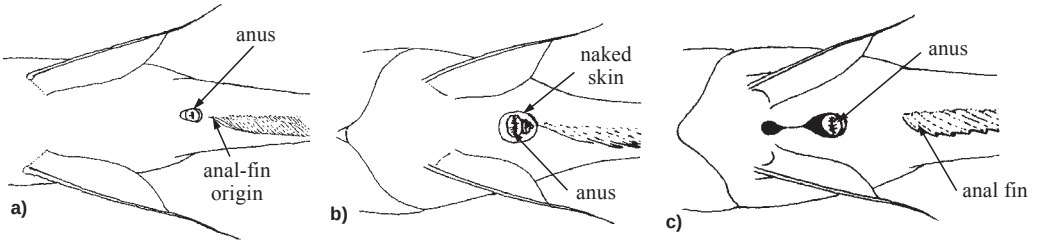


Fig. 1 ventral view

2a. Spinous second ray of first dorsal fin smooth (Fig. 2); snout pointed with spiny terminal scute and coarsely scaled head ridges; branchiostegal rays 6; pelvic-fin rays 7 . . . ***(Caelorinchus)*** → ***4***

2b. Spinous second ray of first dorsal fin serrated (Fig. 3) or smooth, if smooth, head mostly naked and lacking spinulated scales; branchiostegal rays 6 or 7; pelvic-fin rays 8 to 14 (rarely 7) . . . . . → ***3***

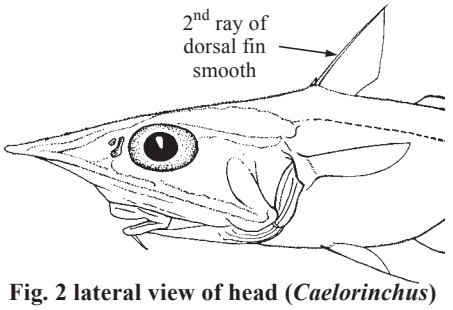


Fig. 2 lateral view of head (*Caelorinchus*)

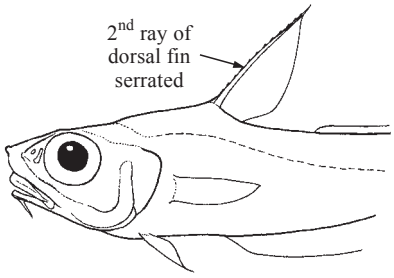


Fig. 3 lateral view of head

3a. Head covering membranous (Fig. 4), mostly without scales; small lens-like structures on chest and in front of anus; spinous second ray of dorsal fin smooth except in one species; striations on gular membrane (Fig. 5); branchiostegal rays 7 (Fig. 6) . . . . . ***(Hymenocephalus)*** → ***7***

3b. Head covering tough, opaque, mostly covered with spinulated scales; no lens on chest or in front of anus; spinous second ray of dorsal fin serrated; no gular striations; branchiostegal rays 6 . . . . . ***(Coryphaenoides)*** → ***10***

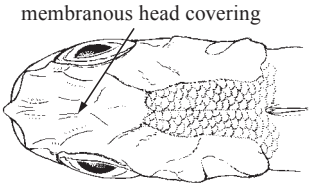


Fig. 4 dorsal view of head

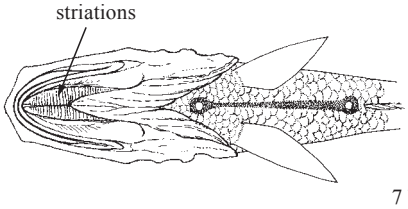


Fig. 5 ventral view of body

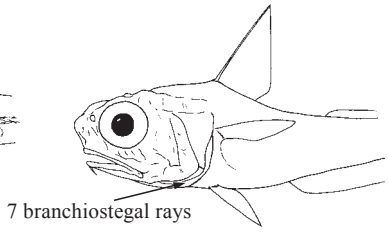


Fig 6 lateral view of body

4a. Underside of head almost completely naked; no black naked fossa on chest; body scales with stout, enlarged median keel (Fig. 7) . . . . . ***Caelorinchus occa***

4b. Underside of head almost entirely scaled except for median swath on underside of snout; a prominent black naked fossa on chest; body scales covered with short, fine spinules, none enlarged (Fig. 8) . . . . . → ***5***

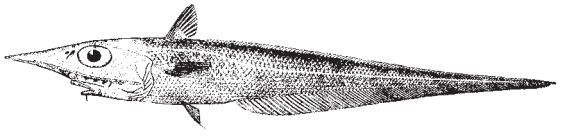


Fig. 7 *Caelorinchus occa*

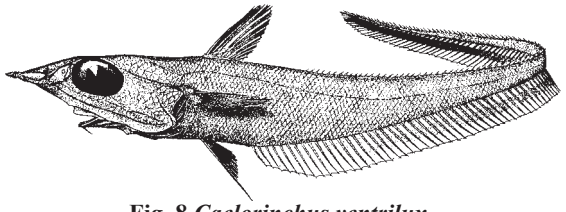


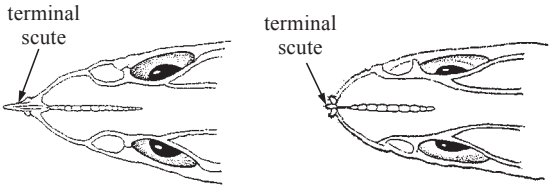
Fig. 8 *Caelorinchus ventrilux*

5a. First dorsal fin with a distinct black membrane between spinous second ray and first branched ray; a prominent black stripe posteriorly on anal fin; narrow black median line between first and second dorsal fins . . . . . ***Caelorinchus ventrilux***

5b. First dorsal fin uniformly blackish; no stripe on anal fin; no black line between dorsal fins . . . . → ***6***

6a. Terminal scute of snout lanceolate, projecting far beyond lateral scutes (Fig. 9a) . . . . . ***Caelorinchus caribbaeus***

6b. Terminal scute of snout short and stubby, projecting little beyond lateral scutes. (Fig. 9b) . . . . . ***Caelorinchus caelorhincus***



a) ***Caelorinchus caribbaeus*** **b)** ***Caelorinchus caelorhincus***

Fig. 9 dorsal view of head

7a. Pelvic-fin rays 7 to 9 (usually 8); spinous ray of dorsal fin with weakly serrated leading edge; gill rakers on lower limb of first arch 12 to 15 (Fig. 10) . . . . . ***Hymenocephalus gracilis***

7b. Pelvic-fin rays 10 to 14; spinous ray of dorsal fin smooth; gill rakers on lower limb of first arch 16 to 25 . . . . . → ***8***

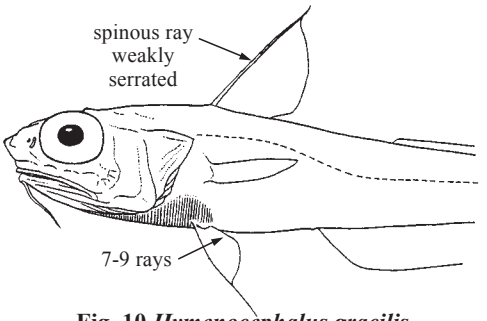


Fig. 10 ***Hymenocephalus gracilis***

8a. Barbel on chin about 10 to 15% of head length; pelvic-fin rays 10 or 11 (rarely 12) (Fig. 11) . . . ***Hymenocephalus italicus***

8b. Barbel absent or rudimentary, less than 10% of head length; pelvic-fin rays 13 or 14 (rarely 12) . . . . . → ***9***

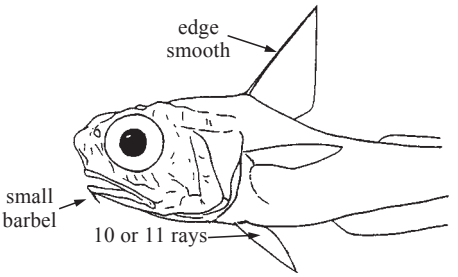


Fig. 11 ***Hymenocephalus italicus***

9a. Horizontal diameter of orbit 4 or 5 times into head; interorbital width 1/3 or more of head length (Fig. 12) . . . . . ***Hymenocephalus aterrimus***

9b. Horizontal diameter of orbit less than 4 times into head; interorbital width 1/3 or less of head length (Fig. 13) . . . . . ***Hymenocephalus billsamorum***

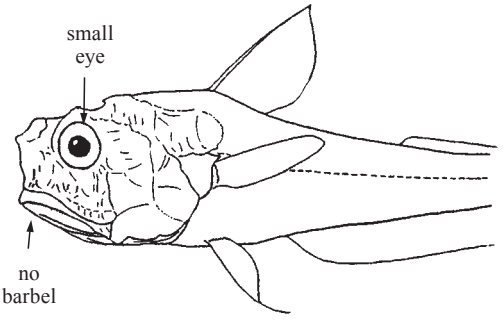


Fig. 12 ***Hymenocephalus aterrimus***

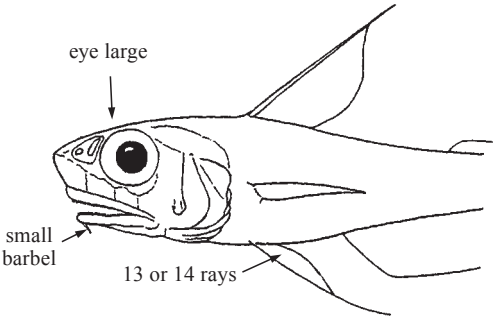


Fig. 13 ***Hymenocephalus billsamorum***

10a. Underside of snout fully scaled . . . . . → ***11***

10b. Underside of snout mostly naked . . . . . → ***15***

11a. Pelvic-fin rays 7 or 8 . . . . . → ***12***
11b. Pelvic-fin rays 9 to 11 . . . . . → ***13***

12a. Head broad, rounded; snout high; interorbital space broad, more than 1/3 of head length; inner gill rakers on first arch 19 to 20 total; grooved lateral line present (Fig. 14)
. . . . . ***Coryphaenoides rupestris***
12b. Head more compressed, not rounded; snout low; interorbital space less than 1/3 of head length; inner gill rakers on first arch 8 or 9 total; no grooved lateral line (Fig. 15)
. . . . . ***Coryphaenoides alateralis***

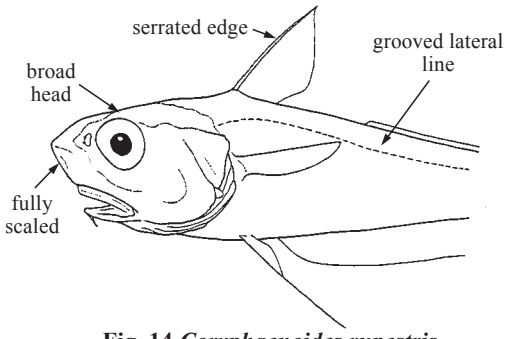


Fig. 14 ***Coryphaenoides rupestris***

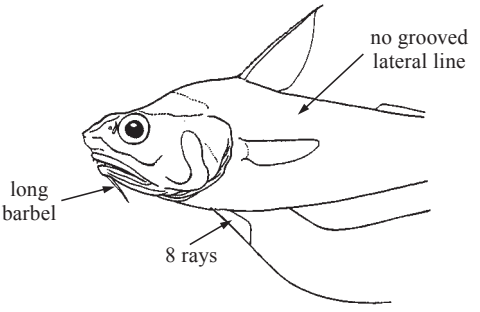


Fig. 15 ***Coryphaenoides alateralis***

13a. Interorbital space less than 1/5 of head length; barbel thick and fleshy (Fig. 16) . ***Coryphaenoides zaniophorus***
13b. Interorbital space more than 1/5 of head length; barbel slender . . . . . → ***14***

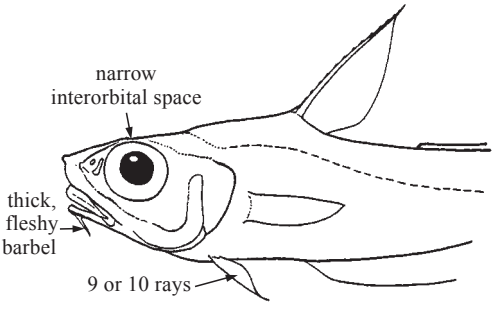


Fig. 16 ***Coryphaenoides zaniophorus***

14a. Upper jaw extends to below posterior 1/3 of orbit; orbital rim black; barbel short, 5 to 9% of head length; terminal snout scute large, prominent (Fig. 17)
. . . . . ***Coryphaenoides mexicanus***
14b. Upper jaw extends to vertical through posterior end of orbit or beyond; orbital rim not marked; barbel 10 to 23% of head length; terminal snout scute moderately developed, not prominent (Fig. 18)
. . . . . ***Coryphaenoides rudis***

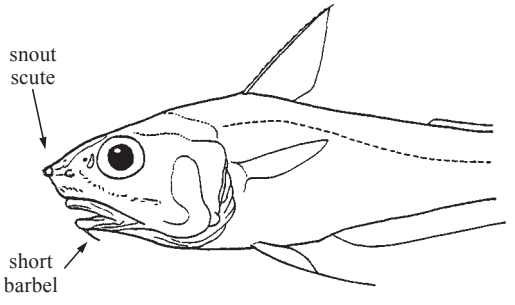


Fig. 17 ***Coryphaenoides mexicanus***

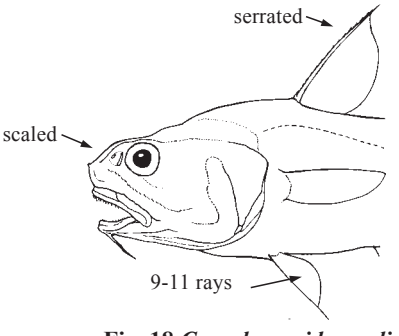


Fig. 18 ***Coryphaenoides rudis***

15a. Pelvic-fin rays 12 to 14; inner gill rakers of first arch 15 or 16 total (Fig. 19) . . . . . ***Coryphaenoides mediterraneus***

15b. Pelvic-fin rays 9 to 11; inner gill rakers of first arch 9 to 16 total . . . . . → ***16***

16a. Premaxillary teeth in 1 or 2 rows (Fig. 20) . . . . . ***Coryphaenoides armatus***

16b. Premaxillary teeth in a narrow to broad band . . . . . → ***17***

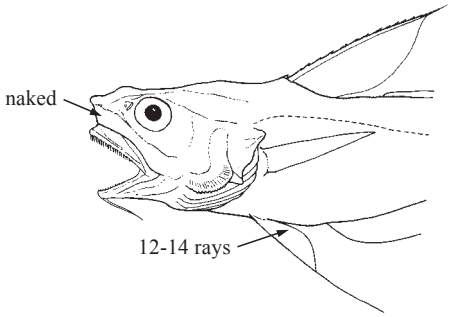


Fig. 19 ***Coryphaenoides mediterraneus***

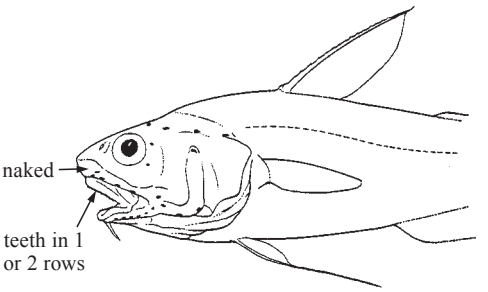


Fig. 20 ***Coryphaenoides armatus***

17a. Lower jaw with 1 row of teeth; snout low and blunt, barely protruding (Fig. 21) . . . . . ***Coryphaenoides leptolepis***

17b. Lower jaw with 2 or 3 rows of teeth; snout relatively high, pointed, and protruding (Fig. 22) . . . . . ***Coryphaenoides carapinus***

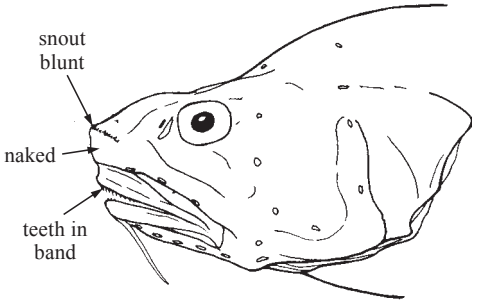


Fig. 21 ***Coryphaenoides leptolepis***

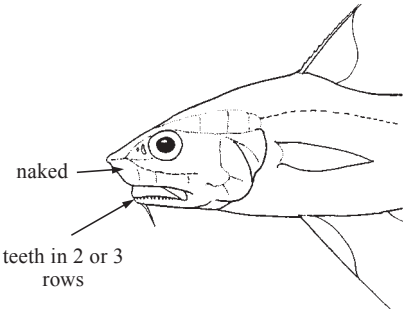


Fig. 22 ***Coryphaenoides carapinus***

18a. Anus surrounded by a broad margin of black naked skin, the entire (periproct) region closely abutting origin of anal fin; no naked fossa anterior to periproct . . . . . → ***19***

18b. Periproct region distinctly separated from anal-fin origin, usually closer to pelvic-fin insertion; small to moderate-size black naked fossa often present before periproct . . . . . → ***21***

19a. Head globose, expanded and soft (Fig. 23); chin barbel minute; 8 to 10 pelvic-fin rays . . . . . ***Cetonurus globiceps***

19b. Head not expanded, generally firm; chin barbel moderate in size; 7 or 11 to 12 pelvic-fin rays . . . . . ***→ 20***

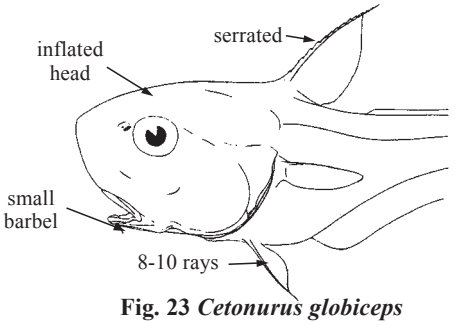


Fig. 23 ***Cetonurus globiceps***

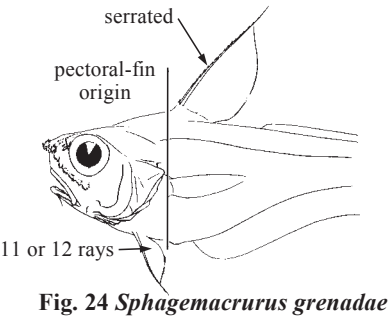


Fig. 24 ***Sphagemacrurus grenadae***

20a. Spinous dorsal-fin ray serrated along leading edge; pelvic fins far forward, anterior to vertical through pectoral-fin base; 11 or 12 pelvic-fin rays (Fig. 24) . . . . . ***Sphagemacrurus grenadae***

20b. Spinous dorsal-fin ray smooth along leading edge; pelvic fins well behind vertical through pectoral-fin base; 7 pelvic-fin rays (Fig. 25) . . . . . ***Trachonurus sulcatus***

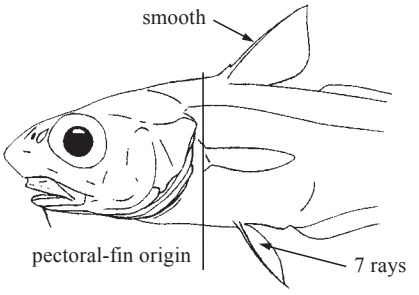


Fig. 25 ***Trachonurus sulcatus***

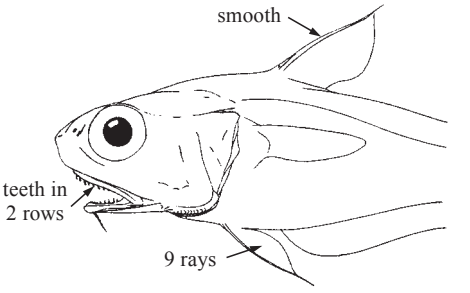


Fig. 26 ***Malacocephalus***

21a. Teeth in lower jaw enlarged, in 1 row; a large, bean-shaped fossa between bases of pelvic fins; scale rows present over lower branchiostegal rays (Fig. 26) . . . . . ***(Malacocephalus) → 22***

21b. Teeth in lower jaw in a 2 or more rows or in a broad band; fossa between bases of pelvic fins present or absent, not bean-shaped; few or no scales on branchiostegal rays . . . . . ***→ 24***

22a. Pelvic-fin rays 8; premaxillary teeth in more than 2 rows; spinous dorsal-fin ray serrated; tip and leading edge of snout blackish . . . . . ***→ 23***

22b. Pelvic-fin rays 9; premaxillary teeth in 2 distinct rows; spinous dorsal-fin ray smooth; no black margins on snout . . . . . ***Malacocephalus laevis***

23a. Interorbital space narrow, 20 to 24% of head length; orbital rim black; no enlarged median spinules on scales of dorsum in adults (Fig. 27) . . . . . ***Malacocephalus occidentalis***

23b. Interorbital space broad, 27 to 34% of head length; no black orbital rim; enlarged median spinules on scales of dorsum in adults (Fig. 28) . . . . . ***Malacocephalus okamurai***

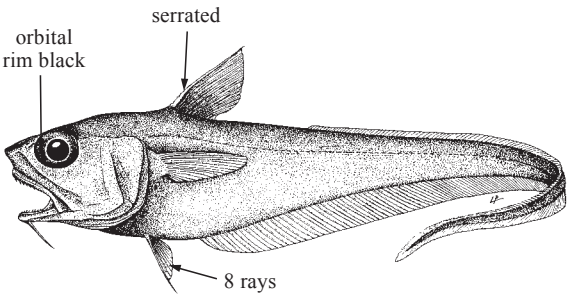


Fig. 27 ***Malacocephalus occidentalis***

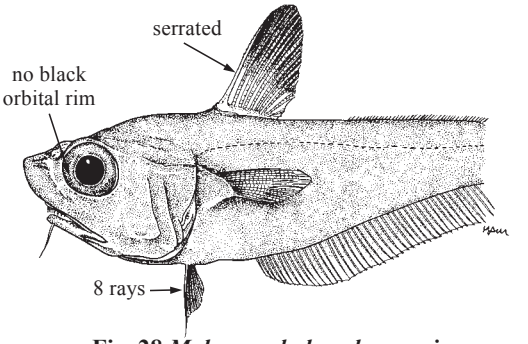


Fig. 28 ***Malacocephalus okamurai***

24a. Almost entire dorsal and ventral surfaces of snout naked; no terminal snout scute (Fig. 29) . . . ***Kumba* sp. A**

24b. Dorsal surface of snout scaled, ventral surface variously naked to fully scaled . . . . . → ***25***

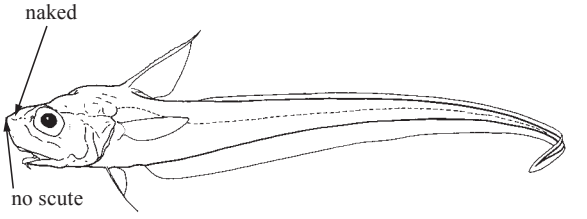


Fig. 29 ***Kumba* sp. A**

25a. All of snout and head surfaces uniformly covered with finely spinulated scales, with no thick, spiny, or tubercular scales at tip of snout or along head ridges; total gill rakers on inner side of first arch 12 to 16; leading edge of snout blackish (Fig. 30) . . . . . ***(Ventrifossa)*** → ***26***

25b. Underside of snout usually with broad to narrow naked area above upper lip; snout with or without a tubercular scale at tip, ridges of head with or without enlarged, coarsely spined scales; total gill rakers on inner side of first arch 8 to 11, rarely 12; leading edge of snout not distinctly marked in black (Fig. 31) . . . . . → ***27***

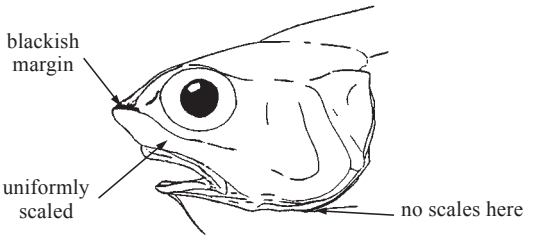


Fig. 30 ***Ventrifossa***

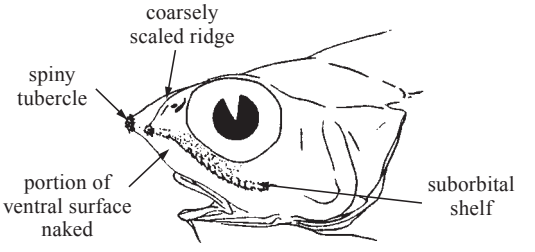


Fig. 31 ***Nezumia***

26a. Length of chin barbel about equal to or much longer than orbit diameter; median nasal ridge blackish; pelvic-fin rays 9 or 10 (Fig. 32) . . . . . ***Ventrifossa macropogon***

26b. Length of chin barbel less than orbit diameter; median nasal ridge pale; pelvic-fin rays 8, rarely 9 (Fig. 33) . . . . . ***Ventrifossa mucocephalus***

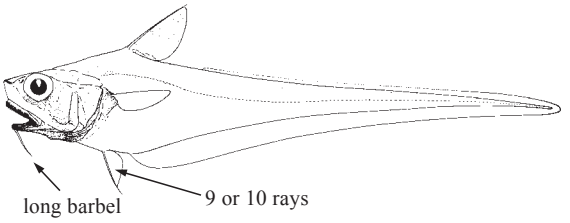


Fig. 32 ***Ventrifossa macropogon***

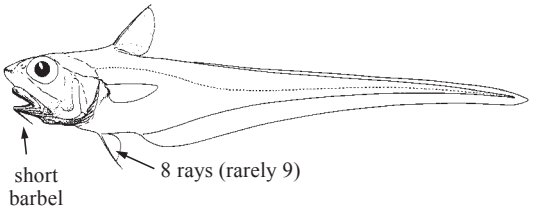


Fig. 33 ***Ventrifossa mucocephalus***

27a. Scales of head and body small, 12 to 15 rows below origin of second dorsal fin to lateral line; scales on suborbital all small (Fig. 34) . . . . . ***Kuronezumia bubonis***

27b. Scales of head and body moderate to large, fewer than 10 rows below origin of second dorsal fin to lateral line; suborbital with 2 rows of stout, coarsely modified scales . . . . ***(Nezumia)*** → ***28***

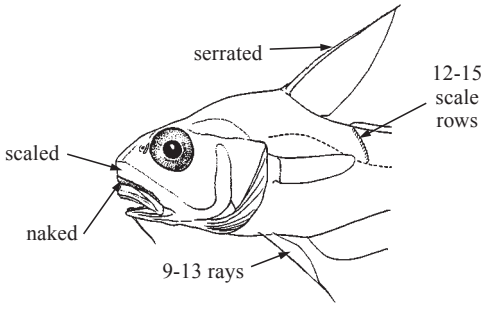


Fig. 34 ***Kuronezumia bubonis***

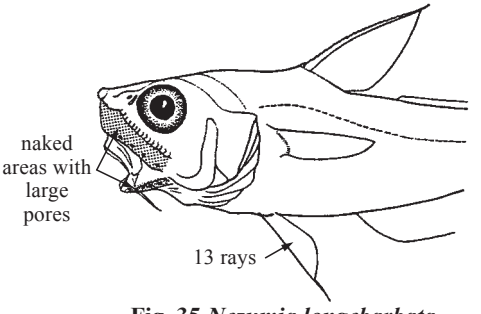


Fig. 35 ***Nezumia longebarbata***

28a. Pelvic-fin rays 7 to 10 . . . . . → ***29***

28a. Pelvic-fin rays 13 (Fig. 35) . . . . . ***Nezumia longebarbata***

29a. First dorsal fin with a prominent black tip or membrane between serrated spinous ray and first branched ray; pelvic-fin rays usually 7 to 9, rarely 10 . . . . . → ***30***

29b. First dorsal fin uniformly dusky or dark; pelvic-fin rays 7 to 10 . . . . . → ***31***

30a. First dorsal fin with a prominent black tip; pelvic-fin rays 7 to 9, rarely 10 (Fig. 36) . . . . . ***Nezumia aequalis***

30b. First dorsal fin with a black membrane between serrated spinous dorsal ray and first branched ray; pelvic-fin rays 7 (Fig. 37) . . . . . ***Nezumia bairdi***

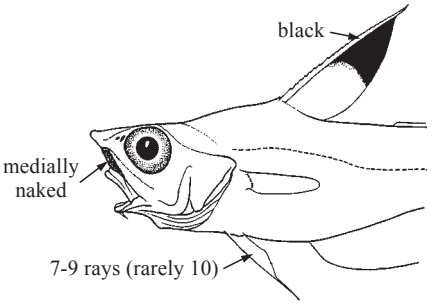


Fig. 36 ***Nezumia aequalis***

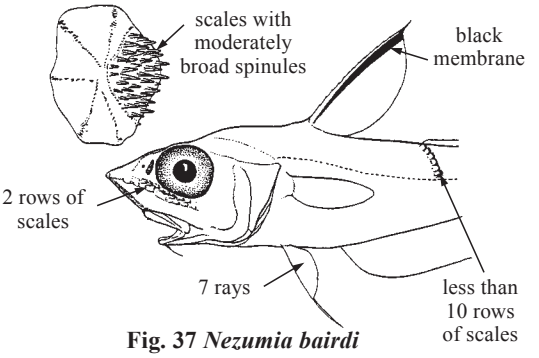


Fig. 37 ***Nezumia bairdi***

31a. Snout pointed, relatively broad across lateral angles; upper jaw short, 20 to 32% of head length . . . . . → ***32***

31b. Snout bluntly rounded, narrow; upper jaw long, 40 to 45% of head length (Fig. 38) . ***Nezumia atlantica***

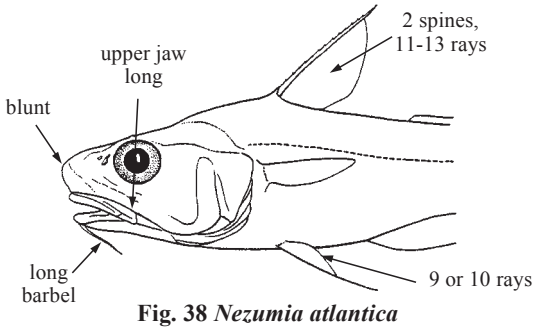


Fig. 38 ***Nezumia atlantica***

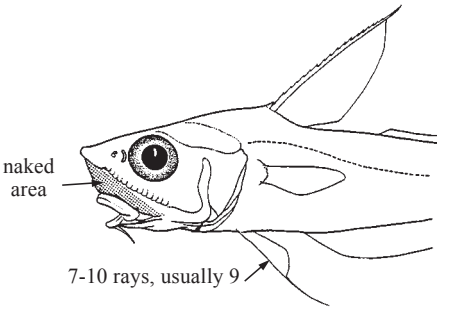


Fig. 39 ***Nezumia sclerorhynchus***

32a. Entire underside of snout, anterior part of suborbital below ridge, and most of lower jaw naked; spinules on body scales needle-like, in parallel to slightly convergent rows, middle row often somewhat enlarged; pelvic-fin rays 7 to 10, usually 9 (Fig. 39) . . . . ***Nezumia sclerorhynchus***

32b. Most of underside of head scaled, although median swath under snout often naked; spinules on body scales broadly lanceolate to shield-shaped; pelvic-fin rays 7 to 10, usually 7 or 9 . . . . . → ***33***

33a. Pelvic-fin rays 7; snout length 28 to 32%, chin barbel 8 to 21% head length (Fig. 40) . . . ***Nezumia suilla***

33b. Pelvic-fin rays 8 to 10, usually 9; snout length 32 to 36%, chin barbel 6 to 8% head length (Fig. 41) . . . . . ***Nezumia cyrano***

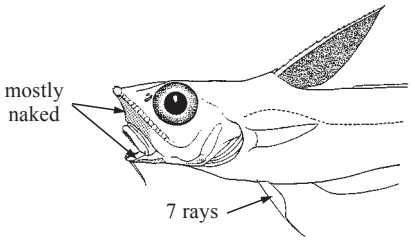


Fig. 40 ***Nezumia suilla***

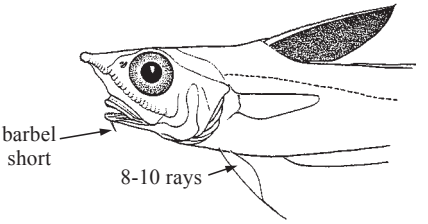


Fig. 41 ***Nezumia cyrano***

List of species occurring in the area

Caelorinchus caelorincus (Risso, 1810). To >30 cm. North Carolina to Suriname, SW21, SE27.
Caelorinchus caribbaeus (Goode and Bean, 1885). To 30 cm. North Carolina to Caribbean.
Caelorinchus occa (Goode and Bean, 1885). To >50 cm. Bahamas to Suriname.
Caelorinchus ventrilux Marshall and Iwamoto, 1973. To 30 cm. West Indies.

Cetonurus globiceps (Vaillant In Filhol, 1883). To 40 cm. Tropical circumglobal.

Coryphaenoides alateralis Marshall and Iwamoto, 1973. To >30 cm. Gulf of Mexico.
Coryphaenoides armatus (Hector, 1875). To 90 cm. Circumglobal.
Coryphaenoides carapinus Goode and Bean, 1883. To 35 cm. North Atlantic.
Coryphaenoides leptolepis Günther, 1877. To >60 cm. North and South Atlantic, E North Pacific.
Coryphaenoides mediterraneus (Giglioli, 1893). To about 75 cm. Gulf of Mexico, SE27.
Coryphaenoides mexicanus (Parr, 1946). To >40 cm. Gulf of Mexico, Caribbean.
Coryphaenoides rudis Günther, 1878. To 125 cm. Circumglobal.
Coryphaenoides rupestris (Gunnerus, 1765). To >90 cm. N31 (N of 31°N), 27.
Coryphaenoides zaniophorus (Vaillant, 1888). To >40 cm. Gulf of Mexico, Caribbean, SE34.

Hymenocephalus aterrimus Gilbert, 1905. To about 20 cm. Probably tropical circumglobal.
Hymenocephalus billsamorum Marshall and Iwamoto, 1973. To 15 cm. Florida Straits, W Indies, Caribbean, Rio de Janeiro.
Hymenocephalus gracilis Gilbert and Hubbs, 1920. To 13 cm. Circumglobal.
Hymenocephalus italicus Giglioli, 1884. To 20 cm. N and Central Atlantic, W Indian Ocean.

Kumba sp. Iwamoto and Sazonov, 1992. Known from one juvenile. W Gulf of Mexico.

Kuronezumia bubonis (Iwamoto, 1974). To 55 cm. Gulf of Mexico to Suriname, Hawaii, W81.

Malacocephalus laevis (Lowe, 1843). To 65 cm. Tropical and temperate circumglobal.
Malacocephalus occidentalis Goode and Bean, 1885. To >45 cm. Tropical and temperate Atlantic.
Malacocephalus okamurai Iwamoto and Arai, 1987. To 30 cm. French Guiana, Brazil.

Nezumia aequalis (Günther, 1878). To 30 cm. Widespread N Atlantic.
Nezumia atlantica (Parr, 1946). To >45 cm. Gulf of Mexico, Caribbean, to N Brazil.
Nezumia bairdii (Goode and Bean, 1877). To 40 cm. Florida Straits to Grand Banks, NE34.
Nezumia cyrano Marshall and Iwamoto, 1973. To 30 cm. Gulf of Mexico, Caribbean, Suriname.
Nezumia longebarbata (Roule and Angel, 1933). To 41 cm. N Gulf of Mexico, E coast US at 39°N, Madeira.
Nezumia sclerorhynchus (Valenciennes, 1838).To 27 cm. Cape Cod S to Florida Straits, NE34, SE27.
Nezumia suilla Marshall and Iwamoto, 1973. To about 30 cm. Gulf of Mexico, Caribbean, Suriname.

Sphagemacrurus grenadae (Parr, 1946). To about 22 cm. Gulf of Mexico, Caribbean, E coast US at 39°N.

Trachonurus sulcatus (Goode and Bean, 1885). To about 50 cm. Widespread N Atlantic.

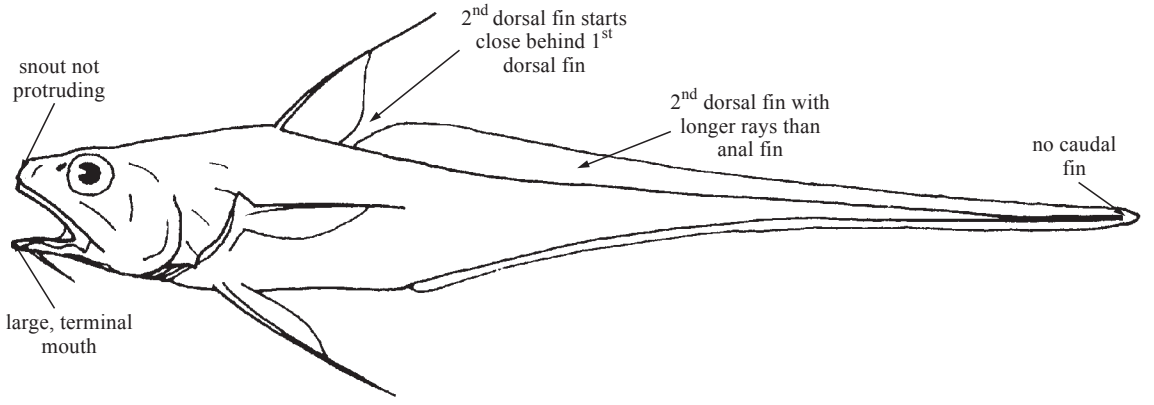
Ventrifossa macropogon Marshall, 1973. To about 45 cm. E coast Florida, Gulf of Mexico, Caribbean.
Ventrifossa mucocephalus Marshall, 1973. To about 40 cm. E coast Florida, Gulf of Mexico, Caribbean.

BATHYGADIDAE

Bathygadids

by T. Iwamoto, California Academy of Sciences, USA

Diagnostic characters: Medium-sized to about 60 cm, commonly 30 to 40 cm, with elongated, laterally flattened body that tapers to a point. **Snout not protruding**. Mouth large, essentially terminal. Jaw teeth all small, in bands; no teeth on roof of mouth. Chin barbel absent, rudimentary, or long. Seven branchiostegal rays. **Outer gill rakers on first arch long, slender; outer gill arch not restricted dorsally and ventrally by opercular membrane. Two dorsal fins; first dorsal fin short-based, long-rayed, with** slightly to greatly elongated flexible **spinous ray, second dorsal fin long, long-rayed, extending to tip of tail, confluent with long-based, short-rayed anal fin; no caudal fin**; pelvic fins well developed, with 8 to 10 soft rays. Scales deciduous, lacking spinules on exposed field. No light organ. Retia mirabilia and gas glands in swimbladder 2 or 4 each. **Colour:** variously dark to pale; belly usually dark.



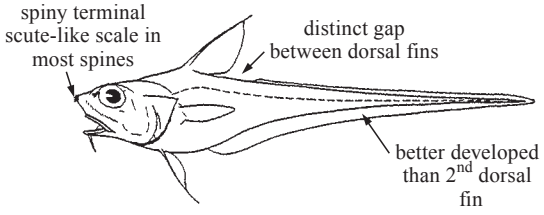
Habitat, biology, and fisheries: Benthopelagic over continental slope in 300 to more than 2 700 m. Almost nothing known of life history. Feeds primarily on swimming crustaceans, fish, and cephalopods. Some species taken in fairly large quantities in bycatch of bottom trawlers fishing for deep-water shrimp, but none currently utilized.

Remarks: Family often treated as subfamily of Macrouridae. Current treatment follows Howes and Crimmen (1990).

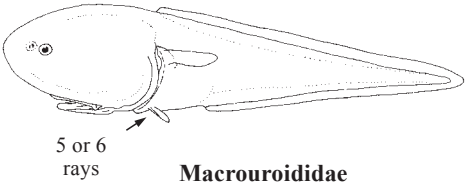
Similar families occurring in the area

Macrouridae: 2 dorsal fins separated by a distinct gap; anal-fin rays generally much longer than second dorsal-fin rays; outer gill rakers on first arch short, tubercular; first gill arch restricted dorsally and ventrally by opercular membrane; snout slightly to greatly protruding, tipped in most with a stout, spiny, modified scale; scales in most species covered with spinules.

Macrouroididae: 1 long-based, short-rayed dorsal fin extending to end of tail; anal fin similarly long-based and short-rayed; no caudal fin; pelvic fin small, short, weakly developed, with 5 or 6 soft rays; head inflated, rounded; mouth greatly underslung; scales covered with small, needle-like spinules.



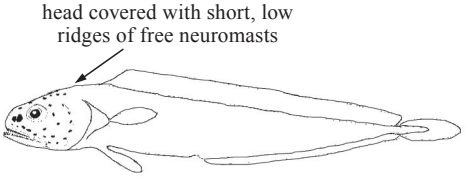
Macrouridae



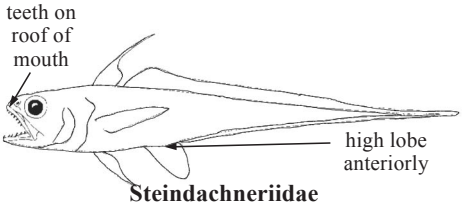
Macrouroididae

Melanonidae: dorsal and anal fins separated from caudal fin; head covered with short, low ridges of free neuromasts; head pores large, prominent.

Steindachneriidae: anal fin with high lobe anteriorly, remainder of fin rudimentary to poorly developed; teeth present on roof of mouth (vomer); abdominal light organ well developed. Anus and urogenital opening widely separated.



Melanonidae



Steindachneriidae

Key to the species of Bathygadidae occurring in the area

1a. Chin barbel long (Fig. 1a); an elongated ray in pectoral and pelvic fins . . . . . ***(Gadomus)*** → ***2***

1b. Chin barbel very small or absent (Fig. 1b); no elongated ray in pectoral and pelvic fins . . . . . ***(Bathygadus)*** → ***4***

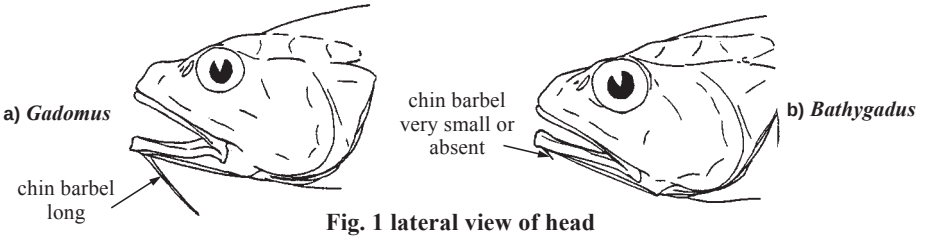


Fig. 1 lateral view of head

2a. Two elongated rays in pelvic fin; pectoral-fin soft rays 22 to 25 (Fig. 2) . . ***Gadomus arcuatus***

2b. One elongated ray in pelvic fin; pectoral-fin soft rays 14 to 20 . . . . . → ***3***

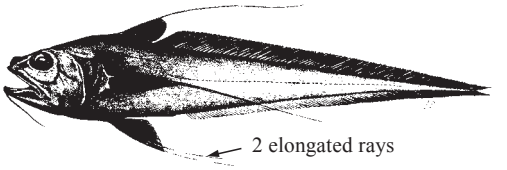


Fig. 2 ***Gadomus arcuatus***

3a. First dorsal and pelvic fins with a greatly elongated ray, each much longer than head length; gill rakers on lower limb of first arch 27 to 31; pectoral-fin soft rays 14 to 16 (Fig. 3) . . . . . ***Gadomus longifilis***

3b. No greatly elongated ray in first dorsal and pelvic fins; gill rakers on lower limb of first arch 20 to 21; pectoral-fin soft rays 18 to 20 (Fig. 4) . . . . . ***Gadomus dispar***

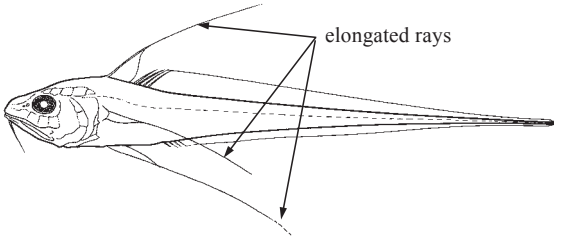


Fig. 3 ***Gadomus longifilis***

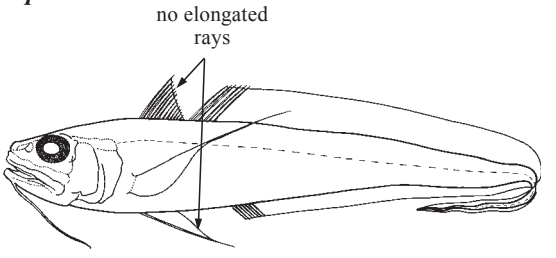


Fig. 4 ***Gadomus dispar***

4a. A very small barbel present on chin; body integument relatively tough, not readily torn; head bones strong; gill filaments pale (Fig. 5) . . . . . ***Bathygadus macrops***

4b. No barbel on chin; body integument weak, easily torn; head bones weak, easily broken; gill filaments dusky or pale. . . . . → ***5***

5a. Pelvic-fin rays 8; gill filaments dusky; orbit 4 or fewer times into head length, 0.9 to 1.3 times into interorbital width (Fig. 6) . . . . . ***Bathygadus melanobranchus***

5b. Pelvic-fin rays 9; gill filaments pale; orbit 4 or more times into head length, 1.3 to 2.9 times into interorbital width (Fig. 7) . . . . . ***Bathygadus favosus***

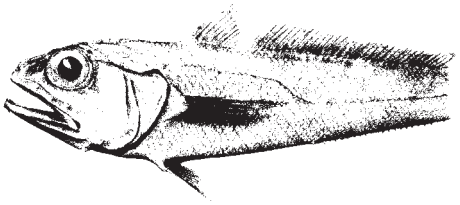


Fig. 5 ***Bathygadus macrops***

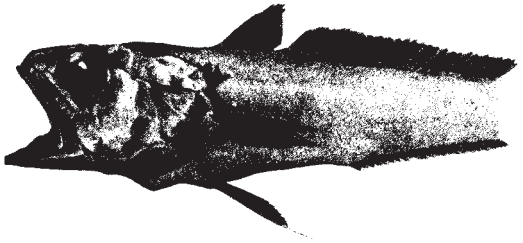


Fig. 6 ***Bathygadus melanobranchus***

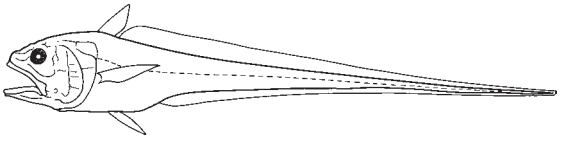


Fig. 7 ***Bathygadus favosus***

List of species occurring in the area

Bathygadus favosus Goode and Bean, 1886. To 45 cm. Gulf of Mexico, Caribbean Sea, NE South America, Area 34; depths 750 to 2 750 m.

Bathygadus macrops Goode and Bean, 1885. To 45 cm. Gulf of Mexico, Caribbean Sea, SE34; depths about 250 to 750 m.

Bathygadus melanobranchus Vaillant, 1888. To 60 cm. Gulf of Mexico, Caribbean Sea, SE27, 34, NE47; depths about 650 to 1 600 m.

Gadomus arcuatus (Goode and Bean, 1886). To more than 58 cm. Gulf of Mexico, Caribbean Sea, NE South America, NE34; depths 600 to 1 400 m.

Gadomus dispar (Vaillant, 1888). To at least 30 cm. Caribbean Sea, NE34; depths 550 to 1 100 m.

Gadomus longifilis (Goode and Bean, 1885). To 30 cm. Gulf of Mexico, Caribbean Sea, SE27, 34; depths 650 to more than 1 600 m).

References

Cohen, D.M., T. Inada, T. Iwamoto, and N. Scialabba. 1990. FAO species catalogue. Vol. 10. Gadiform fishes of the world (order Gadiformes). An annotated and illustrated catalogue of cods, hakes, grenadiers and other gadiform fishes known to date. *FAO Fish. Synop*., (125)Vol.10:442 p.

Marshall, N.B. 1973. Family Macrouridae. In Fishes of the western North Atlantic, edited by D.M. Cohen. *Mem. Sears Found. Mar. Res*., (1)Pt.6:698 p.

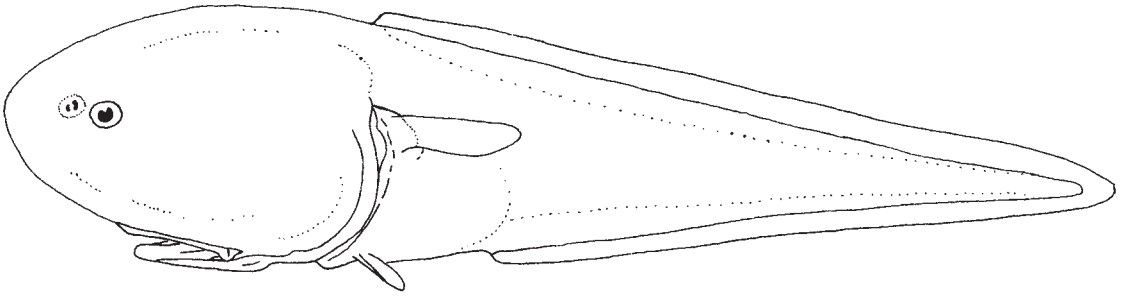
Parr, A.E. 1946. The Macrouridae of the western North Atlantic and Central American seas. *Bull. Bingham Oceanogr. Coll.,* 10(1):1-99.

MACROUROIDIDAE

Macrouroids

by T. Iwamoto, California Academy of Sciences, USA

Diagnostic characters: Head enormous, soft, rounded; trunk short, body tapering posteriorly to long, slender tail. Orbit tiny, 10 or more times into head length; mouth underslung; no chin barbel. Outer gill rakers long and slender. **One long-based, short-rayed dorsal fin extending to end of tail; anal fin similarly long-based and short-rayed; no caudal fin; pelvic fin small**, short, weakly developed, with 5 or 6 soft rays (*Squalogadus*) or absent (*Macrouroides*). Scales covered with small, needle-like spinules. **Colour:** overall dark brown to black; fins black.

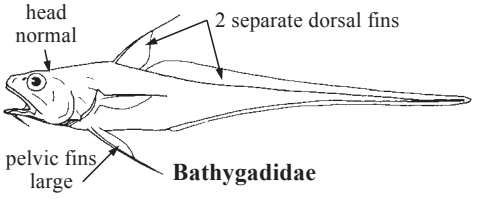


Habitat, biology, and fisheries: Benthopelagic to bathypelagic in middle- to deep-slope waters. Probably circumglobal in tropical to warm-temperate waters, but not off eastern Pacific or eastern Atlantic coasts. Little known of biology. No fisheries, although sometimes taken in large quantities in deep water trawl hauls.

Remarks: Macrouroids often treated as subfamily of Macrouridae. Family includes 2 species in 2 genera.

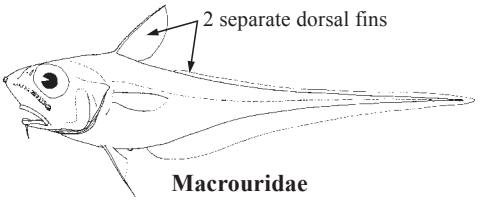
Similar families occurring in the area

Bathygadidae: head normal, codlike; 2 separate dorsal fins, second ray of first dorsal fin a flexible spine and slightly to extremely prolonged; pelvic fins large, with 8 to 10 rays.

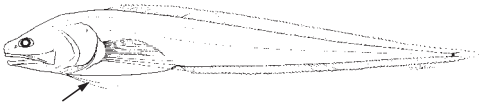


Macrouridae: 2 separate dorsal fins, second ray of first dorsal fin a flexible spine; anal fin usually with much longer rays than second dorsal fin; gill rakers all tubercular.

Ophidiidae: pelvic fins close together, each with 1 or 2 slender rays; 2 or more tooth patches usually present on floor of mouth (basibranchial teeth).



Macrouridae



Ophidiidae

List of species occurring in the area

Macrouroides inflaticeps Smith and Radcliffe, 1912. To 35 cm, common to 25 cm. Recorded only from waters off Suriname and French Guiana.

Squalogadus modificatus Gilbert and Hubbs, 1916. To 35 cm, common to 25 cm. Probably widespread in area; records are incomplete.

References

Cohen, D.M., T. Inada, T. Iwamoto, and N. Scialabba. 1990. FAO species catalogue. Vol. 10. Gadiform fishes of the world (order Gadiformes). An annotated and illustrated catalogue of cods, hakes, grenadiers and other gadiform fishes known to date. *FAO Fish. Synop.,* (125)Vol.10:442 p.

Marshall, N.B. 1973. Family Macrouridae. In Fishes of the western North Atlantic, edited by D.M. Cohen. *Mem. Sears Found. Mar. Res*., (1)Pt. 6:698 p.

Uyeno, T., K. Matsuura, and E. Fujii (eds). 1983. Fishes trawled off Suriname and French Guiana. *Japan Mar. Fish. Resource Res. Center.*, Tokyo, 519 p.

STEINDACHNERIIDAE

Luminous hake

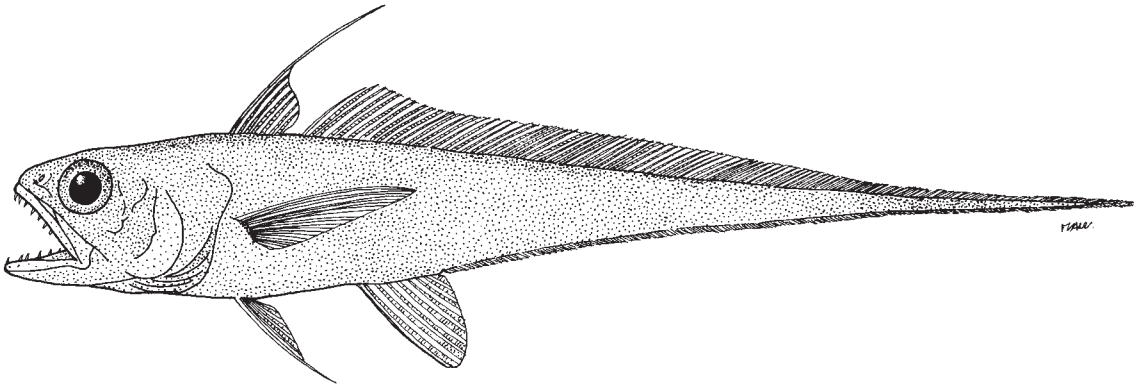
by T. Iwamoto, California Academy of Sciences, USA and D. M. Cohen, Bodega Bay, California, USA

A single species occurring in the area.

Steindachneria argentea Goode and Bean, 1896

Frequent synonyms / misidentifications: None / None.

FAO names: En - Luminous hake; **Fr** - Merlu lumineux; **Sp** - Merluza luminosa.

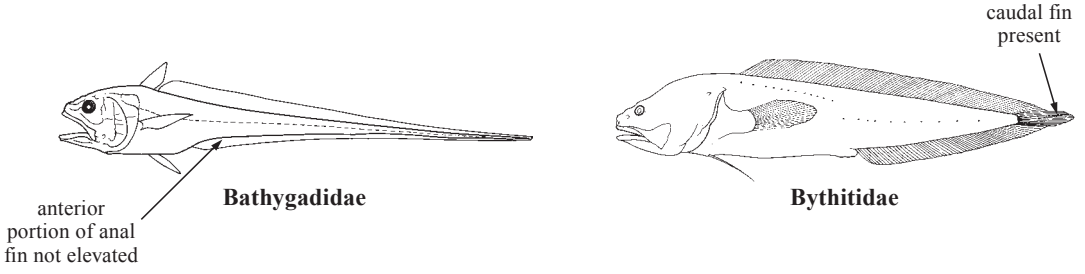


Diagnostic characters: Medium-sized fish to at least 35 cm (commonly 20 to 30 cm), with **elongated body that tapers to a point**. Mouth terminal, large; teeth in 1 or 2 series in each jaw, outer series large, sharp, widely spaced, inner teeth small, irregular in lower jaw, in close-set row in upper jaw, and widely separated from outer series; small teeth on vomer; no chin barbel. **Two dorsal fins**, the first high, short-based, with first ray spinous and slightly prolonged as thin filament, second dorsal fin long-based, extending to end of tail; **anal fin with high, short-based anterior portion followed by long-based, short-rayed posterior portion** that extends to end of tail; **caudal fin absent**; length of pectoral fin about equal to head length; pelvic fins with 8 soft rays, outermost ray slightly prolonged. **Anus between pelvic fins, well separated from urogenital opening** situated a short distance from anal fin. **Luminescent tissue along entire ventral length of body**, on pectoral bases, and entire underside and opercular areas of head; luminescent areas demarcated by striated appearance of skin. **Colour:** silvery overall, blackish over abdominal region.

Similar families occurring in the area

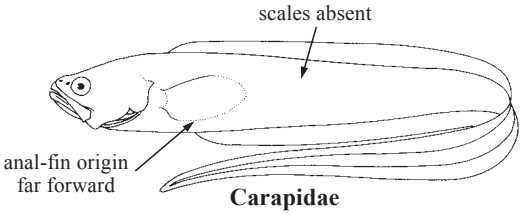
Bathygadidae: anal fin lacking elevated anterior portion; anus and urogenital opening close together, immediately before anal-fin origin; no teeth on roof of mouth; jaw teeth all small.

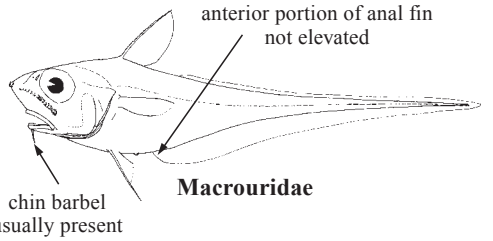
Bythitidae: caudal fin present, connected with long-based dorsal and anal fins or free; pelvic fins of 1 or 2 slender rays; viviparous, males with external intromittent organ; anterior nostril immediately above upper lip in most.



Carapidae: anal-fin origin far forward, usually beneath pectoral fin and usually anterior to origin of long-based, short-rayed dorsal fin; dorsal and anal fins without elevated portions; anus and urogenital opening close together; scales absent.

Macrouridae: anal-fin rays longer than rays of second dorsal fin, anterior portion not elevated; chin barbel usually present; spinules on scales in most species; anus and urogenital opening close together.

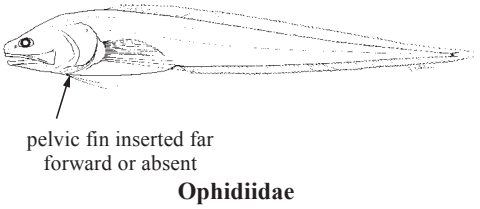




Ophidiidae: dorsal and anal fins single, long-based, and relatively short-rayed, each fin continuous with small caudal fin; pelvic fin inserted far forward, under head in some, with 1 or 2 slender rays, or fin absent.

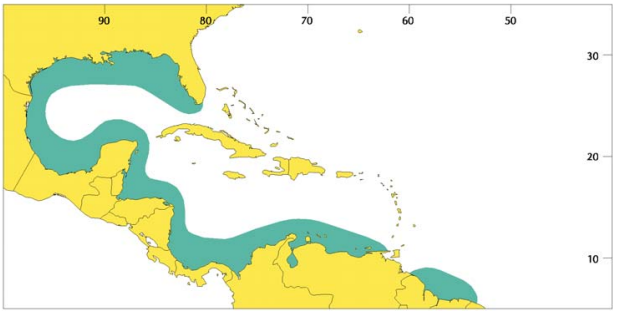
Size: To about 30 cm, commonly 20 to 25 cm.

Habitat, biology, and fisheries: Benthopelagic, inhabiting depths of about 350 to 550 m at continental-shelf break and on upper slope over soft bottoms. Of no commercial value, although sometimes taken in fairly large numbers by bottom trawlers.



Distribution: Found throughout Gulf of Mexico, Caribbean Sea (including West Indies) south, and east to French Guiana.

Remarks: One species, treated by some as a subfamily of Macrouridae or Merlucciidae.



References

Inada, T. 1990. Steindachneriidae. In FAO species catalogue, edited by D.M. Cohen, T. Inada, T. Iwamoto, and N. Scialabba. Vol. 10. Gadiform fishes of the world (order Gadiformes). An annotated and illustrated catalogue of cods, hakes, grenadiers and other gadiform fishes known to date. *FAO Fish. Synop.*, (125)Vol.10:442p.

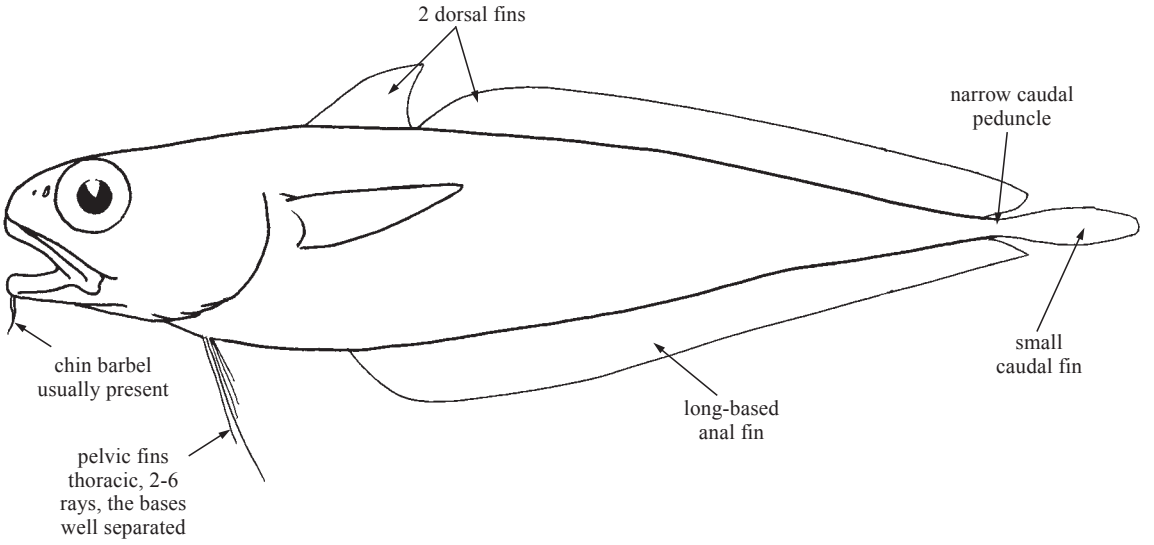
Parr, Albert E. 1946. The Macrouridae of the western North Atlantic and Central American seas. *Bull. Bingham Oceanogr. Coll.* 10(1):1-99.

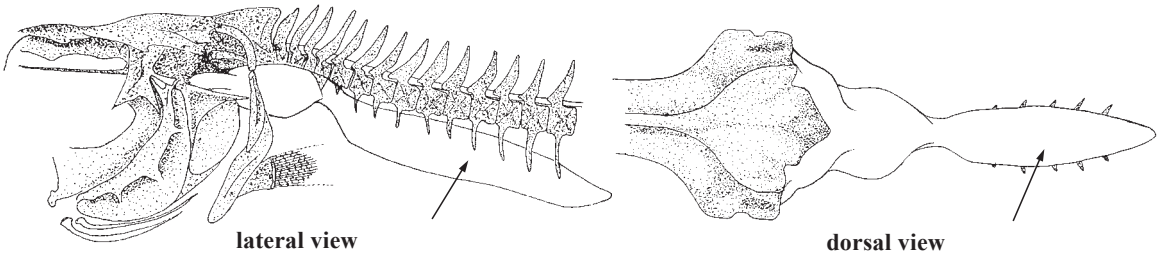
MORIDAE

Moras (morid cods)

by T. Iwamoto, California Academy of Sciences, USA and D. M. Cohen, Bodega Bay, California, USA

Diagnostic characters: Small to medium-sized (to about 65 cm, usually 20 to 30 cm), mostly deep-water, continental slope fishes in 40 to 1 500 m, commonly between 100 to 600 m. Body elongated, rounded in front of abdomen, more laterally flattened behind, tapering to **a narrow caudal peduncle**. Top of head lacking V-shaped ridge. Mouth large, jaws extending to below midorbit or beyond, slightly to moderately inferior; eye large, about 3 or 4 times in head; **teeth few or lacking on roof of mouth. Two dorsal fins**, the first short-based and triangular, the second long-based, its length more than half total length; anal fin long-based, its length 1/2 of, or longer than, that of second dorsal fin; **pelvic fins thoracic, small, with 2 to 6 rays, the bases well separated; caudal fin small, margin rounded to slightly forked, separated from dorsal and anal fins**. Spine on top of first vertebra tightly connected to a narrow crest at rear of skull. **Swimbladder with two anterior projections that attach to back of skull. Abdominal light organ in some species**, seen externally as small, black naked fossa anterior to vent. **Colour:** brown, black, to pinkish, with violet, bluish, or blackish abdomen and underside of head; some with silvery over sides of head and body.





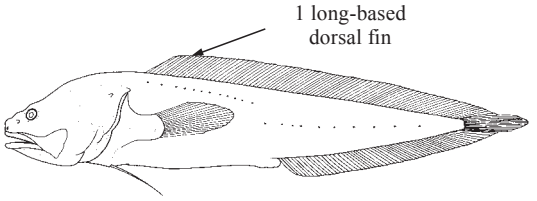
swimbladder attachment to skull

Habitat, biology, and fisheries: Species in area benthopelagic in deep waters of continental shelf and slope. Little known of life history of most species. Food includes bottom invertebrates, swimming crustaceans, small cephalopods, and small fish. Most morids in area too small, occur too deep, or found in too small of concentrations to be of commercial interest, but a few species in other parts of world commercially exploited by trawl and longline gear.

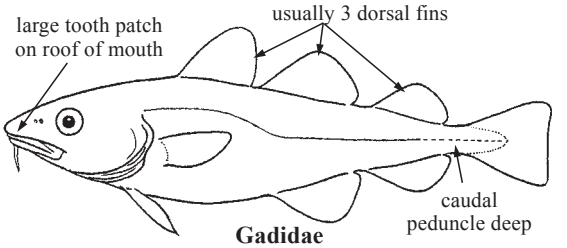
Similar families occurring in the area

Bythitidae: 1 long-based dorsal fin; anterior nostril immediately above upper lip in most; viviparous, males with an external intromittent organ.

Gadidae: usually 3 dorsal fins and 2 anal fins, caudal fin large, truncate to forked, caudal peduncle deep; large tooth patch on roof of mouth (vomer); no light organ.



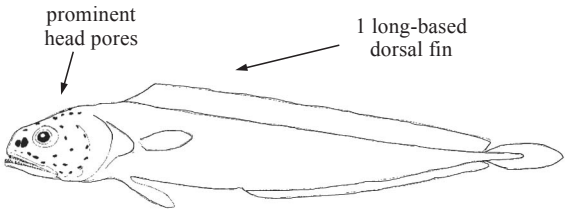
Bythitidae



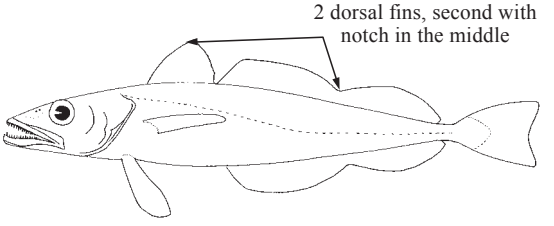
Gadidae

Melanonidae: 1 long-based dorsal fin; mesopelagic or bathypelagic; large, prominent head pores; free neuromasts in short longitudinal ridges cover extensive surfaces of head; no chin barbel; no light organ.

Merlucciidae: 2 dorsal fins, 1 anal fin, the second dorsal and anal fins similar in size and shape, with notch in middle; V-shaped crest on top of head; no chin barbel.



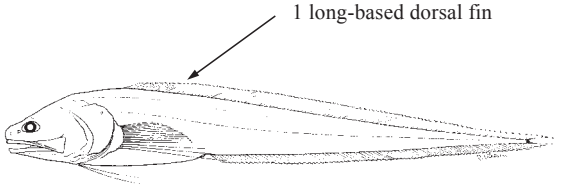
Melanonidae



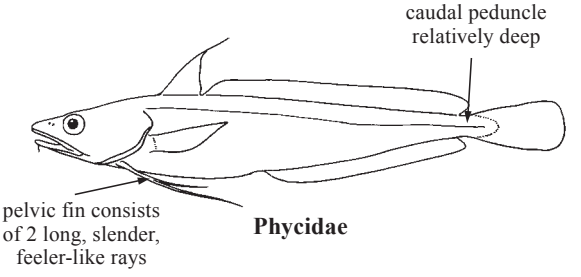
Merlucciidae

Ophidiidae: 1 long-based dorsal fin; caudal fin connected with dorsal and anal fins; bases of pelvic fins close together, without a broad scaled space between.

Phycidae: teeth on vomer well developed; no connection of swimbladder to back of skull; caudal peduncle relatively deep; pelvic fin consists of 2 long, slender, feeler-like rays, the longest extending close to or beyond vent; no light organ.



Ophidiidae



Phycidae

Key to the species of Moridae occurring in the area

1a. Snout spade-shaped when viewed from above (Fig. 1) . . . . . ***Antimora rostrata***

1b. Snout rounded. . . . . → ***2***

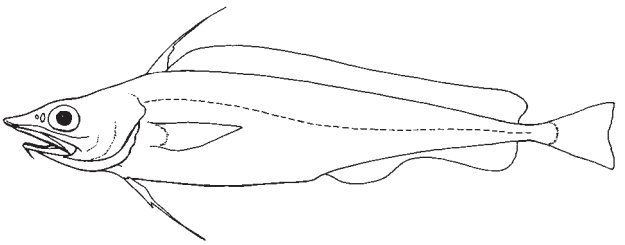


Fig. 1 ***Antimora***

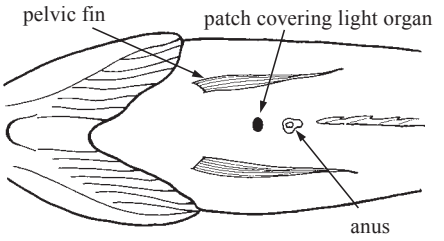


Fig. 2 ventral view of body

2a. A small black fossa of light organ on abdomen anterior to anus (Fig. 2) . . . . . → ***3***

2b. No black fossa on abdomen . . . . . → ***6***

3a. Chin barbel absent; fossa of light organ very small; black anchor-shaped patch on tongue and roof of mouth (Fig. 3) . . . . . ***Gadella imberbis***

3b. Chin barbel present; fossa of light organ moderate sized; no prominent pigment patches on tongue and roof of mouth . . . . . → ***4***

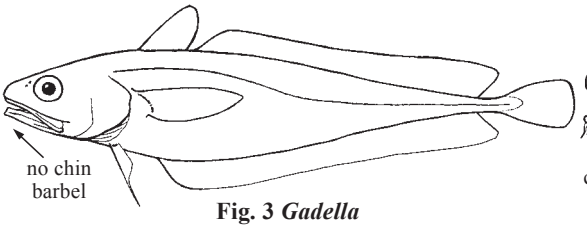


Fig. 3 ***Gadella***

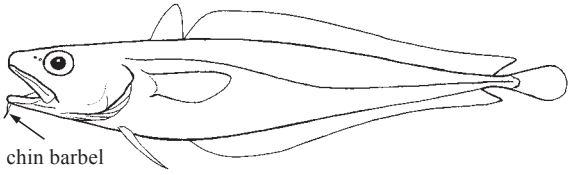


Fig. 4 ***Physiculus***

4a. Scales between base of first dorsal fin and lateral line 6 or 7; pectoral-fin rays 21 to 26 (Fig. 4) . . . . . ***Physiculus fulvus***

4b. Scales between base of first dorsal fin and lateral line 12 to 20; pectoral-fin rays 26 to 31 . . . . . → ***5***

5a. Scales between base of first dorsal fin and lateral line 14 to 20; pectoral-fin rays 26 or 27; no scales on gular membrane or on vertical fin membranes; gill rakers moderately long, slender . . . . . ***Physiculus karrerae***

5b. Scales between base of first dorsal fin and lateral line 12 to 14; pectoral-fin rays 28 to 31; scales usually present on gular membrane and vertical fin membranes; gill rakers short, blunt . . . . . ***Physiculus kaupi***

6a. Dorsal-fin rays 6+66 to 73; anal-fin rays 65 to 71 . . . . . ***Laemonema goodebeanorum***

6b. Dorsal-fin rays 6 or 7+53 to 63; anal-fin rays 52 to 63 . . . . . → ***7***

7a. Distal 2/3 of caudal fin and triangular-shaped areas at posterior end of second dorsal and anal fins prominently black with thin white outer margins; no prolonged spine on first dorsal fin; dorsal-fin rays 7+53 to 61; pectoral-fin rays 25 to 27, anal-fin rays 52 to 59 . . . . . ***Laemonema melanurum***

7b. Distal end of caudal fin blackish, but not sharply defined, no triangular black blotches on second dorsal and anal fins; a prolonged black spine on first dorsal fin; dorsal-fin rays 6 or 7+57 to 63; pectoral-fin rays 19 to 23; anal-fin rays 54 to 63 . . . . . ***Laemonema barbatulum***

List of species occurring in the area

The symbol is given when species accounts are included.

Antimora rostrata (Günther, 1878).

Gadella imberbis (Vaillant, 1888).

Laemonema barbatulum Goode and Bean, 1883.
Laemonema goodebeanorum Meléndez and Markle, 1997.
Laemonema melanurum Goode and Bean, 1896.

Physiculus fulvus Bean, 1884.
Physiculus karrerae Paulin, 1989. To about 30 cm. Caribbean, S Brazil, St. Helena.
Physiculus kaupi Poey, 1865. To about 23 cm. Caribbean, N and S Brazil.

References

Cohen, D. M., T. Inada, T. Iwamoto, and N. Scialabba. 1990. FAO species catalogue. Vol. 10. Gadiform fishes of the world (Order Gadiformes). An annotated and illustrated catalogue of cods, hakes, grenadiers and other gadiform fishes known to date. *FAO Fish. Synop*., (125)Vol.10:442 p.

Meléndez C.R. and D.F. Markle. 1997. Phylogeny and zoogeography of *Laemonema* and *Guttigadus* (Pisces; Gadiformes; Moridae). *Bull. Mar. Sci*., 61(3):593-670.

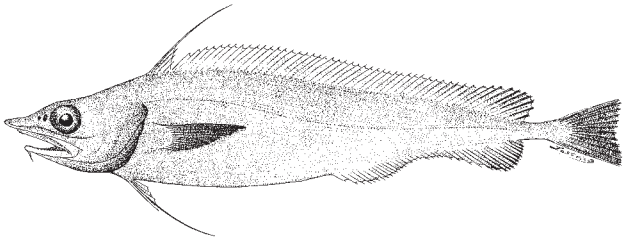
Paulin, C.D. 1983. A revision of the family *Moridae* (Pisces: Anacanthini) within the New Zealand region. *Rec. Natl. Mus. New Zealand,* 2(9):81-126.

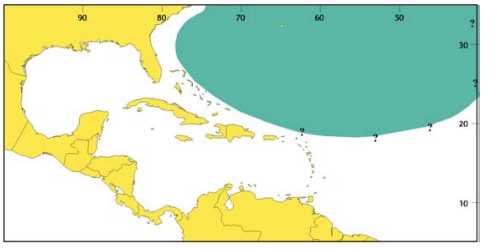
Paulin, C.D. 1988. Review of the morid genera *Gadella, Physiculus*, and *Salilota* (Teleostei: Gadiformes) with descriptions of seven new species. *New Zealand J. Zool*., 16:93-133.

Antimora rostrata (Günther, 1878) ANT

En - Blue antimora; **Fr** - Antimora bleu; **Sp** - Mollera azul.

Maximum size at least 65 cm, commonly to 50 cm; males smaller than females. Benthopelagic over continental slope in about 350 to 3 000 m. Little known of life history; females probably reach maturity at more than 50 cm and occur at greater depths than males. Off USA Atlantic coast, and perhaps elsewhere, a dominant fish species at middle- to lower-slope depths. Distribution worldwide except in North Pacific, where it is replaced by a related species, *A. microlepis*; absent in Gulf of Mexico and Caribbean Sea, and so far not known from northern coast of South America. Of no commercial importance, but sometimes taken in bycatch of trawlers fishing deep waters.

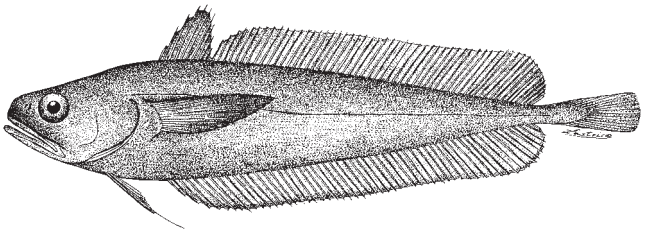


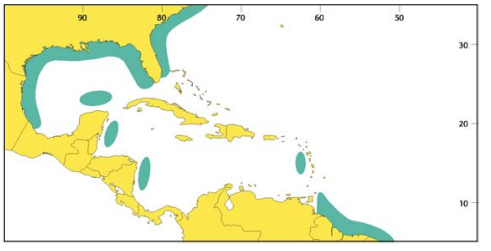


Gadella imberbis (Vaillant, 1888) GDI

En - Beardless codling; **Fr** - Moro imberbe; **Sp** - Bacaladilla imberbe.

Maximum size about 23 cm, commonly to 15 cm. Benthopelagic over continental slope in about 350 to 800 m. Little known of life history; often abundant. Distribution temperate and tropical Atlantic, from Cape Cod to southern Brazil in western Atlantic, from Cape Verde Islands to Angola in eastern Atlantic. Taken as bycatch by deep-water shrimp trawlers in western Atlantic, but not utilized.

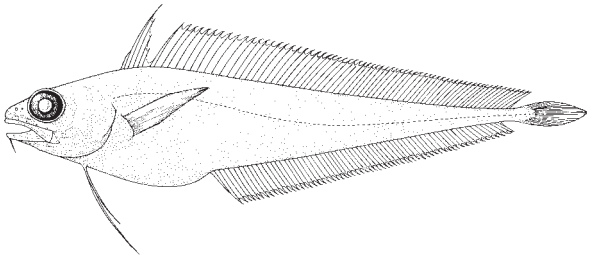


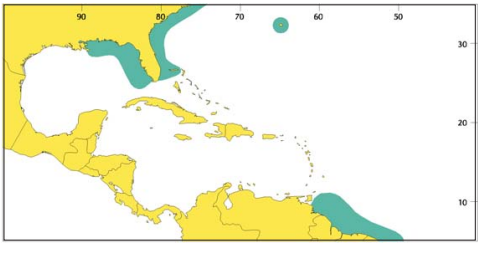


Laemonema barbatulum Goode and Bean, 1883

En - Shortbeard codling.

Maximum size about 40 cm, commonly to 30 cm. Benthopelagic over continental slope in 50 to 1 620 m, usually from 300 to 400 m. Little known of life history. Distribution temperate and tropical Atlantic, from south of Nova Scotia to northern Brazil, including northeastern Gulf of Mexico, northern Bahamas, and Bermuda.

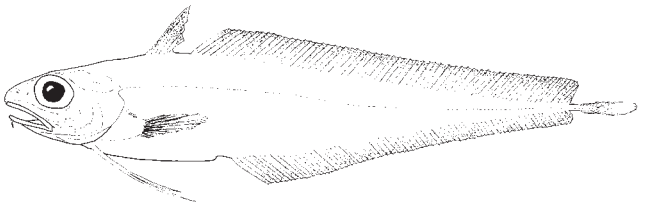


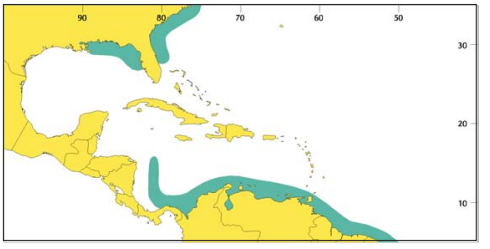


Laemonema goodebeanorum Meléndez and Markle, 1997

En - American codling.

Maximum size about 30 cm, commonly to 25 cm. Benthopelagic over continental slope in about 180 to 800 m, usually 400 to 600 m. Little known of life history. Distribution from Canada (south of Nova Scotia) to southern Brazil, including Gulf of Mexico, Caribbean, Suriname, French Guiana. Taken as bycatch by deep-water shrimp trawlers, but not utilized for food.

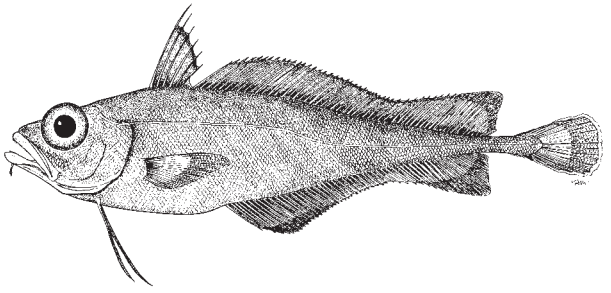


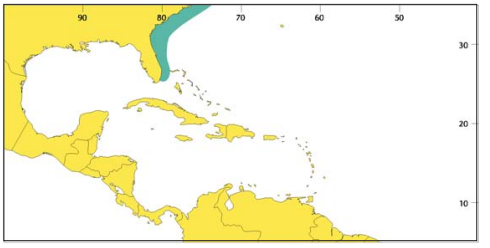


Laemonema melanurum Goode and Bean, 1896

En - Blackfin codling.

Maximum size about 30 cm, commonly to 20 cm. Benthopelagic over continental slope in 452 to 644 m. Little known of life history. Distribution in western Atlantic from off New York to Florida. Taken as bycatch by deep-water shrimp trawlers, but not utilized for food.

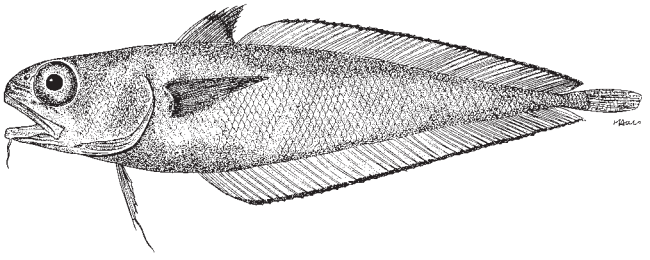


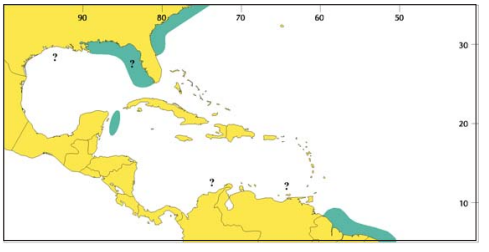


Physiculus fulvus Bean, 1884

En - Metallic codling.

Maximum size about 14 cm. Benthopelagic over continental slope in about 100 to 475 m. Little known of life history. Distribution temperate and tropical western Atlantic, from Cape Cod (about 40°N) to mouth of Amazon, including Gulf of Mexico and Caribbean Sea. Taken as bycatch by deep-water shrimp trawlers in western Atlantic, but not utilized.





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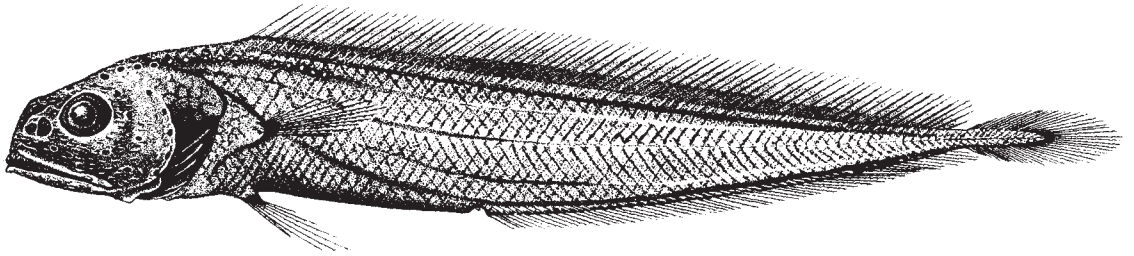
MELANONIDAE

Pelagic cods

by T. Iwamoto, California Academy of Sciences, USA and D. M. Cohen, Bodega Bay, California, USA

Melanonus zugmayeri Norman, 1930

En - Tropical pelagic cod.

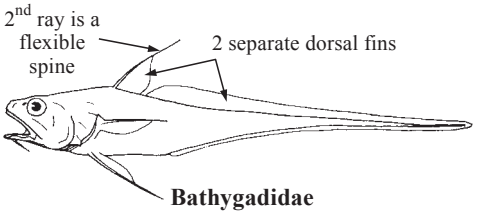


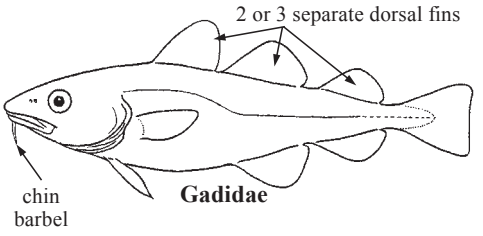
Diagnostic characters: Body slender, tapering to a narrow caudal peduncle. Head covered with free neuromasts aligned longitudinally into short ridges; pores of sensory lateralis system on head large, prominent; mouth large; teeth in 2 or 3 series in jaws, **inner series laterally in lower jaw large, canine-like, widely spaced; teeth on vomer and palatines**; no chin barbel. **One long-based dorsal fin, high anteriorly, slightly notched at about sixth to tenth ray; anal fin long-based, rays finer than opposites of dorsal fin; caudal fin poorly developed, narrow, rounded to somewhat pointed**; pectoral fin midlateral, below origin of dorsal fin; pelvic fin with 7 rays, origin anterior to pectoral base. **Colour:** overall blackish.

Similar families occurring in the area

Bathygadidae: no caudal fin; no teeth on roof of mouth; 2 separate dorsal fins, second ray of first dorsal fin a flexible spine, slightly to extremely prolonged.

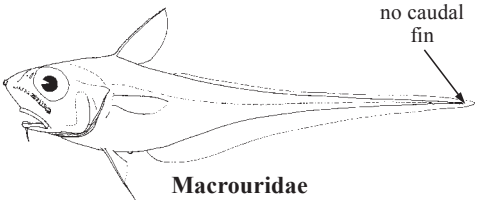
Gadidae: 2 or 3 separate dorsal fins; 1 or 2 anal fins; chin barbel present.

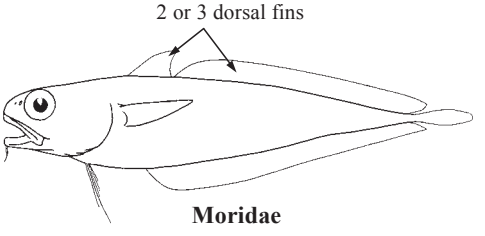




Macrouridae: no caudal fin; no teeth on roof of mouth; scales usually covered with spinules.

Moridae: 2 or 3 dorsal fins, 1or 2 anal fins, pelvic fins narrow with filamentous tips in some species; chin barbel developed in many; no enlarged, canine-like teeth in lower jaw, few or no teeth on vomer; swimbladder with anterior projections that connect to rear of skull.



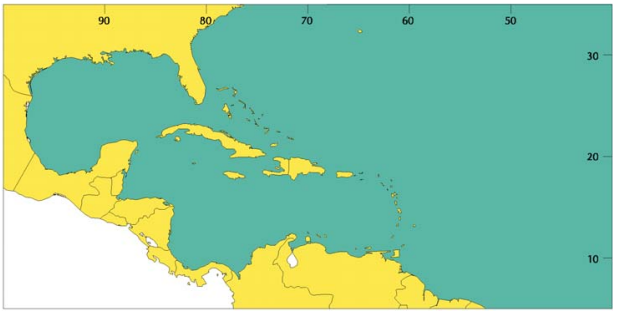


Size: Maximum to about 25 cm, more commonly between 10 and 15 cm.

Habitat, biology, and fisheries: Mesopelagic to bathypelagic, inhabiting temperate to tropical waters. Of no commercial value.

Distribution: Apparently circumglobal in temperate to tropical waters.

Remarks: Uncommon, only 2 species, 1 found in area, the other with subantarctic distribution.



References

Cohen, D.M. 1986. Family Melanonidae. In *Smith's Sea Fishes*, edited by M.M. Smith and P.C. Heemstra. Johannesburg, South Africa, Macmillan, 1047 p.

Cohen, D.M. 1990. Melanonidae. In FAO species catalogue. Vol. 10. Gadiform fishes of the world (order Gadiformes). An annotated and illustrated catalogue of cods, hakes, grenadiers and other gadiform fishes known to date, edited by D.M. Cohen, T. Inada, T. Iwamoto, and N. Scialabba. *FAO Fish. Synop.*, (125)Vol.10:442 p.

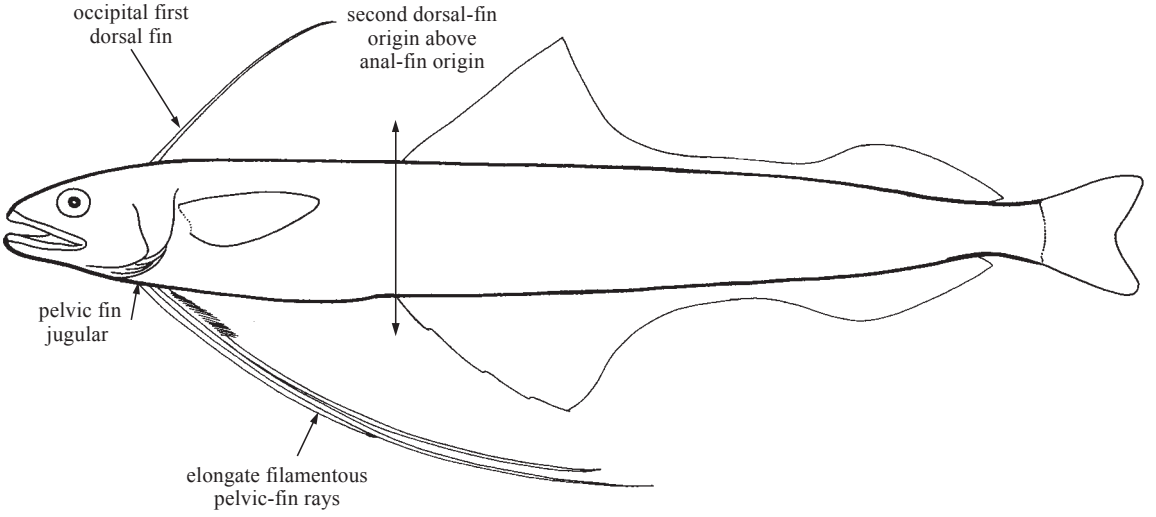
Howes, G.J. 1993. Anatomy of the Melanonidae (Teleostei: Gadiformes), with comments on its phylogenetic relationships. *Bull. Nat. Hist. Mus. (Zool.),* 59(1):11-31.

BREGMACEROTIDAE

Codlets

by A. S. Harold and R. K. Johnson (deceased), Grice Marine Laboratory, South Carolina, USA

Diagnostic characters: Small body size, reaching a little over 10 cm total length, more commonly 5 to 6 cm. **Body moderately elongate with body depth about 8 to 10 times in standard length, slightly compressed to somewhat tubular**. Head small, about 15 to 20% of standard length. Eye small, between about 1/4 and 1/3 of head length. Snout short, its length about equal to eye diameter. Mouth terminal, moderate in size, angle of jaw below posterior portion of eye. **Two dorsal fins, the first a single elongate flexible ray near the back of the head (occipital position) extending back to near leading edge of second dorsal fin and fitting into a predorsal groove when depressed; the second dorsal fin long-based, extending from anterior of midbody to near the caudal fin**; rays of middle portion of second dorsal fin short compared to rays of anterior and posterior portions of second dorsal fin, producing a marked concavity in outline of fin margin. **Anal fin of similar base length and outline to second dorsal fin, with its origin directly below that of second dorsal fin**. Second dorsal and anal fins, each with 40 to 60 soft rays; caudal fin slightly forked; pectoral fin short, with 16 to 23 rays; **pelvic fin in jugular position with 4 short branched and 3 elongate filamentous rays, the longest extending back to about middle of anal fin**. Caudal fin distinctly separate from dorsal and anal fins. Adipose fin absent. Scales small, about 60 to 80 in longitudinal series; **lateral line located dorsally, on either side of first dorsal-fin groove. Colour:** variable, ranging from pale overall with dark dorsal counter-shading to dark and minutely speckled with minute dark pigment over most of the body; silvery pigment occasionally present on side.



Habitat, biology, and fisheries: Epipelagic and mesopelagic in coastal and oceanic areas. Bregmacerotids comprise the only gadiform family limited to tropical and subtropical waters. Widely distributed in tropics and subtropics of Atlantic, Pacific, and Indian Oceans but most concentrated near land masses. Of no commercial importance in western central Atlantic, but taken as bycatch in some fisheries. Some inshore species of the family are harvested commercially in the Indo-West Pacific. Some species are locally important as forage for commercially significant fishes. Larvae are often among the 10 most abundant families represented in larval fish surveys in both coastal and offshore tropical and subtropical waters.

Remarks: Three named species and another undescribed species are reported for the area. Previous accounts of the family have reported *Bregmaceros mcclellandi* from the Atlantic but we have established that the species is restricted to the Indo-West Pacific region. The Atlantic species previously identified as *B. mcclellandi* is new and will be described elsewhere by the authors.

Similar families occurring in the area

None. The Bregmacerotidae is distinct by the elongate single dorsal-fin ray on the top of head, and the long, filamentous pelvic-fin rays inserted under the head.

List of species occurring in the area

Bregmaceros atlanticus Goode and Bean, 1886. To 5 cm. Tropical to subtropical Atlantic.
Bregmaceros cantori Millekin and Houde, 1984. To 6 cm. Tropical to subtropical W Atlantic.
Bregmaceros houdei Saksena and Richards, 1986. To 2 cm. Subtropical W Atlantic.
Bregmaceros n. sp. To 8 cm. Worldwide tropical to subtropical.

References

Milliken, D.M. and E.D. Houde. 1984. A new species of Bregmacerotidae (Pisces), *Bregmaceros cantori*, from the western Atlantic Ocean. *Bull. Mar. Sci.,* 35:11-19.

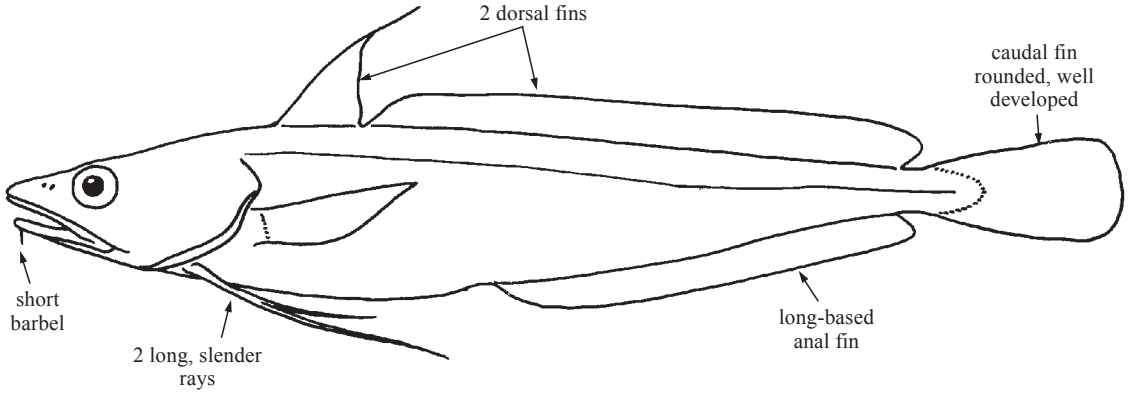
Saksena, V.P. and W.J. Richards. 1986. A new species of gadiform fish, *Bregmaceros houdei*, from the western north Atlantic. *Bull. Mar. Sci*., 38:285-292.

PHYCIDAE

Phycid hakes

by T. Iwamoto, California Academy of Sciences, USA and D. M. Cohen, Bodega Bay, California, USA

Diagnostic characters: small to large (to about 120 cm, usually 20 to 40 cm); body moderately soft, elongated, generally rounded in front of vent, more laterally flattened behind vent; caudal peduncle narrow to moderately deep. Top of head lacking V-shaped ridge. Mouth large, lower jaw usually shorter than upper jaw; **chin barbel short**, occasionally absent in some individuals. Well-developed tooth patch on roof of mouth (vomer). **Two dorsal fins, the first short-based and long-rayed, with 8 to 13 rays, the second long-based with straight distal margin; anal fin long-based, without indentation in margin; pelvic fin with 2 rays developed into long, slender feelers**, fin base usually well forward of pectoral-fin base; **caudal fin well developed, margin rounded; not connected to dorsal and anal fins**. No light organ; swimbladder not connected to back of skull. **Colour:** olive, brown, or reddish, often becoming paler ventrally to silvery white on belly, median fins often with dark distal margins; a dusky opercular blotch in most.



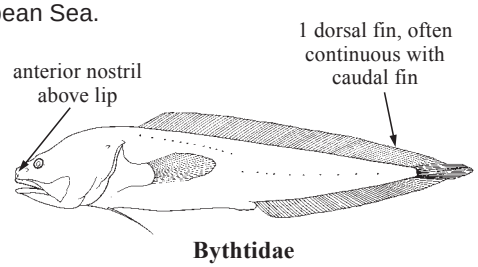
Habitat, biology, and fisheries: Demersal, mostly on soft mud or sand bottoms, from shallow coastal waters to offshore waters at upper continental slope depths. Young of most species found close inshore, often in estuaries in low salinity waters, migrating offshore as adults; adults of most species migrate inshore in summer and autumn for spawning, then offshore to deeper waters. Feeds primarily on small fish and crustaceans (especially shrimp and amphipods), but also on polychaetes and molluscs (especially squid). Of limited commercial importance in the area, although some incidentally trawled in substantial quantities and may be a potential resource. Taken primarily by bottom trawls, but also captured in gill nets and with longlines. Marketed fresh, dried, frozen, smoked, as fish cakes, or used as animal feed; livers in some yield oils, swimbladder used in gelatins.

Remarks: Phycid hakes most often treated in past as subfamily of Gadidae and members of subfamily Lotinae. Two genera and many species, some of uncertain status; at least 7 species in area, with an eighth, possibly undescribed, species from Gulf of Mexico and Caribbean Sea.

Similar families occurring in the area

Among similar families in area, only some species of Bythitidae, Ophidiidae, and Moridae have pelvic fins developed into long, slender feelers. Species in the first 2 families have a single dorsal fin, and morids have few or no teeth on the vomer and a swimbladder with anterior projections that connect to back of skull.

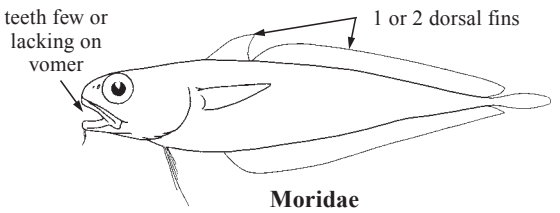
Bythitidae: 1 long-based dorsal fin; anterior nostril immediately above upper lip in most; viviparous, males with an external intromittent organ.



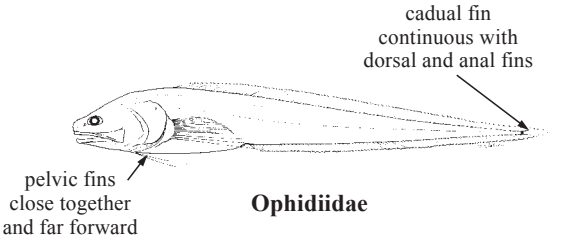
Bythtidae

Moridae: 2 dorsal fins, 1or 2 anal fins; teeth few or lacking on vomer; swimbladder with anterior projections that connect to rear of skull.

Ophidiidae: one long-based dorsal fin; caudal fin connected with dorsal and anal fins; bases of pelvic fins close together, without a broad scaled space between.



Moridae



Ophidiidae

Key to the species of Phycidae occurring in the area (adapted from Cohen, 1990)

1a. First dorsal fin with an elongated ray . . . . . → *2*

1b. First dorsal fin without an elongated ray . . . . . → *4*

2a. Longest ray in pelvic fin reaching nearly to or beyond end of anal-fin base (Fig. 1) . . . . . *Phycis chesteri*

2b. Longest ray in pelvic fin not reaching beyond midpoint of anal-fin base . . . . . → *3*

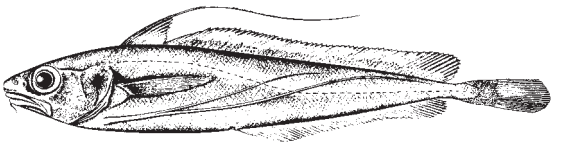


Fig. 1 ***Phycis chesteri***

3a. Upper limb of first gill arch with 2 rakers (rarely 3); scale rows between first dorsal fin and lateral line 11 or more (Fig. 2) . . . . . *Urophycis tenuis*

3b. Upper limb of first gill arch with 3 rakers (rarely 2); scale rows between first dorsal fin and lateral line about 7 (Fig. 3) . . . . . *Urophycis chuss*

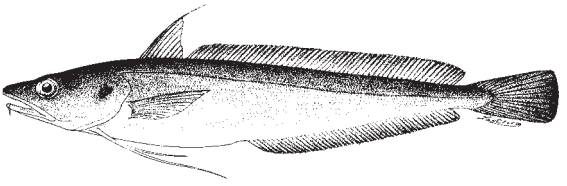


Fig. 2 ***Urophycis tenuis***

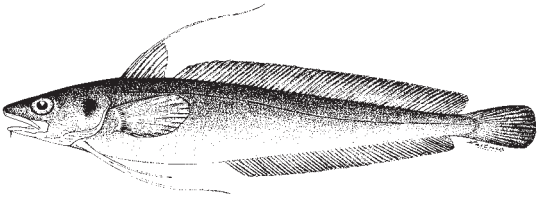


Fig. 3 ***Urophycis chuss***

4a. Scale rows between first dorsal fin and lateral line 18 to 21 (Fig. 4) . . . . . *Urophycis earllii*

4b. Scale rows between first dorsal fin and lateral line 12 or fewer . . . . . → *5*

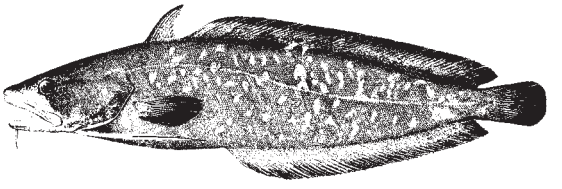


Fig. 4 ***Urophycis earllii***

5a. Upper limb of first gill arch with 2 rakers (Fig. 5) . . . . . ***Urophycis floridana***

5b. Upper limb of first gill arch with 3 (rarely 2) rakers. . . . . → ***6***

6a. A series of dark spots on head; first dorsal fin with a dark blotch and distinct white margin (Fig. 6) . . . ***Urophycis regia***

6b. No series of dark spots on head; first dorsal fin lacking dark blotch or white margin (Fig. 7). . . . . ***Urophycis cirrata***

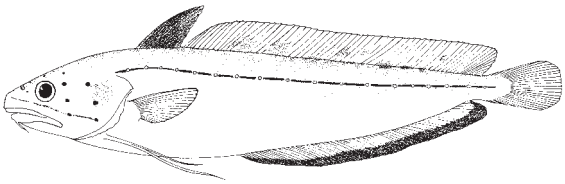


Fig. 5 ***Urophycis floridana***

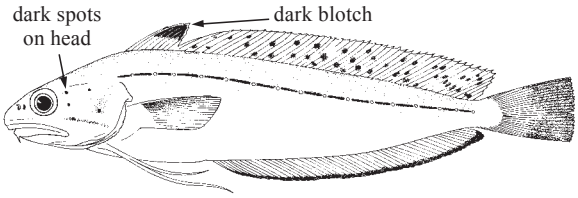


Fig. 6 ***Urophycis regia***

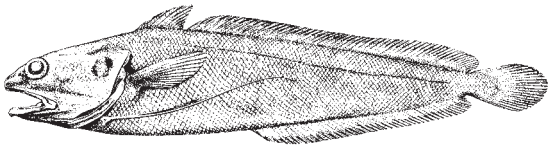


Fig. 7 ***Urophycis cirrata***

List of species occurring in the area

The symbol ◄ is given when species accounts are included.

◄ *Phycis chesteri* Goode and Bean, 1878.

◄ *Urophycis chuss* (Walbaum, 1792).
◄ *Urophycis cirrata* (Goode and Bean, 1896).
◄ *Urophycis earllii* (Bean, 1880).
◄ *Urophycis floridana* (Bean and Dresel, 1884).
◄ *Urophycis regia* (Walbaum, 1792).
◄ *Urophycis tenuis* (Mitchill, 1814).

References

Cohen, D.M., T. Inada, T. Iwamoto and N. Scialabba. 1990. FAO species catalogue. Vol. 10. Gadiform fishes of the world (Order Gadiformes). An annotated and illustrated catalogue of cods, hakes, grenadiers and other gadiform fishes known to date. *FAO Fish. Synop*., (125)Vol.10:442 p.

Bigelow, H.B. and W.C. Schroeder. 1953. Fishes of the Gulf of Maine. *U.S. Fish and Wildl. Serv. Fish. Bull*., 53:1-577.

Markle, D.F. , D.A. Methven, and L.J. Coates-Markle. 1982. Aspects of spatial and temporal cooccurrence in the life history stages of the sibling hakes, *Urophycis chuss* (Walbaum 1792) and *Urophycis tenuis* (Mitchill 1815)(Pisces: Gadidae). *Can. J. Zool.*, 60(9):2057-2078.

Musick, J.A. 1972. A meristic and morphometric comparison of the hakes, *Urophycis chuss* and *U. tenuis* (Pisces, Gadidae). *Fish. Bull. (U.S.),* 71(2):479-488.

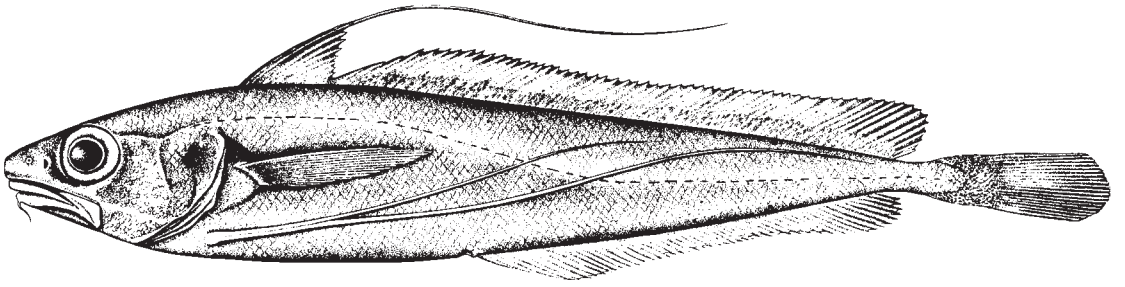
Wenner, C.A. 1983. Biology of the longfin hake, *Phycis chesteri* in the western North Atlantic. *Biol. Oceanogr.,* 3:41-75.

Phycis chesteri Goode and Bean, 1878

GPE

Frequent synonyms / misidentifications: None / None.

FAO names: En - Longfin hake; **Fr** - Merluche à longues nageois.

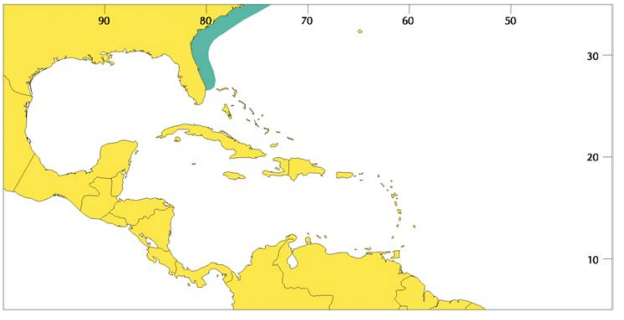


Diagnostic characters: Body elongated, greatest depth about 6 in total length; head about 5.5 in total length. Eye large, about 3.5 times in head. **First dorsal fin with 9 or 10 rays, the third prolonged** and longer than head; second dorsal fin with 55 to 57 rays; **longest pelvic fin ray reaching near or beyond posterior end of anal-fin base**. About 90 rows of scales along lateral line. **Colour:** olive above and on sides, belly silvery white; margins of dorsal, anal, and caudal fins darker.

Size: To about 40 cm, commonly to about 30 cm.

Habitat, biology, and fisheries: Benthopelagic, living on or near bottom at depths from 90 to about 1400 m; most abundant between 360 and 800 m, but depths to 1 370 m recorded. Often seen or photographed curled in depressions in the substrate. Females usually greatly outnumber males (sex ratio 1:2.85). Spawns on continental slope from autumn to early spring, with peak in December and January. Feeds primarily on crustaceans, but also on molluscs and fishes. Currently not of commercial importance, but often abundant in trawl catches to north of area. Flesh somewhat soft.

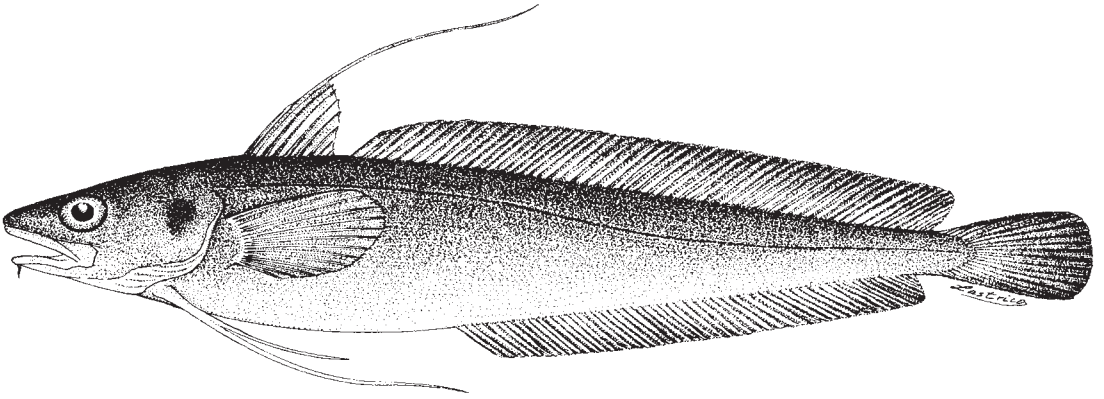
Distribution: From Labrador Sea off Newfoundland south to Florida Straits, but not abundant south of Cape Hatteras.



Urophycis chuss (Walbaum, 1792) HKR

Frequent synonyms / misidentifications: *Enchelyopus americanus* Bloch and Schneider, 1801; *Gadus longipes* Mitchill, 1814; *Phycis marginatus* Rafinesque, 1818; *Phycis filamentosus* Storer, 1858 / *Urophycis tenuis* (Mitchill, 1814).

FAO names: En - Red hake; **Fr** - Merluche écureuil; **Sp** - Locha roja.



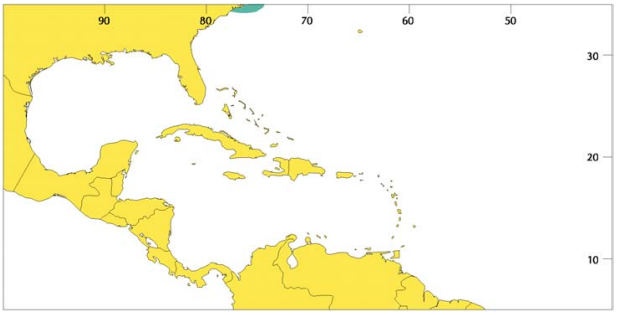
Diagnostic characters: Body elongated, greatest depth 5 to 6 in total length; head about 4.5 to 5 in total length. Eye large, about 3.5 to 4 times in head. **First dorsal fin with 9 rays, the third prolonged** and longer than head; second dorsal fin with about 57 rays; anal fin with 48 to 50 rays; **longest pelvic-fin ray reaching near anterior end of anal fin**. About 110 rows of scales along lateral line. **Colour:** variable from reddish to olive-brown above, sides paler, sometimes with dusky spots; belly and underside of head pale; a dusky blotch on opercle; fins generally darker except for pale pelvic fins.

Size: To about 50 cm, commonly 30 to 40 cm.

Habitat, biology, and fisheries: Lives on or near bottom at depths from near shore to more than 550 m depth, most abundant at 110 and 130 m; juveniles live in shallow waters along coast, migrating to deeper waters with increasing size. Juveniles live commensually in scallops (*Placopecten magellanicus*), then in the vicinity of scallop beds until their second year of life. Matures in two years at about 30 cm; moves inshore from spring to summer to spawn, and spends winter offshore in deeper waters; depth and distribution highly dependent on temperature. Feeds primarily on crustaceans, but also on squid and fishes. Of variable commercial importance, but of minor importance in Area 31. Taken in trawls; marketed fresh and frozen; smaller fish used in animal feeds.

Distribution: From southern Nova Scotia to North Carolina.

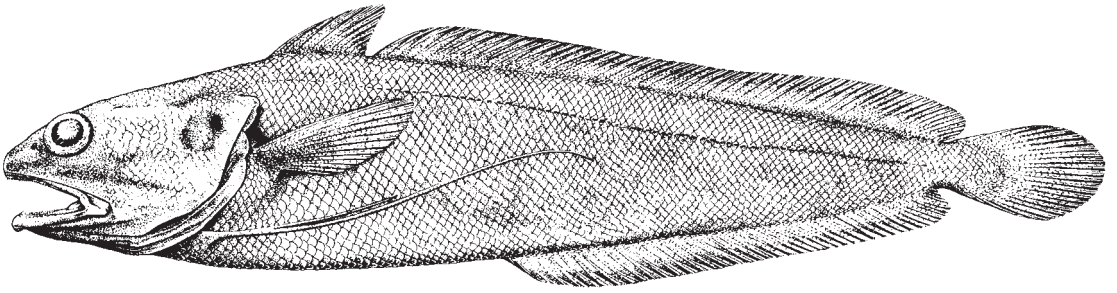
Remarks: The species was formerly confused with the white hake, *U. tenuis*, but Musick (1973, 1974) confirmed differences in morphometry, distribution, and life history of the two species. Markle et al. (1982) compared other life history traits of the 2 sibling hake species.



Urophycis cirrata (Goode and Bean, 1896) URI

Frequent synonyms / misidentifications: None / None.

FAO names: En - Gulf hake; **Fr** - Phycis du Golfe; **Sp** - Locha de fondo.

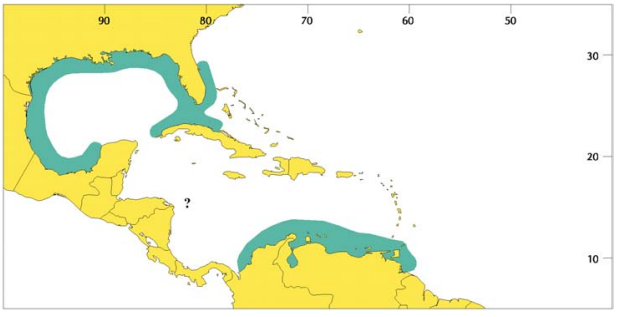


Diagnostic characters: Body elongated, greatest depth about 5 to 5.7 in total length; head 4 to 4.5 in total length. Eye small, about 5 times in head. **Three (rarely 2) gill rakers on upper limb of anterior gill arch. First dorsal fin with 9 or 10 rays, none prolonged**; second dorsal fin with about 66 rays; anal fin with about 57 rays; **longest ray of pelvic fin reaching beyond origin of anal fin**. About 93 rows of scales along lateral line. **Colour:** brownish above, belly silvery white; a diffuse dusky blotch on operculum, **no dark spots on cheek; first dorsal fin without a distinct white margin.**

Size: To at least 57 cm, commonly to about 35 cm.

Habitat, biology, and fisheries: Lives over mud bottoms from 27 to 684 m; most common in 360 to 470 m. Little known about life history. No commercial fishery so far as known.

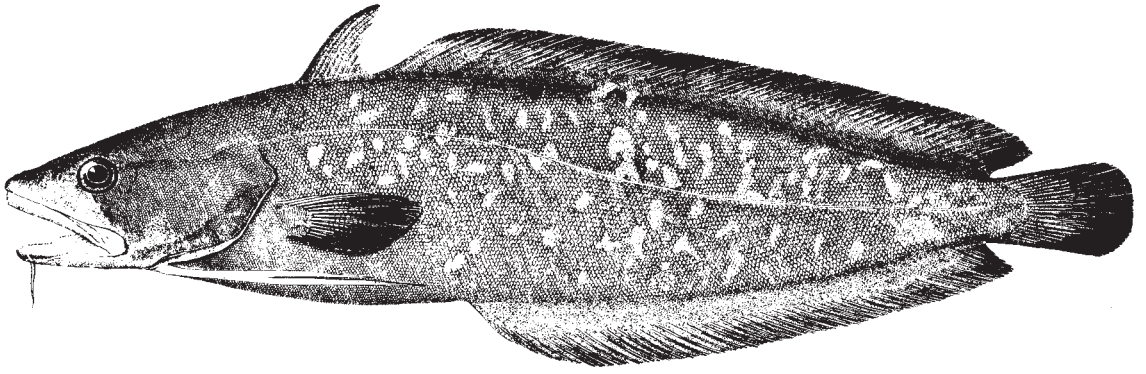
Distribution: From east coast of Florida, into Gulf of Mexico, and along Caribbean coast of South America. Some questionable records from Brazil.



Urophycis earllii (Bean, 1880) URE

Frequent synonyms / misidentifications: None / None.

FAO names: En - Carolina hake.



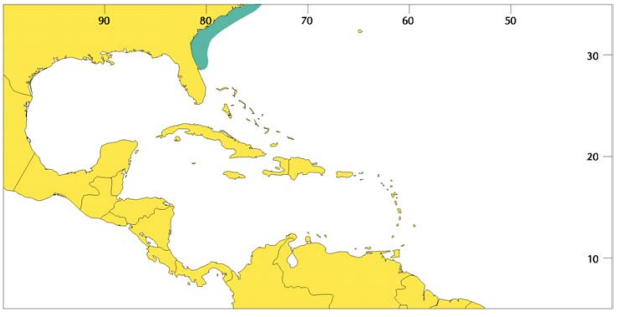
Diagnostic characters: Body moderately elongated, greatest depth about 5 in total length; head about 4.2 in total length. Eye about 6 to 6.5 times in head. **Two gill rakers on upper limb of anterior gill arch. First dorsal fin with 10 rays, none prolonged**; second dorsal fin with about 60 rays; **longest pelvic-fin ray falling short of anterior end of anal fin. Scales small, about 18 to 21 rows between lateral line and first dorsal fin**; more than 150 rows of scales along lateral line. **Colour:** dark overall with sides mottled.

Size: To about 45 cm total length.

Habitat, biology, and fisheries: Lives on or near bottom from near shore to depths of about 80 m; prefers hard bottoms. Little known of biology. Taken as bycatch in trawls, but no commercial fishery for species.

Distribution: Distribution restricted: Cape Hatteras to northeast coast of Florida.

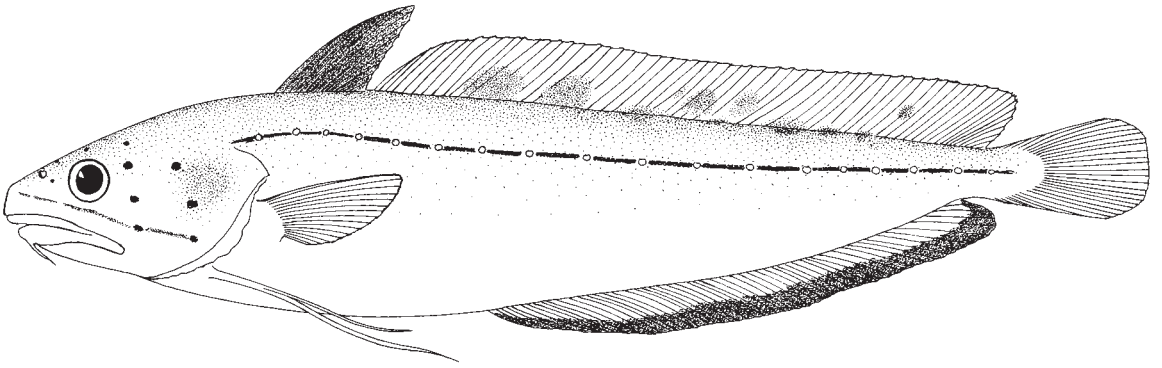
Remarks: A closely similar undescribed species apparently occurs in the Gulf of Mexico.



Urophycis floridana (Bean and Dresel, 1884) URF

Frequent synonyms / misidentifications: None / None.

FAO names: En - Southern codling (AFS: Southern hake); **Fr** - Phycis de Floride; **Sp** - Locha de Florida.

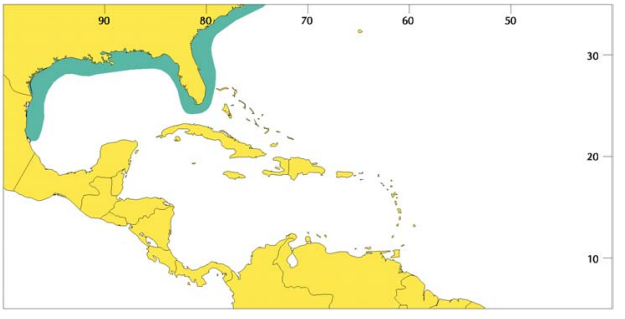


Diagnostic characters: Body elongated, greatest depth about 5.0 to 5.5 in total length; head about 4.5 in total length. Eye about 6 times in head. **Two gill rakers on upper limb of anterior gill arch. First dorsal fin with 11 to 13 rays, none prolonged**; second dorsal fin with 54 to 59 rays; anal fin with 49 to 52 rays; longest pelvic-fin ray not reaching anal fin in adults. About 110 to 120 rows of scales along lateral line. **Colour:** brownish above, belly silvery white, **lateral line dark with row of pale spots**; a diffuse dusky blotch on operculum, **a series of dark spots on cheek; dorsal fin without a distinct white margin.**

Size: To about 35 cm, commonly to about 25 cm.

Habitat, biology, and fisheries: Lives on or near bottom from near-shore to depths of about 400 m; most abundant in less than 300 m; juveniles spend part of life in estuaries. Feeds in shallow water on crustaceans, worms, and fishes. Fished in coastal waters with bottom trawls; marketed fresh.

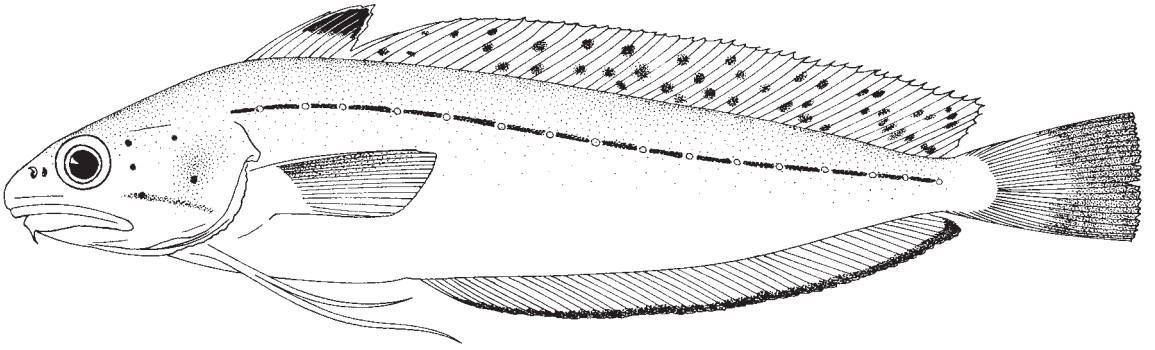
Distribution: From about Cape Hatteras south to Florida and into northern Gulf of Mexico.



Urophycis regia (Walbaum, 1792)

Frequent synonyms / misidentifications: None / None.

FAO names: En - Spotted codling (AFS: Spotted hake); **Fr** - Phycis tachetè; **Sp** - Locha regia.

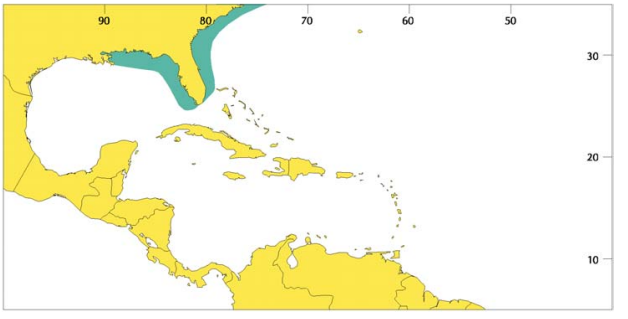


Diagnostic characters: Body moderately elongated, greatest depth about 5 in total length; head about 4.5 in total length. Eye about 6 times in head. **Three gill rakers on upper limb of anterior gill arch**. First dorsal fin with 8 or 9 rays, none prolonged; second dorsal fin with 46 to 51 rays; **longest pelvic-fin ray reaching near or slightly beyond anterior end of anal fin**. About 90 to 95 rows of scales along lateral line. **Colour:** brownish above and on sides, whitish on belly; **lateral line dark with white spots at intervals**; a large diffuse spot on operculum, **a series of small dark spots on cheek; upper half of first dorsal fin black with white edging; second dorsal fin with irregular dark spots.**

Size: To about 41 cm, commonly to about 17 cm.

Habitat, biology, and fisheries: Lives on or near bottom from near shore to depths 420 m; most abundant between 110 and 185 m; juveniles spend part of their lives in estuaries. Spawns in offshore waters from late summer to winter. Feeds primarily on crustaceans, but also fish and squid. Of limited commercial importance, taken in bottom trawls and with hook-and-line. Marketed fresh or used for fish meal.

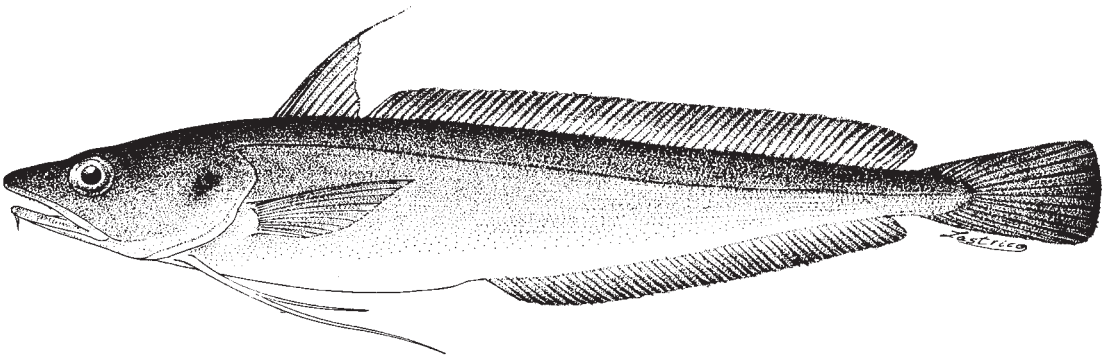
Distribution: From somewhat north of Cape Cod south to Florida, and into the northeastern Gulf of Mexico.



Urophycis tenuis (Mitchill, 1814)

Frequent synonyms / misidentifications: None / *Urophycis chuss* (Walbaum, 1792); *Phycis americanus* Storer, 1858.

FAO names: En - White hake; **Fr** - Merluche blanche; **Sp** - Locha blanca.



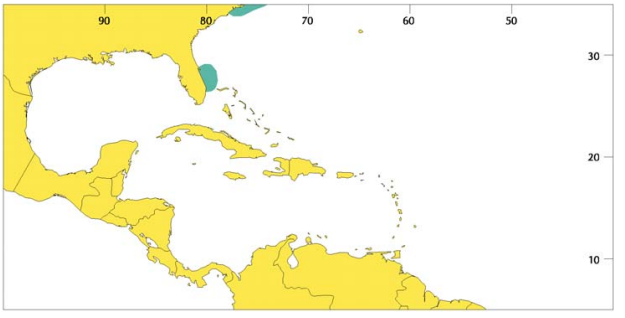
Diagnostic characters: Body elongated, greatest depth 5 to 6 in total length; head about 4.5 to 5 in total length. Eye large, about 3.5 to 4 times in head. **Two gill rakers on upper limb of anterior gill arch. First dorsal fin with 9 or 10 rays, the third prolonged** but less than head length; second dorsal fin with 54 to 57 rays; anal fin with 48 to 50 rays; **longest pelvic-fin ray falling short of anal fin**. About 140 rows of scales longitudinally along body. **Colour:** variable from purplish brown to slate above, dirty white to yellowish on belly; fins generally match adjacent body colour.

Size: To about 135 cm, commonly to 70 cm.

Habitat, biology, and fisheries: Lives over soft mud or sand bottoms of continental shelf and upper slope at depths of more than 980 m, most abundant at about 180 m. Matures in 3 to 5 years at 40 to 50 cm; moves inshore in summer to spawn, and spends winter offshore in deeper waters. Feeds on crustaceans, squid, and fishes. Of variable commercial importance in primary distribution areas, but of little importance in Area 31. Taken in trawls; marketed fresh, salted and dried, and canned.

Distribution: From Iceland, Labrador, and Newfoundland to North Carolina, straying to east coast of Florida in deep water.

Remarks: Musick (1974) clarified differences in the life history and distribution of the white hake and the red hake, *U. chuss*. Previous confusion between the two species had resulted in unreliable records of distribution and fishery for them.



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GAIDROPSARIDAE

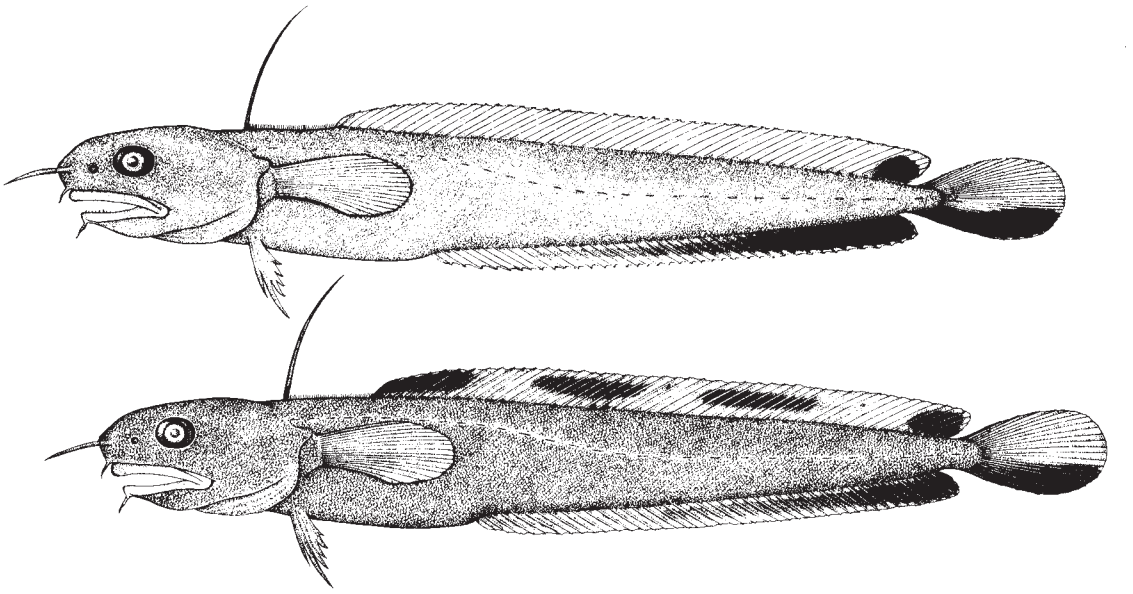
Rocklings

by T. Iwamoto, California Academy of Sciences, USA and D.M. Cohen, Bodega Bay, California, USA

A single species occurring in the area.

Enchelyopus cimbrius (Linnaeus, 1766) ENC

FAO names: En - Fourbeard rockling; **Fr** - Motelle à quatre barbillons.



Diagnostic characters: Body elongated, cylindrical; caudal peduncle moderately deep. Mouth slightly underslung, lower jaw shorter than upper jaw; **4 barbels, one at each anterior nostril, one at tip of snout, one on chin. Dorsal fin in 3 parts, first part a single, thickened, unsegmented ray, second part a low fleshy ridge of unsegmented rays in a shallow groove, third part long-based with 45 to 52 segmented rays**; anal fin long-based with straight distal margin; caudal and pectoral fins well developed, with rounded margins; pelvic fins thoracic with 5 to 7 soft rays. **Colour:** variable, olive to brown dorsally, pale ventrally, generally paler in northern latitudes; median fins with prominent black blotches in some specimens; juveniles silvery.

Similar families occurring in the area

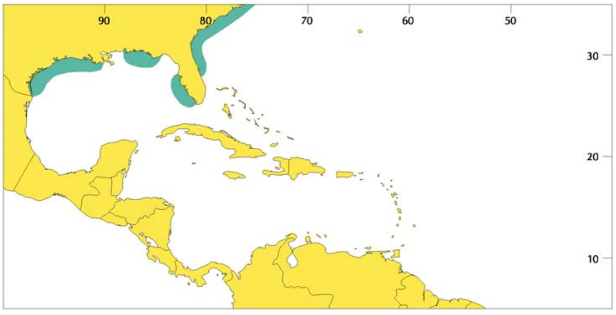
Rocklings are alone among gadoids in having barbels on the snout and a peculiar dorsal fin arrangement, with first part composed of a single ray, the second a series of short fleshy filaments in a groove, and the third a long section of normal, segmented rays with a straight, unindented margin.

Size: Maximum to about 41 cm, usual size less than 30 cm.

Habitat, biology, and fisheries: Adults benthic, sedentary on mud or soft bottoms on continental slope, and often in shallow waters near shore, juveniles pelagic; depth range about 20 m to 650 m. Possibly migrates to shallower waters in autumn and winter, then back to deeper waters in spring and summer. Spawning season prolonged, from January through September, duration varying with area. Growth slow, about 15 cm at 3 years, 20 cm at 5 years, 25 cm at 7 years, and 29 to 30 cm at 9 years. Feeds primarily on crustaceans, less often on fish. Incidentally caught in trawl fisheries, but of little or no commercial value.

Distribution: North Atlantic, from northern Gulf of Mexico to Greenland in west, Iceland and northern Europe to Bay of Biscay and Mauritania in the east.

Remarks: Family composed of only 3 genera, *Ciliata* (2 spp.), *Enchelyopus* (1 sp.), and *Gaidropsarus* (about 13 spp.), only 1 species in the area. Family often included as subfamily of Phycidae or Gadidae.



References

Cohen, D.M. 1990. Family Gadidae. In FAO species catalogue. Vol. 10. Gadiform fishes of the world (order Gadiformes). An annotated and illustrated catalogue of cods, hakes, grenadiers and other gadiform fishes known to date, edited by D.M. Cohen, T. Inada, T. Iwamoto, and N. Scialabba. *FAO Fish. Synop.*, (125)Vol.10:442 p.

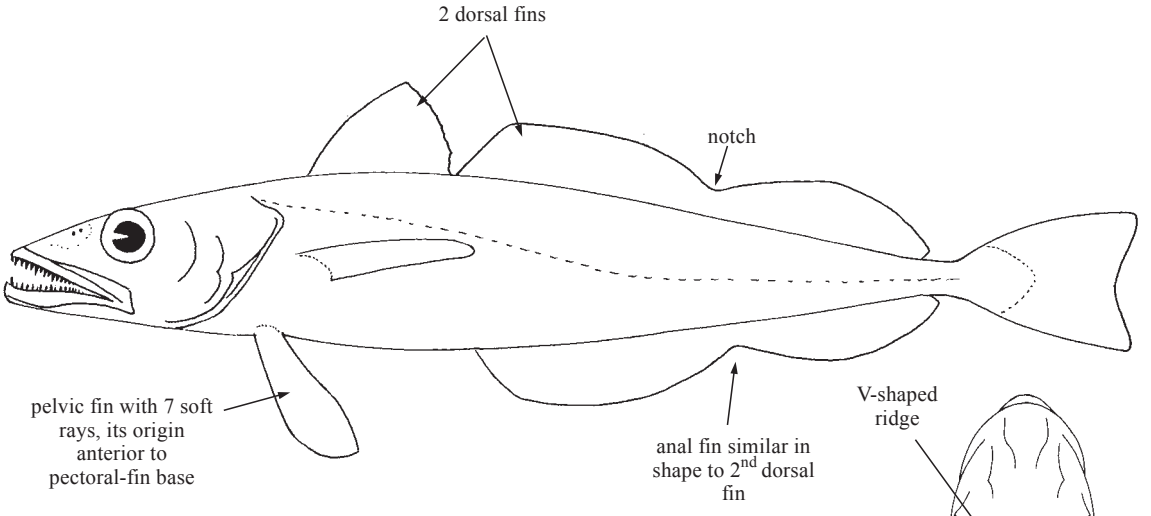
Cohen, D.M. and J.L. Russo. 1979. Variation in the fourbeard rockling, *Enchelyopus cimbrius*, a North Atlantic gadid fish, with comments on the genera of rocklings. *Fish. Bull. (U.S.),* 77(1):91-102.

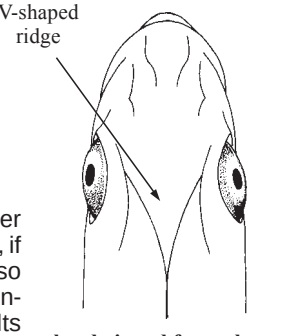
MERLUCCIIDAE

Merlucciid hakes

by T. Iwamoto, California Academy of Sciences, USA and D.M. Cohen, Bodega Bay, California, USA

Diagnostic characters: Medium-sized (to about 80 cm in Area 31, >140 cm in other areas) with elongated body, rounded anteriorly, becoming laterally compressed posteriorly. **Head somewhat flattened on top, its length 3.5 to 4.5 times into total length; a low, v-shaped ridge on top of head**. Mouth large, terminal, jaws almost half length of head, **lower jaw slightly protruding. Jaw teeth well developed, pointed, in 2 irregular series**; teeth on vomer, none on palatines. **Two dorsal fins, the first short-based and triangular, the second long-based and notched near midlength; anal fin similar in length and shape to second dorsal fin; caudal fin well developed, weakly forked; pectoral fin extends to over anus, upper edge of base at midbody depth; pelvic fin with 7 soft rays, its origin anterior to pectoral-fin base. Colour:** usually silvery when alive, steel greyish on back, lighter on sides, silvery white on belly.





head viewed from above

Habitat, biology, and fisheries: Benthopelagic fishes living on the shelf and upper continental slope, from shallow coastal waters to more than 1 000 m; most species, if not all, migrate vertically at night to feed; seasonal onshore-offshore migrations also documented. All species voracious predators, the young feed predominantly on invertebrates (crustaceans, especially euphausiids and pandalids), shifting in adults to predominantly fish and cephalopods. Spawning in Area 31 species during late spring through summer and autumn; eggs pelagic, young develop rapidly, females live longer and become larger than males. Species in temperate waters generally grow larger than warmer-water species and form important commercial fisheries, but almost all of some commercial importance. In Area 31, offshore hake fishery insignificant (mostly bycatch of bottom trawlers) and silver hake fishery almost entirely north of area. Marketed fresh, frozen, smoked, or used as fish meal. Flesh white, flaky, and low in fat.

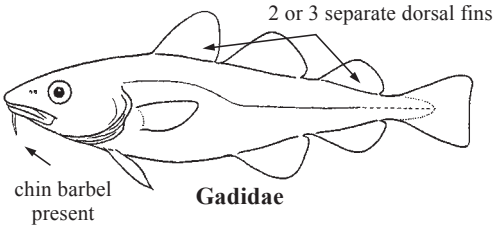
Remarks: Thirteen species, only 2 in the area. Merlucciidae sometimes treated as subfamily of Gadidae. Steindachneriidae (*Steindachneria*) and Macruroninae (*Macruronus, Lyconodes* and *Lyconus*) considered by some as subfamilies, but here treated as full families, following Nelson (1994).

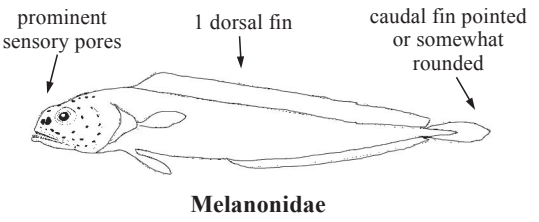
Similar families occurring in the area

Merlucciids can be distinguished from all other gadoids in having the combination of 2 dorsal fins, both second dorsal and anal fins long-based and notched at midlength, the caudal fin well developed, the pelvic fins normally developed, the mouth large, with lower jaw slightly protruding, and no chin barbel.

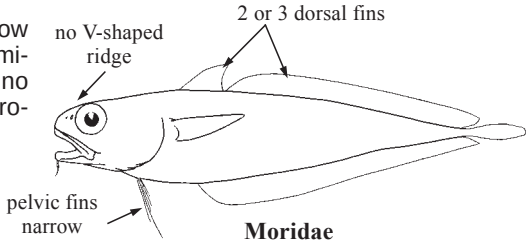
Gadidae: 2 or 3 separate dorsal fins, 1 or 2 anal fins, chin barbel present.

Melanonidae: small (about 25 cm) mesopelagic or bathypelagic fishes with 1 long-based dorsal fin; one long-based anal fin; caudal fin pointed or with somewhat rounded margin; colour usually blackish; prominent sensory pores and ridgelike rows of free neuromasts on head.





Moridae: 2 or 3 dorsal fins, 1 or 2 anal fins, pelvic fins narrow with filamentous tips in some species; mouth inferior or terminal; chin barbel in many; teeth few or lacking on vomer; no v-shaped ridge on top of skull; swimbladder with anterior projections that connect to rear of skull.



Key to the species of Merluccidae occurring in the area

1a. Total number of gill rakers on first arch fewer than 13; second dorsal fin with 35 to 39 soft rays . . . . . ***Merluccius albidus***

1b. Total number of gill rakers on first arch more than 16 to 20; second dorsal fin with 37 to 42 soft rays . . . . . ***Merluccius bilinearis***

List of species occurring in the area

The symbol is given when species accounts are included.

Merluccius albidus (Mitchill, 1818).

Merluccius bilinearis (Mitchill, 1814).

References

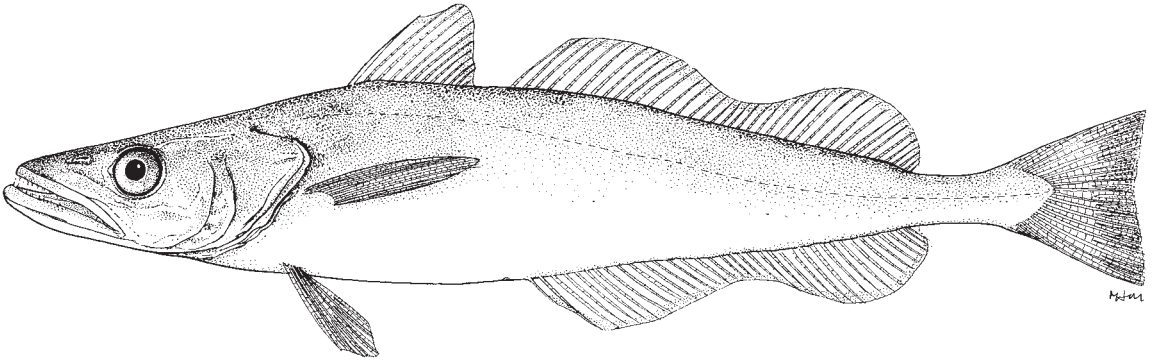
Inada, T. 1981. Studies on the merlucciid fishes. *Bull. Far Seas Fish. Res. Lab. Shimizu,* (18):1-172.

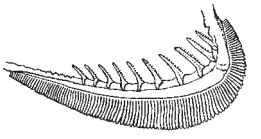
D.M. Cohen, T. Inada, T. Iwamoto, and N. Scialabba. 1990. FAO Species Catalogue. Vol. 10. Gadiform fishes of the world (order Gadiformes). An annotated and illustrated catalogue of cods, hakes, grenadiers and other gadiform fishes known to date. *FAO Fish. Synop*. 10(125):442 p.

Merluccius albidus (Mitchill, 1818) HOF

Frequent synonyms / misidentifications: *Merluccius magnoculus* Ginsburg, 1954 / *M. bilinearis* (Mitchill, 1814).

FAO names: En - Offshore silver hake; **Fr** - Merlu argenté du large; **Sp** - Merluza blanca de altura.



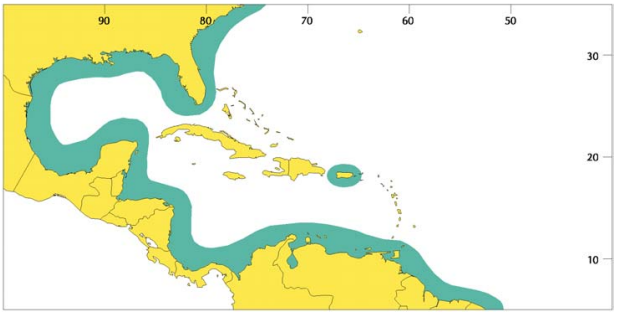


first gill arch

Diagnostic characters: Head 27 to 32% of standard length; gill rakers short and thick, with blunt tips, total number on first arch 8 to 11. Second dorsal fin with 35 to 39 soft rays; anal fin with 35 to 41 soft rays. Scales moderately large, 104 to 119 on lateral line. Total number of vertebrae 51 to 55. **Colour:** greyish to brownish dorsally, remaining areas silvery white.

Size: Males to about 40 cm, females to 70 cm.

Habitat, biology, and fisheries: Primarily a near-bottom inhabitant of shelf and upper continental slope waters; males and young females inhabit depths between 80 and 550 m, mature females occur deeper than 550 m, to maximum of 1 170 m. Fish, squid, and crustaceans compose the major part of the diet; spawning takes place from spring to early autumn on or near bottom at around 330 to 550 m; females live longer than males (at least 5 years, compared to 3 years in males) and are much larger. The offshore hake is of minor interest to fisheries; it is taken as a bycatch of the silver hake (trawl) fishery in the New England states; a small, potential commercial resource exists in the Gulf of Mexico; marketed fresh, frozen, and smoked.



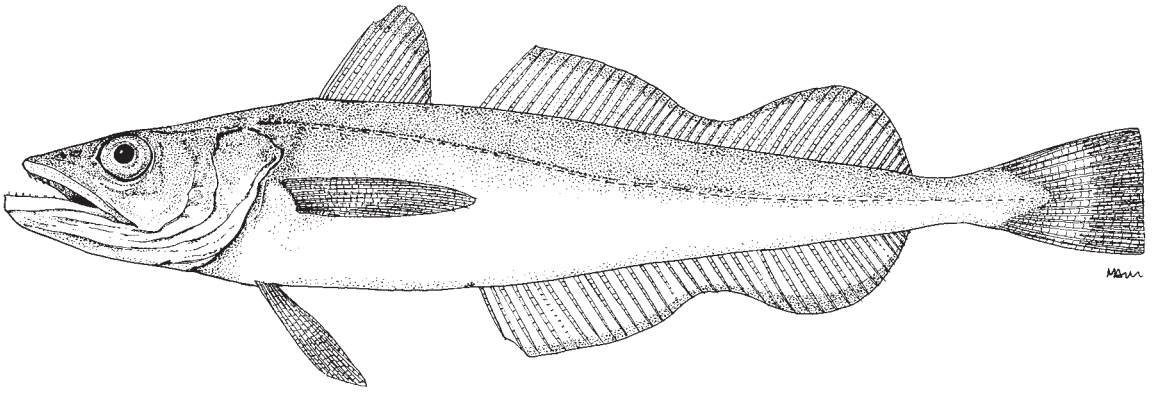
Distribution: Widespread in western central Atlantic, from Georges Bank off Maine to Rio de Janeiro, Brazil, and throughout Gulf of Mexico and Caribbean Sea.

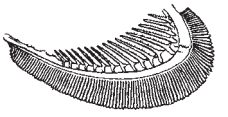
Remarks: Range in the north overlaps with that of commercially important silver hake, but offshore hake generally found in deeper waters. The fewer gill rakers and larger head distinguish offshore hake from silver hake.

Merluccius bilinearis (Mitchill, 1814) HKS

Frequent synonyms / misidentifications: None / *Merluccius merluccius* (Linnaeus, 1758), *M. albidus* (Mitchill, 1818)

FAO names: En - Silver hake; **Fr** - Merlu argenté; **Sp** - Merluza norteamericana.



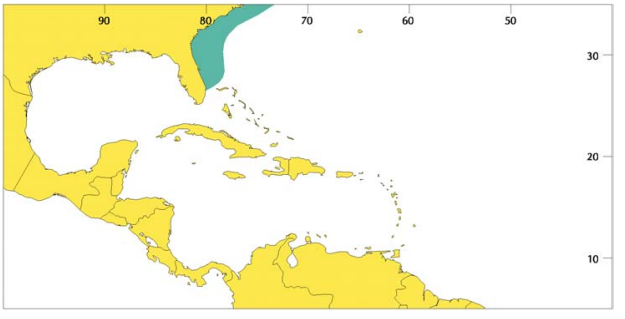


first gill arch

Diagnostic characters: Head length 24 to 27% of standard length; gill rakers long and pointed, 16 to 20 total on first arch. Second dorsal fin with 37 to 42 soft rays; anal fin with 37 to 42 soft rays. Scale rows 101 to 110 on lateral line. Total number of vertebrae 26 to 29. **Colour:** greyish dorsally, remaining areas silvery white.

Size: Maximum length about 76 cm.

Habitat, biology, and fisheries: Inhabits continental shelf depths from about 55 to 300 m, but also found in upper-slope waters to more than 900 m; occasionally strays into shallow coastal waters; seasonally migrates to shallower waters during warmer months, to deeper offshore waters in winter. Young of 1 to 3 years feed primarily on invertebrates (mostly crustaceans, especially euphausiids and pandalids); older fish feed mostly on fish and cephalopods; cannibalism significant and may regulate population of species. Spawning occurs in summer and early autumn and is highly dependent on water temperature. An important commercial fish in Area 21, but not found in significant quantities in Area 31. Marketed fresh, frozen, and smoked.



Distribution: Atlantic coast of North America from Florida to Newfoundland.

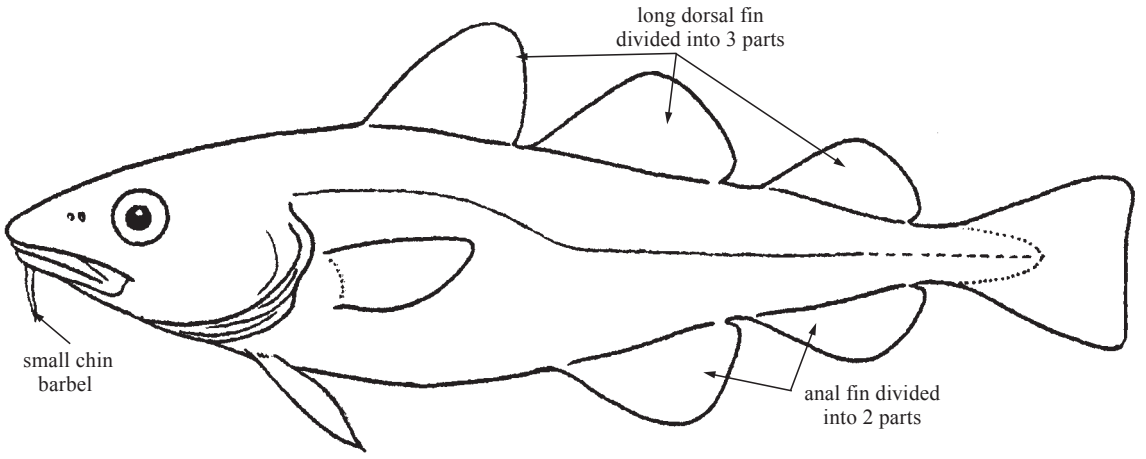
Remarks: Catch statistics may include mixture of silver and offshore hakes.

GADIDAE

True cods

by T. Iwamoto, California Academy of Sciences, USA and D.M. Cohen, Bodega Bay, California, USA

Diagnostic characters: Large fish to 2 m, commonly from 30 to 100 cm, with elongated body and moderately deep caudal peduncle. Top of head lacking V-shaped ridge. Mouth large with either upper jaw or lower jaw slightly protruding in many; teeth on vomer; **small chin barbel present** in most species. **Long dorsal fin divided into 3 parts; anal fin in 2 parts**; caudal fin well developed, truncate to forked; pectoral fins well developed, pointed; **pelvic fins short, thoracic. Colour:** variable, usually brownish to olive, or greyish to bluish dorsally, somewhat paler ventrally, belly often white, grey, or yellowish.



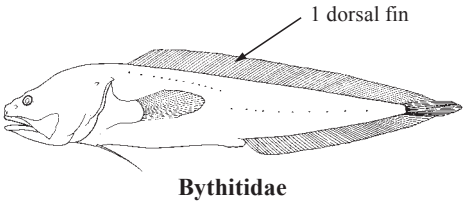
Habitat, biology, and fisheries: Most species confined to cold temperate to Arctic waters of North Atlantic and North Pacific, with few species in southern hemisphere. Most live on or near bottom (a few species pelagic) over continental shelf from nearshore to far offshore, but some occur at depths of 600 m or more; early-life stages pelagic, juveniles of some species found in estuaries and shallow coastal waters. Seasonal inshore-offshore migrations common, some undergo extensive north-south migrations. Fecundity in most species high, depending on size of individual; spawning occurs in colder months, usually from late autumn to spring, depending on locality and water temperature. Most species voracious and omnivorous predators; food preferences include, but not limited to, fish, shrimp, crabs, squid, and various bottom invertebrates. Of little or no significance to fisheries.

Remarks: Gadidae often treated (especially in older literature) as including several other groups, notably rocklings, cuskfishes, phycid hakes, and merlucciid hakes, all of which are here treated as of family rank. Gadidae include about 25 species in 12 genera, but only 3 species are found in the area, and those are only marginally present at the northern border.

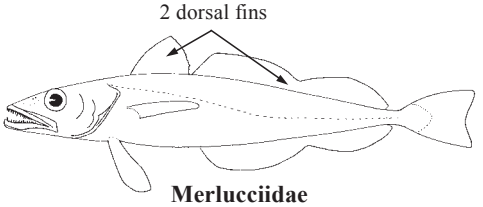
Similar families occurring in the area

Bythitidae: 1 long-based dorsal fin; anterior nostril immediately above upper lip in most; viviparous, males with an external intromittent organ.

Merlucciidae: 2 dorsal fins, 1 anal fin, the second dorsal and anal fins similar in size and shape, with notch in middle; V-shaped crest on top of head; no chin barbel.



Bythitidae

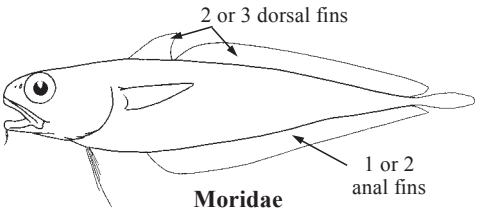


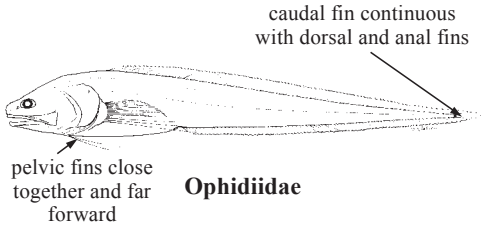
Merlucciidae

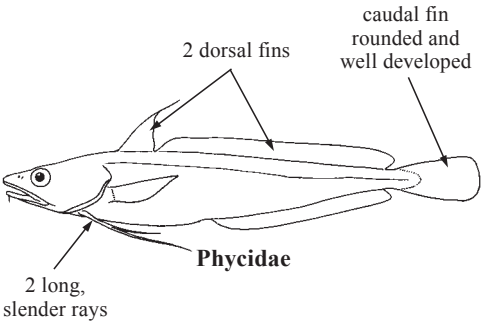
Moridae: 2 or 3 dorsal fins, 1 or 2 anal fins, pelvic fins narrow with filamentous tips in some species, more normal in shape in other species; teeth few or lacking on vomer; swimbladder with 2 anterior projections that connect to rear of skull.

Ophidiidae: 1 long-based dorsal fin; caudal fin connected with dorsal and anal fins; pelvic fins with 0 to 2 rays, bases close together without a broad scaled space between.

Phycidae: teeth on vomer well developed; no connection of swimbladder to back of skull; caudal peduncle relatively deep; pelvic fin consists of 2 long, slender, feeler-like rays, the longest extending close to or beyond vent; no light organ.







Key to the species of Gadidae occurring in the area

1a. First anal fin with long base, 1/2 or more of preanal distance; lower jaw slightly longer than upper jaw; chin barbel very small or absent . . . . . → *2*

1b. First anal fin short-based, less than 1/2 preanal distance; lower jaw slightly shorter than upper jaw; chin barbel large (Fig. 1) . . . . *Gadus morhua*

2a. Dorsal fins widely separated, space between second dorsal fin and third dorsal fin greater than length of base of first dorsal fin; chin barbel absent (Fig. 2) . . . . . *Micromesistius poutassou*

2b. Dorsal fins closer together, space between second dorsal fin and third dorsal fin less than length of base of first dorsal fin; a small chin barbel usually present in young (Fig. 3) . . . . . *Pollachius virens*

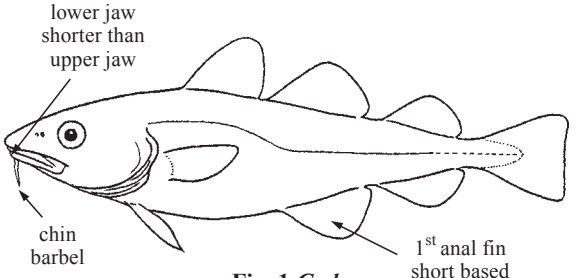


Fig. 1 ***Gadus***

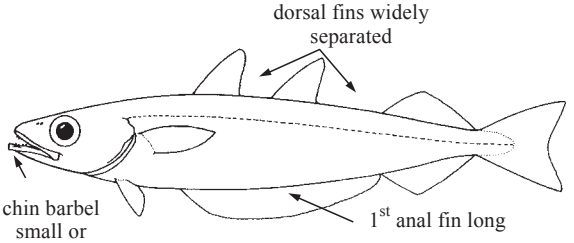


Fig. 2 ***Micromesistius***

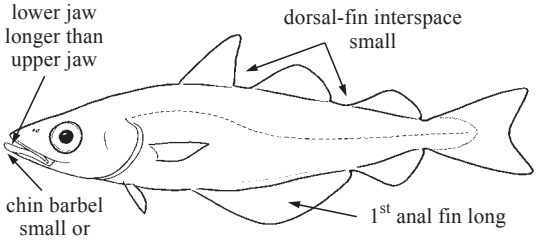


Fig. 3 ***Pollachius***

List of species occurring in the area

The symbol is given when species accounts are included.

Gadus morhua Linnaeus, 1758.

Micromesistius poutassou (Risso, 1827).

Pollachius virens (Linnaeus, 1758) .

References

Bigelow, H.B. and W.C. Schroeder. 1953. Fishes of the Gulf of Maine. *U.S. Fish & Wildl. Serv. Fish. Bull.,* 53:1-577.

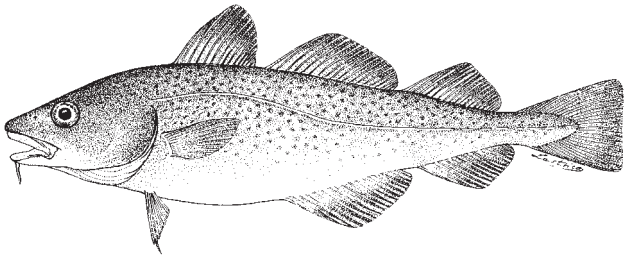
Cohen, D.M., T. Inada, T. Iwamoto, and N. Scialabba. 1990. FAO species catalogue. Vol. 10. Gadiform fishes of the world (order Gadiformes). An annotated and illustrated catalogue of cods, hakes, grenadiers and other gadiform fishes known to date. *FAO Fish. Synop*., (125)Vol.10:442 p.

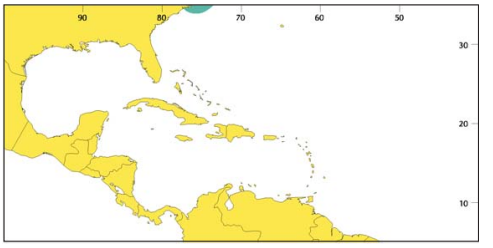
Liem, A.H. and W.B. Scott. 1966. Fishes of the Atlantic coast of Canada. *Fish. Res. Bd. Can. Bull.,* (155):485 p.

Gadus morhua Linnaeus, 1758 COD

En - Atlantic cod; **Fr** - Morue de l'Atlantique; **Sp** - Bacalao del Atlántico.

Maximum size to 2 m and about 90 kg, but average size only around 60 cm with weights averaging about 2 to 3 kg in western Atlantic. Primarily demersal, but becoming pelagic when feeding and spawning; found mostly over continental shelf in 150 to 200 m, but recorded to much greater depths (over 600 m). Prefers cold waters of 0 to 5 C, but found in waters as warm as 15 C. A species of considerable economic importance, but stocks in western Atlantic severely depleted and commercial harvest for the most part curtailed. Marketed fresh, frozen, dried, salted, and smoked. A boreal North Atlantic species ranging from North Carolina to Greenland, Iceland, across northern Europe, into Barents Sea including Novaya Zemlya and Spitzbergen; uncommon south of New York and New Jersey and of no commercial importance in Area 31.

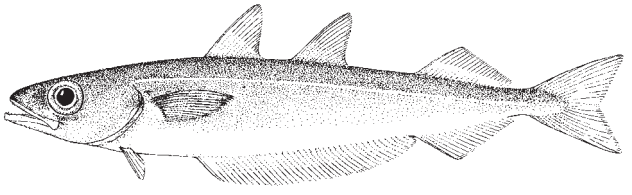


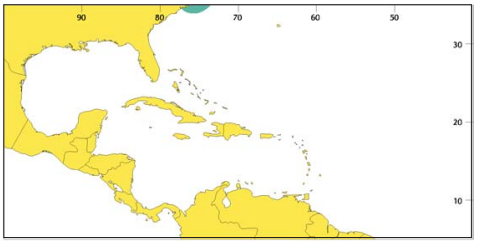


Micromesistius poutassou (Risso, 1827) WHB

En - Blue whiting; **Fr** - Merlan bleu; **Sp** - Bacaladilla.

Maximum size 50 cm, commonly from 15 to 30 cm. Oceanic and benthopelagic in habit at depths of 150 to more than 1 000 m, but more common at 300 to 400 m. Undergoes vertical and seasonal migrations. Feeds primarily on small crustaceans, but also on small fish and cephalopods. Ranges in North Atlantic from Barents Sea south to northern Africa, into Mediterranean, off Iceland and Greenland, and off southeastern coast of Canada and northeastern USA to about Cape Hatteras. Marketed fresh, frozen, and rendered into fish meal and oil. Uncommon south of Cape Hatteras and not of commercial importance in Area 31.

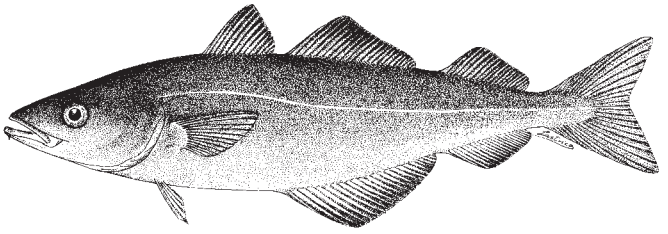


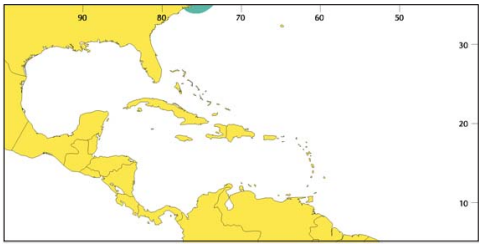


Pollachius virens (Linnaeus, 1758) POK

En - Saithe (AFS: Pollock); **Fr** - Lieu noir; **Sp** - Carbonero.

Maximum size to 130 cm; commonly to 100 cm. Occurs pelagically in inshore and offshore waters to about 200 m. Active swimmers, gregarious; migrates inshore in spring, offshore in winter, also known to migrate long distances north-south. Voracious feeders; young feed primarily on invertebrates (especially crustaceans), the adults on fish. Important commercial trawl and sports fish in New England states and northern Europe, but occurrence only incidental in Area 31, at southern end of range (North Carolina). Marketed fresh, salted, dried, smoked and canned. North Atlantic in polar and temperate marine waters, North Carolina to Greenland, Iceland, Spitzbergen, and northern Europe south to Bay of Biscay.





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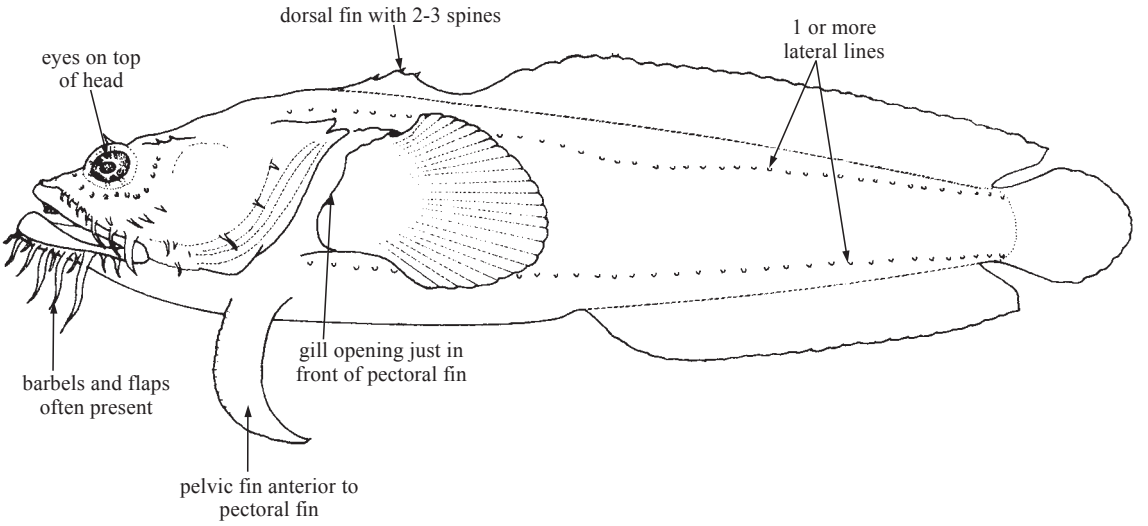
Order BATRACHOIDIFORMES

BATRACHOIDIDAE

Toadfishes

by B.B. Collette, National Marine Fisheries Service, National Museum of Natural History, Washington D.C., USA

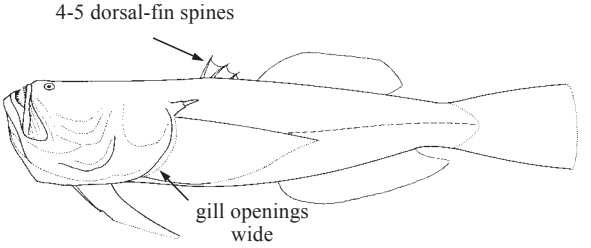
Diagnostic characters: Small to medium-sized fishes (to 57 cm) easily recognized by their characteristic shape. **Head broad and flattened, often with barbels and/or fleshy flaps; eyes on top of head, upward-directed; mouth wide. Gill openings restricted to sides, just in front of pectoral-fin base**. Two dorsal fins, the first consisting of 2 or 3 strong, sharp spines; the second consisting of a large number of soft rays; pelvic fins jugular, inserted well in advance of pectoral fins, with 1 spine and 2 or 3 soft rays. One to several lateral lines on head and body. Body naked or covered with small, cycloid (smooth) scales. **Colour:** mostly drab brown with spots or saddles of black, although at least 1 coral reef species, *Sanopus splendidus*, is brightly coloured. One subfamily, the Porichthyinae, is characterized by having photophores (light-emitting organs) in rows along lateral lines on head and body.



Habitat, biology, and fisheries: Toadfishes are bottom-dwellers ranging from shallow inshore areas to deep waters; several species enter rivers, and some migrate regularly between shallow and deep waters. They are sluggish in their movements and are ambush predators, feeding mainly on molluscs and crustaceans. They may bite when handled. The subfamily Thalassophryninae, or 'venomous toadfishes', includes species with hollow spines in the first dorsal fin and on the opercles; the spines are connected to venom glands that can force a poison into a wound. Although no catch statistics are reported, larger species of toadfish are commonly found in local markets. Some species are eaten and may fetch fairly high prices in Venezuela and French Guiana.

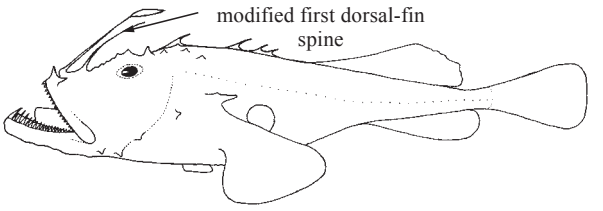
Similar families occurring in the area

Uranoscopidae (stargazers): gill openings wide, branchiostegal membranes nearly separate, free from isthmus (on underside of head); pelvic fins with 1 spine and 5 soft rays (1 spine and 2 or 3 soft rays in Batrachoididae); also, species of Uranoscopidae in Area 31 either lack the spiny dorsal fin or have 4 or 5 dorsal-fin spines (2 or 3 in Batrachoididae).



Uranoscopidae

Lophiidae: body and head more strongly depressed; first dorsal-fin spine modified into a long fishing rod with a fleshy bait.

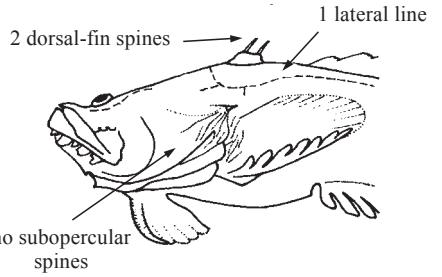


Lophiidae

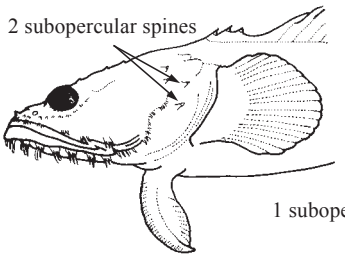
Key to the species of Batrachoididae occurring in the area

1a. Dorsal-fin spines 2; subopercular spines absent (Fig. 1a); body scaleless; no axillary pore behind pectoral fins; canine-like teeth and photophores present or absent . . . . . → *2*

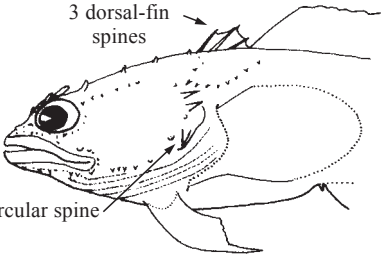
1b. Dorsal-fin spines 3; 1 or 2 subopercular spines present (Figs 1b, c); body with or without scales; axillary pore (Fig. 1d) behind pectoral fins present or absent; canine-like teeth and photophores absent . . . . . → *8*



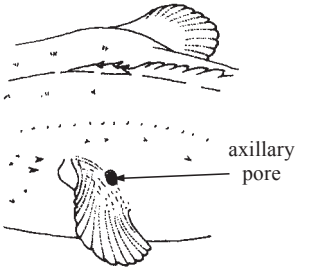
a) lateral view of head



b) lateral view of head



c) lateral view of head



d) lateral view of midbody

Fig. 1

2a. Dorsal-fin spines and opercular spine hollow, with venom glands; a single lateral line (Fig. 1a); no photophores; no canine-like teeth; no distinct glands on pectoral fins but glandular tissue scattered distally on fins (Fig. 2); second dorsal fin with 17 to 21 soft rays; anal fin with 16 to 20 soft rays . . . . . *(Thalassophryne)* → *3*

2b. Dorsal-fin spines solid, without venom glands; 4 lateral lines on body (Fig. 3); photophores present along lateral lines; canine-like teeth present; discrete glands present on the inner surface of pectoral fins between the upper fin rays; second dorsal fin with 29 to 39 soft rays; anal fin with 27 to 37 soft rays . . . . . *(Porichthys)* → *5*

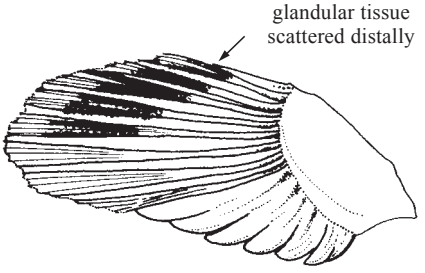


Fig. 2 ***Thalassophryne*** **(pectoral fin)**

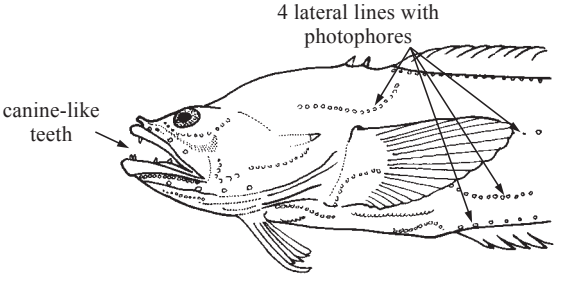


Fig. 3 ***Porichthys***

3a. Dorsal, anal, pectoral, and caudal fins with pale distal margins . . . . . ***Thalassophryne nattereri***

3b. Dorsal, anal, pectoral, and caudal fins pigmented to distal margins . . . . . → ***4***

4a. No prominent spots on body or fins; pectoral-fin rays 13 to 15, usually 14; eye very large, 54 to 67 (mean 62) thousandths of standard length . . . . . ***Thalassophryne megalops***

4b. Body colour variable with small and large spots, frequently with large blotches; pectoral-fin rays 14 to 17, usually 15 or 16; eye moderately large, 35 to 78 (mean 54) thousandths of standard length . . . . . ***Thalassophryne maculosa***

5a. Branchiostegal series of photophores united in a broad V, without a forward-directed commissure at the apex; dorsal-fin rays 29 to 32; anal-fin rays 27 to 30 . . . . . → ***6***

5b. Branchiostegal series of photophores with a U-shaped forward-directed commissure at the apex; dorsal-fin rays 33 to 39; anal-fin rays 30 to 36, usually 31 to 34 . . . . . → ***7***

6a. Back and head with 6 or 7 well-defined saddle marks; no spots present on body; opercular spine often spear-shaped; pectoral-fin rays 14 to 16, usually 14 or 15; total gill rakers on first arch usually 8 occasionally 9 . . . . . ***Porichthys pauciradiatus***

6b. Six fairly well-defined blotches of pigment on back and nape, coalescing so as to form saddle marks in larger specimens; numerous small spots and 'worm-bore' markings present on upper part of head and anterodorsal part of back, more numberous in former region; opercular spine not spear-shaped; pectoral-fin rays 16 or 17; total gill rakers on first arch 12 or 13 . . . . . ***Porichthys oculofrenum***

7a. Entire body darkly pigmented; 4, 5, or 6 irregularly shaped dark blotches on upper part of body; pectoral-fin rays usually 16 or 17, occasionally 15 or 18; in relatively deep water, 200 to 300 m . . . . . ***Porichthys bathoiketes***

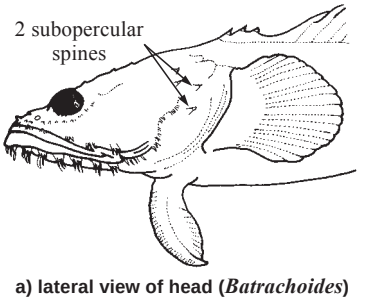
7b. Body variously pigmented, but rarely as dark as in *P. bathoiketes*; upper part of head and body variously spotted, but with more than 5 or 6 blotches; pectoral-fin rays 17 to 19, occasionally 16; usually in relatively shallow water, less than 200 m . . . . . ***Porichthys plectrodon***

8a. Two subopercular spines (Fig. 4a); body covered with small embedded scales . . . . . ***(Batrachoides)*** → ***9***

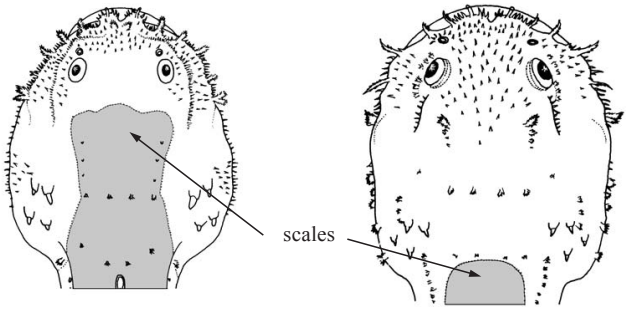
8b. A single subopercular spine (Fig. 4b); body naked . . . . → ***11***

9a. Scales on head extending beyond supratemporal canal to middle of head (Fig. 5a); dorsal-fin rays 28 to 30; anal-fin rays 25 to 27; pores in lower lateral line 48 to 66 . . . . . ***Batrachoides surinamensis***

9b. Scales on head not reaching supratemporal canal (Fig. 5b); dorsal-fin rays 21 to 26; anal-fin rays 19 to 23; pores in lower lateral line 24 to 40 . . . . . → ***10***

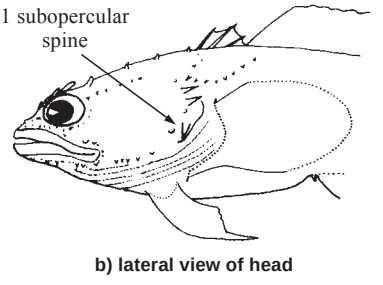


a) lateral view of head (*Batrachoides*)



a) *Batrachoides surinamensis* **b)**

Fig. 5 dorsal view of head



b) lateral view of head

Fig. 4

10a. Anal-fin rays 19 to 21; dorsal-fin rays 21 to 23, rarely 24; usually fewer than 34 pores in lower lateral line . . . . . ***Batrachoides manglae***

10b. Anal fin rays 22 or 23; dorsal-fin rays 24 to 26; usually 34 or more pores in lower lateral line . . . . . ***Batrachoides gilberti***

11a. Discrete glands present between the upper rays on inner surface of pectoral fins (Fig. 6) . . . . . → ***12***

11b. No glands present between pectoral-fin rays . . . . . → ***17***

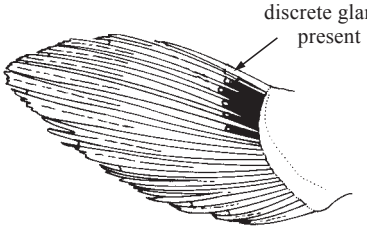


Fig. 6 pectoral fin

12a. Axillary pore absent; second dorsal fin with 17 to 21 soft rays; anal fin with 13 to 17 soft rays . . . . . ***Triathalassothia gloverensis***

12b. Axillary pore present on body behind pectoral fins; second dorsal fin with 23 to 27 soft rays; anal-fin with 19 to 23 soft rays . . . . . ***(Opsanus)*** → ***13***

13a. Second dorsal-fin rays 23 to 25, rarely 26; pectoral-fin rays usually 17 or 18, occasionally 19; precaudal vertebrae 10; head narrow, 195 to 301 thousandths of standard length; lower half of mouth usually darkly pigmented in specimens over 70 mm standard length . . . . . → ***14***

13b. Second dorsal-fin rays 25 to 27, usually 26; pectoral-fin rays usually 20 or 21, occasionally 19; precaudal vertebrae 11; head wide, 246 to 366 thousandths of standard length; neither upper nor lower half of mouth pigmented . . . . . → ***15***

14a. Interorbital distance 43 to 79 thousandths of standard length, about equal to orbit length (52 to 92 thousandths of standard length); both upper and lower halves of mouth usually pigmented in specimens over 80 mm standard length . . . . . ***Opsanus phobetron***

14b. Interorbital distance 29 to 65 thousandths of standard length, less than orbit diameter (60 to 104 thousandths of standard length); posterior part of lower half of mouth usually pigmented in specimens over 70 mm standard length . . . . . ***Opsanus dichrostomus***

15a. Background body pigmentation light, overlain with brown spots as large as pupil or a little larger on head, body, and fins, those on dorsal and anal fins arranged in more or less oblique rows; snout to anal fin distance longer, 586 to 648 thousandths of standard length . . . . . ***Opsanus pardus***

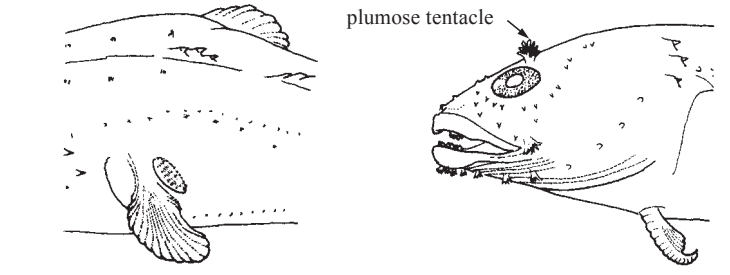
15b. Background body pigmentation dark, crossbands on body instead of dark spots on a light background; snout to anal fin distance shorter, 551 to 609 thousandths of standard length . . . . → ***16***

16a. Pectoral fin with definite crossbars, which are not composed of a series of round or nearly round light spots, the light areas continuous across the fin; sides and belly with brownish to blackish reticulations, or finely mottled, especially on sides of belly; no round light spots on sides of body; pectoral-fin rays usually 20 or 21; second dorsal-fin rays 25 or 26, usually 26 . ***Opsanus tau***

16b. Pectoral fin with definite light crossbars made up of a series of distinct nearly round light spots; darkish background pigment of sides with small light spots; sides and belly without any trace of reticulations; pectoral-fin rays 18 or 19; second dorsal-fin rays 24 or 25 . . . ***Opsanus beta***

17a. No axillary pore on body behind pectoral fins (Fig. 7a); a prominent plumose supraorbital tentacle present (Fig. 7b) . . . . . ***Amphichthys cryptocentrus***

17b. Axillary pore present (Fig. 8); no prominent plumose supraorbital tentacle, although some filaments may be present in interorbital region . . . . . ***(Sanopus) → 18***



a) side of body with pectoral fin folded down **b) lateral view of head**

Fig. 7 ***Amphichthys cryptocentrus***

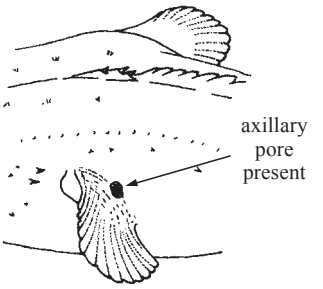


Fig. 8 ***Sanopus***

18a. All chin barbels branched; dorsal-fin rays 29 to 32, usually 30 or fewer . . . . . ***→ 19***

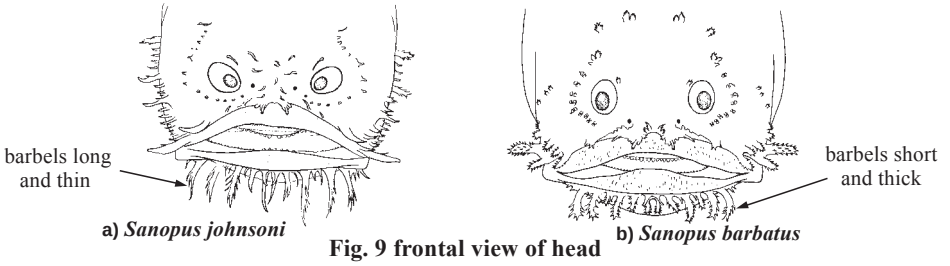
18b. Only 1 or 2 median chin barbels branched; dorsal-fin rays 31 to 34, usually 32 or more . . . . . ***→ 21***

19a. Reticulate pattern on body and head . . . . . ***Sanopus reticulatus***

19b. Body and head dark, not reticulate; lines or light spots may be present on head . . . . . ***→ 20***

20a. Chin barbels long and thin; branches on chin barbels long, thin, and few (Fig. 9a) . . ***Sanopus johnsoni***

20b. Chin barbels short and thick; branches on chin barbels short, thick, and many (Fig. 9b) . . . . . ***Sanopus barbatus***



a) ***Sanopus johnsoni*** **b)** ***Sanopus barbatus***

Fig. 9 frontal view of head

21a. Dorsal, anal, caudal, and pectoral fins broadly bordered with black and bright orange-yellow in life (white in preservative); upper lateral line papillae 30 to 34 . . . ***Sanopus splendidus***

21b. Body dark with prominent light markings, no bright colours or black borders to fins; upper lateral line papillae 36 to 41 . . . . . ***→ 22***

22a. Many light lines on head, 8 to 12 continuous light lines radiating out from eyes (Fig. 10a)
. . . . . ***Sanopus greenfieldorum***

22b. Head and interorbital region with many small light spots and few short light lines (Fig. 10b)
. . . . . ***Sanopus astrifer***

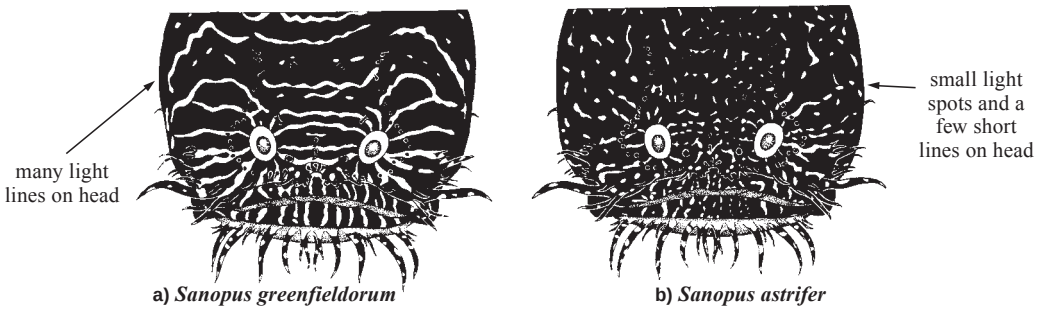


Fig. 10 frontal view of head

List of species occurring in the area

The symbol ◄ is given when species accounts are included.

◄ *Amphichthys cryptocentrus* (Valenciennes, 1837).

◄ *Batrachoides gilberti* Meek and Hildebrand, 1928.
◄ *Batrachoides manglae* Cervigón, 1964.
◄ *Batrachoides surinamensis* (Bloch and Schneider, 1801).

◄ *Opsanus beta* (Goode and Bean, 1880).
◄ *Opsanus dichrostomus* Collette, 2001.
◄ *Opsanus pardus* (Goode and Bean, 1880).
◄ *Opsanus phobetron* Walters and Robins, 1961.
◄ *Opsanus tau* (Linnaeus, 1766).

◄ *Porichthys bathoiketes* Gilbert, 1968.
◄ *Porichthys oculofrenum* Gilbert, 1968.
◄ *Porichthys pauciradiatus* Caldwell and Caldwell, 1963.
◄ *Porichthys plectrodon* Jordan and Gilbert, 1882.

◄ *Sanopus astrifer* (Robins and Starck, 1965).
◄ *Sanopus barbatus* (Meek and Hildebrand, 1928).
◄ *Sanopus greenfieldorum* Collette, 1983.
◄ *Sanopus johnsoni* Collette and Starck, 1974.
◄ *Sanopus reticulatus* Collette, 1983.
◄ *Sanopus splendidus* Collette, Starck and Phillips, 1974.

◄ *Thalassophryne maculosa* Günther, 1861.
◄ *Thalassophryne megalops* Bean and Weed, 1910.
◄ *Thalassophryne nattereri* Steindachner, 1876.

◄ *Triathalassothia gloverensis* Greenfield and Greenfield, 1973.

References

Collette, B.B. 1966. A review of the venomous toadfishes, subfamily Thalassophryninae. *Copeia,* 1966:846-864.

Collette, B.B. 1983. Two new species of coral toadfishes, family Batrachoididae, genus *Sanopus*, from Yucatan, Mexico, and Belize. *Proc. Biol. Soc. Wash.,* 96:719-724.

Collette, B.B. and J.L. Russo. 1981. A revision of the scaly toadfishes, genus *Batrachoides*, with descriptions of two new species from the eastern Pacific. *Bull. Mar. Sci*., 31:197-233.

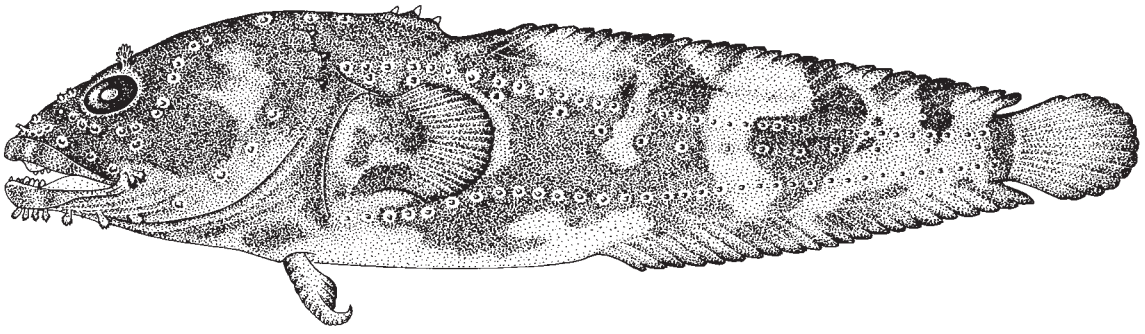
Gilbert, C.R. 1968. Western Atlantic batrachoid fishes of the genus *Porichthys*, including three new species. *Bull. Mar. Sci*., 18:671-730.

Greenfield, D.W. and T. Greenfield. 1973. *Triathalassothia gloverensis*, a new species of toadfish from Belize (= British Honduras) with remarks on the genus. *Copeia,* 1973:560-565.

Amphichthys cryptocentrus (Valenciennes, 1837) BAY

Frequent synonyms / misidentifications: *Marcgravia cryptocentra* (Valenciennes, 1837); *Amphichthys hildebrandi* (Breder, 1925) / None.

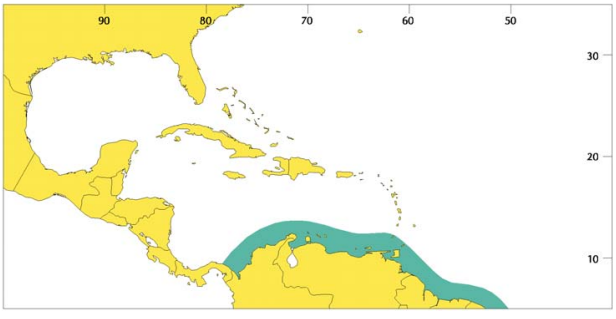
FAO names: En - Bocon toadfish; **Fr** - Crapaud goulu; **Sp** - Sapo bocón.



Diagnostic characters: Head and anterior part of body greatly depressed. Barbels present on head, especially on lower jaw; **a large branched tentacle on upper margin of eye; 2 solid opercular spines** (not associated with venom glands) and **1 subopercular spine**. Large molar-like teeth present in both jaws; no canine-like teeth. First dorsal fin consisting of 3 solid spines without associated venom glands; second dorsal fin with 29 soft rays, **anal fin with 23 to 25 soft rays** and pectoral fins with 20 to 23 rays; **no glands between upper pectoral-fin rays; glandular tissue present in axil of pectoral fin but no axillary pore**. Two lateral lines, 32 to 40 pores in upper and 27 to 34 pores in lower. Number of vertebrae 36 to 38. Body scaleless. **Colour:** upper side usually brownish yellow with diffuse mottlings, belly whitish. Head often with small orange spots and its lower portion brown with white reticulations; a dark transverse bar across nape followed by a second one, slightly wider. Dorsal fin with alternating oblique yellow and brown stripes; anal fin almost uniform yellowish brown. Some individuals are nearly uniform brownish red.

Size: Maximum to 34 cm, commonly to 25 cm.

Habitat, biology, and fisheries: A very sluggish inhabitant of littoral waters, usually found on sandy or rock bottom; even large specimens may be found in waters less than 1 m deep hiding in crevices or caves; rarely entering lagoons. Feeds mostly on molluscs and crustaceans. Separate statistics are not reported for this species, but it is moderately abundant and regularly consumed by local fishermen. Caught in traps and by special types of hooks (garrapinos). Marketed mainly fresh.

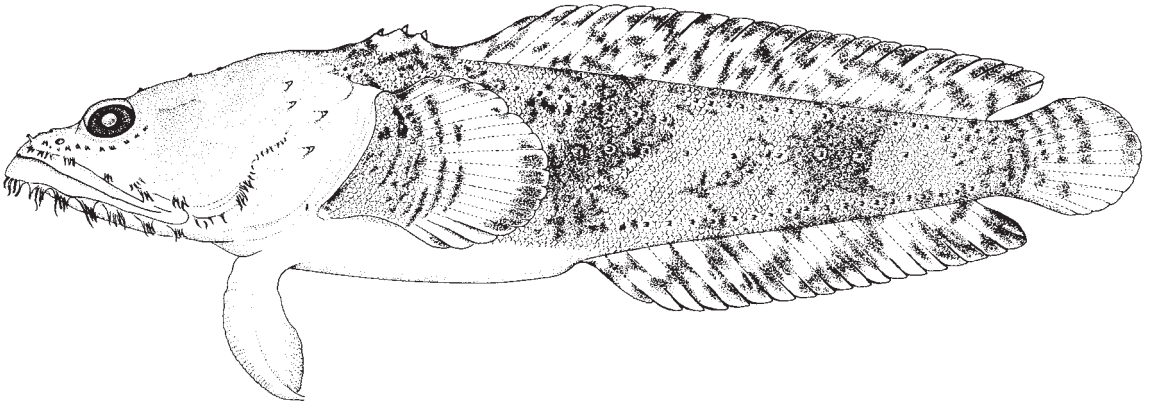


Distribution: North coast of South America, from Panama to Brazil.

Batrachoides manglae Cervigón, 1964

Frequent synonyms / misidentifications: None / None.

FAO names: En - Cotuero toadfish; **Fr** - Crapaud lagunaire; **Sp** - Sapo lagunero.

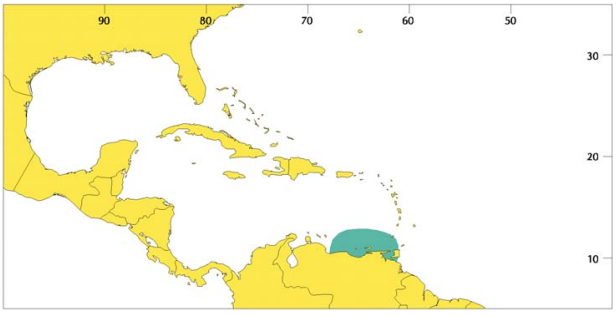


Diagnostic characters: Head and anterior part of body greatly depressed. Head long, 39.5 to 43.5% of standard length, bearing many barbels, especially on lower jaw; **no tentacles present above eyes, dorsal surface of head scaleless, mostly covered with fine filaments; eye large, 5.0 to 7.0% of standard length; 2 solid opercular spines** (not associated with venom glands) and **2 subopercular spines**. Large molar-like teeth in both jaws; no canine-like teeth. First dorsal fin consisting of 3 solid spines without associated venom glands; second dorsal fin with 21 to 24 soft rays, anal fin with 19 to 21 soft rays and pectoral fin with 18 to 21 rays; **6 to 11 discrete glands present on the inner surface of pectoral fins between the bases of upper rays**; axil of pectoral fins (behind pectoral-fin base) also with glandular tissue, but without an axillary pore. Two lateral lines, 31 to 40 pores in the upper, 29 to 37 in the lower. **Body covered with small, embedded scales**. Number of vertebrae 31 to 33. **Colour:** back and sides brown with a yellow or greenish tinge and several irregular dark crossbars; belly whitish, sometimes mottled with brown; fins with alternating dark and pale stripes.

Size: Maximum to about 30 cm (350 g); commonly to 20 cm.

Habitat, biology, and fisheries: Inhabits muddy bottoms in shallow waters, especially abundant in mangrove-lined lagoons. Feeds mainly on small gastropod molluscs and crustaceans. Separate statistics are not reported for this species. Caught mainly with traps; also with bottom trawls. Marketed fresh, but the flesh is considered of low quality.

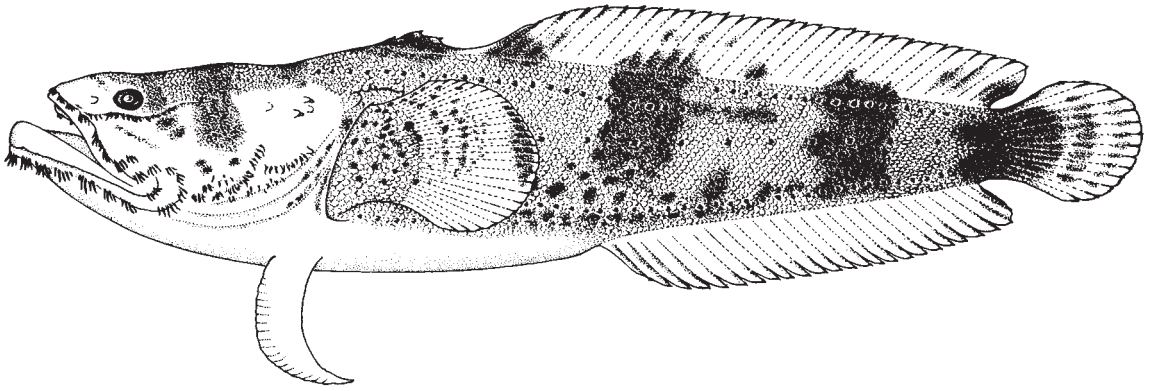
Distribution: Venezuela: Isla de Margarita, Isla de Cubagua, Peninsula de Araya.



Batrachoides surinamensis (Bloch and Schneider, 1801)

Frequent synonyms / misidentifications: None / None.

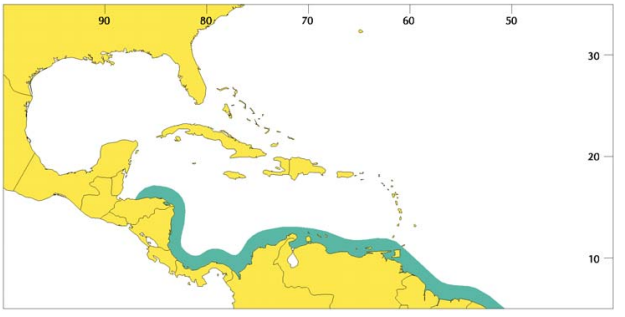
FAO names: En - Pacuma toadfish; **Fr** - Crapaud guyanais; **Sp** - Sapo guayanés.



Diagnostic characters: Head and anterior part of body greatly depressed. Head short, 27.2 to 38.6% of standard length, bearing many barbels, especially on lower jaw; no tentacles present above eyes, **posterior half of dorsal surface of head covered with small embedded scales but no fine filaments present except anteriorly; eye very small, 2.0 to 4.1% of standard length**; 2 solid opercular spines (not associated with venom glands) and 2 subopercular spines. Large molar-like teeth in both jaws; no canine-like teeth. First dorsal fin consisting of 3 solid spines without associated venom glands; second dorsal fin with 28 to 30 soft rays, anal fin with 25 to 27 soft rays and pectoral fins with 20 to 22 rays; **3 to 11 discrete glands present on the inner surface of pectoral fins between the bases of upper rays**; axil of pectoral fins (behind pectoral-fin base) also with glandular tissue, but without an axillary pore. Two lateral lines, 54 to 67 pores in upper, 48 to 63 in the lower. **Body covered with small, more or less embedded scales**. Number of vertebrae 36 to 39. **Colour:** brown with several prominent dark transverse bands dorsally on head and sides of body; belly whitish.

Size: Maximum to about 340 mm standard length.

Habitat, biology, and fisheries: Inhabits muddy bottoms in shallow brackish waters of high temperature (up to 29.5 C). Feeds mainly on small gastropod molluscs and crustaceans. Separate statistics are not reported for this species. Caught mainly with bottom trawls. Marketed mostly fresh; a valued foodfish in Trinidad and French Guiana where it fetches high prices in markets. Of little or no commercial importance in Venezuela.

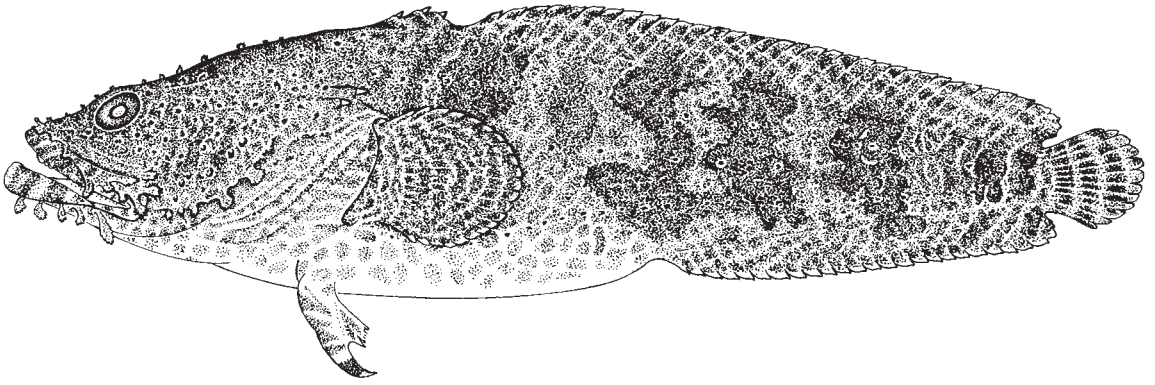


Distribution: Honduras to Brazil (southern limit: Rio de Janeiro) in the vicinity of estuaries in Colombia and the Gulf of Venezuela, absent along the north coast of Venezuela and present again from Trinidad southward.

Sanopus barbatus (Meek and Hildebrand, 1928)

Frequent synonyms / misidentifications: *Opsanus barbatus* Meek and Hildebrand, 1928 / None.

FAO names: En - Bearded toadfish; **Fr** - Crapaud barbu; **Sp** - Sapo barbudo.

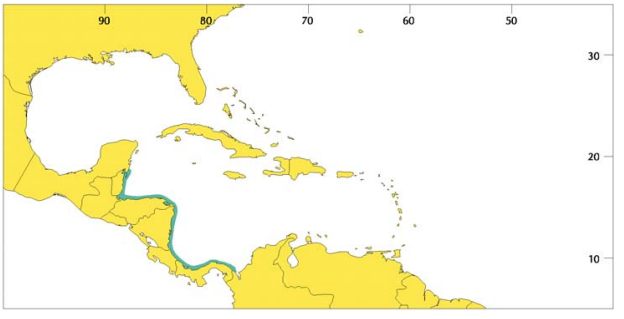


Diagnostic characters: Head and anterior part of body greatly depressed. Head covered with branched barbels, fleshy flaps, and cirri, but **no cirri present between the eyes**; 2 solid, strongly diverging opercular spines (not associated with venom glands) and **1 subopercular spine**, these spines hidden in the skin. Large molar-like teeth in both jaws; no canine-like teeth. First dorsal fin consisting of 3 solid spines without associated venom glands; second dorsal fin with 31 to 34 soft rays, and anal fin with 25 to 28 soft rays and pectoral fins with 20 to 22 rays; no glands or glandular tissue on pectoral fins; **axillary pore present behind pectoral-fin base**. Two lateral lines, 32 to 38 pores with short, wide papillae in upper, 27 to 34 in lower. Body scaleless. **Colour:** upper side brown, belly mottled brown over white; **caudal fin of adults with a varying number of eye-like spots.**

Size: Maximum to about 370 mm standard length; commonly to 300 mm total length.

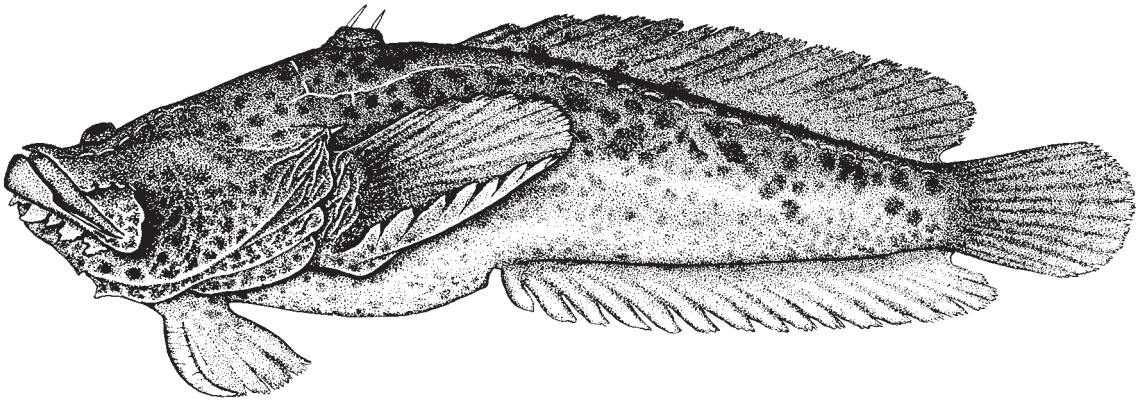
Habitat, biology, and fisheries: Inhabits shallow waters around coral reefs. Separate statistics are not reported for this species. Caught on hook-and-line and with spears. Probably consumed fresh locally.

Distribution: Caribbean coast of Central America from Honduras to Panama.



Thalassophryne maculosa Günther, 1861 BTM

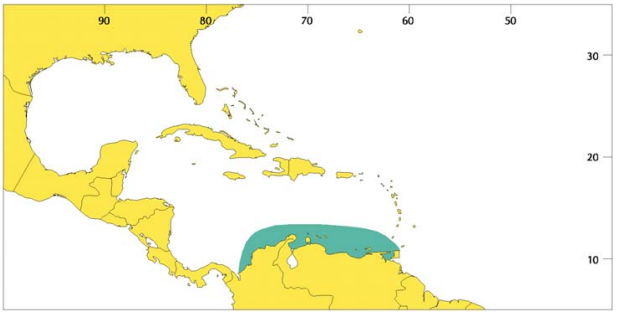
Frequent synonyms / misidentifications: *Thalassophryne wehekindi* Fowler, 1931 / None.
FAO names: En - Caño toadfish; **Fr** - Crapaud tacheté; **Sp** - Sapo caño.



Diagnostic characters: Head and anterior part of body greatly depressed. **A sharp, hollow opercular spine connected to a venom gland; subopercular spines absent**; relatively few flat barbels on chin. Large molar-like teeth in both jaws; no canine-like teeth. **First dorsal fin consisting of 2 hollow spines connected to venom glands**; second dorsal fin with 17 to 20 soft rays, anal fin with 16 to 19 soft rays and pectoral fins with 14 to 16 rays; **no distinct glands between bases of pectoral-fin rays, but glandular tissue scattered distally on fin**. A single lateral line on body. Body scaleless. Number of precaudal vertebrae 7. **Colour:** small specimens tend to be pale with small to medium dark spots and blotches. Larger individuals tend to have a darker background colour with smaller spots which do not stand out as prominently as smaller individuals. Dorsal, anal, pectoral, and caudal fins pigmented to distal margins.

Size: Maximum to 150 mm standard length; commonly to 120 mm total length.

Habitat, biology, and fisheries: Lives partially buried in mud or sand to 200 m; capable of inflicting painful wounds with its venomous dorsal and opercular spines. Feeds on small gastropod molluscs. Separate statistics are not reported for this species. Caught with seines and in shrimp trawls. Consumed fresh in some localities, but generally considered undesirable. Usually not fished for, but occurs in seine and trawl hauls and is a danger to fishermen since it can inflict painful wounds.

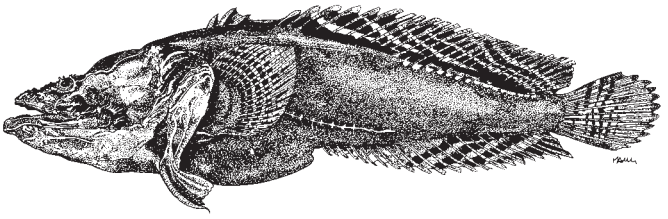


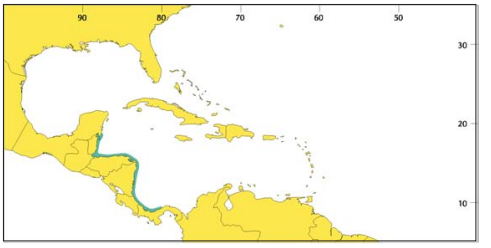
Distribution: Northern coast of South America off Colombia and Venezuela, including the islands of Aruba, Curacao, Margarita, Cubagua, Trinidad and Tobago, but not extending into the West Indies proper.

Batrachoides gilberti Meek and Hildebrand, 1928

En - Gilbert's toadfish (AFS: Large-eye toadfish).

Maximum size 230 mm standard length. Occurs in shallow coastal waters and also enters fresh waters in Belize. Feeds on xanthid and portunid crabs, shrimps, gastropods, and small fishes. Caribbean side of the Yucatán Peninsula to the Panama Canal Zone.

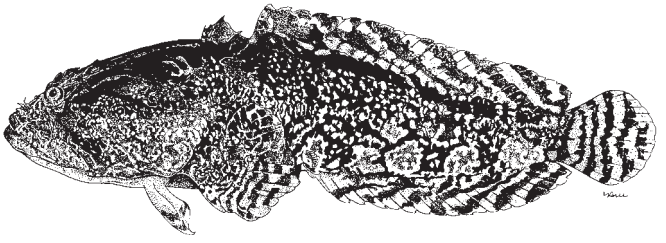


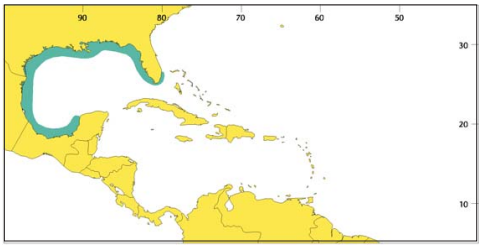


Opsanus beta (Goode and Bean, 1880) BOU

En - Gulf toadfish.

Maximum size to 324 mm standard length. Occurs in shallow seagrass beds and rocky areas near shore. Nests in a variety of cavities such as old conch shells, sponges, clam shells, and tin cans. Gulf of Mexico from Belize and the Campeche Banks through the Florida Keys north at least to Palm Beach.

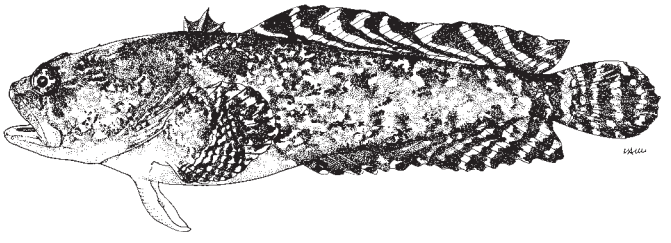


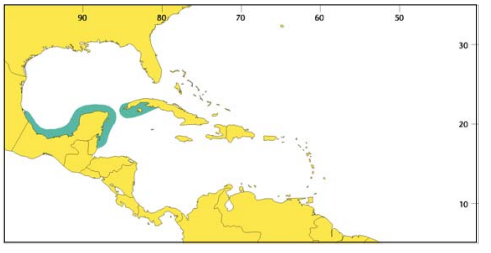


Opsanus dichrostomus Collette, 2001

En - Bicolor toadfish.

Maximum size to 126 mm standard length. Known from shallow waters of Campeche, the Yucatán Peninsula, and the Gulf of Batabanó, off the southwestern coast of Cuba.

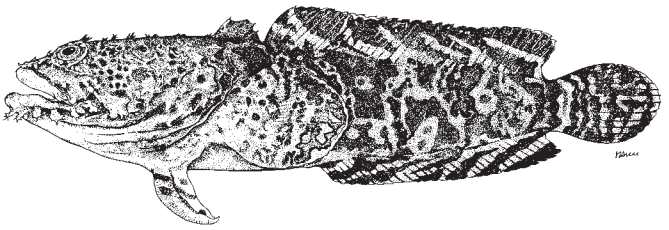


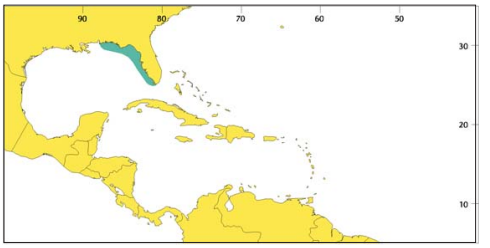


Opsanus pardus (Goode and Bean, 1880)

En - Leopard toadfish

Maximum size to 324 mm standard length. Known from moderate depths on the fishing grounds and shrimp banks in the Gulf of Mexico.

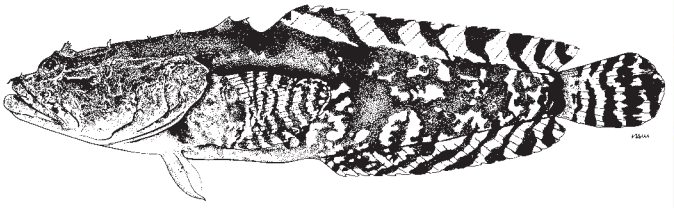


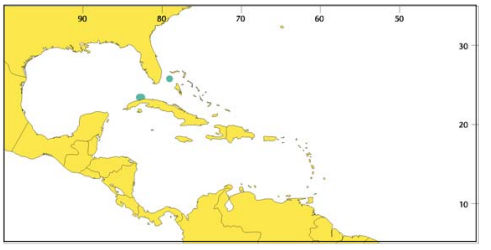


Opsanus phobetron Walters and Robins, 1961

En - Scarecrow toadfish.

Maximum size to 129 mm standard length. Most specimens have been taken in old conch shells in shallow water. Bahamas and Cuba.



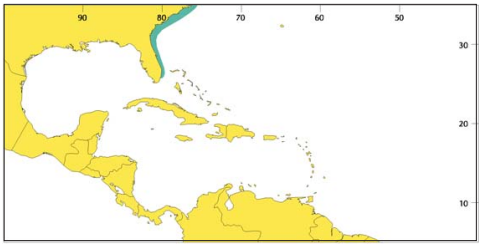


Opsanus tau (Linnaeus, 1766)

En - Oyster toadfish.

Maximum size to 381 mm standard length. The IGFA all-tackle gamefish record is 2.23 kg for a fish caught in North Carolina in 1994. Gulf of Maine south to Florida.



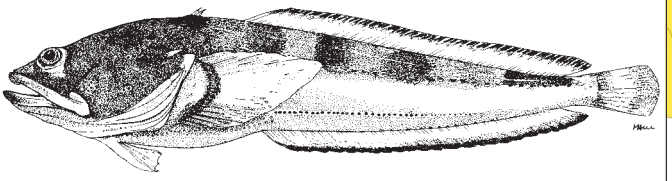


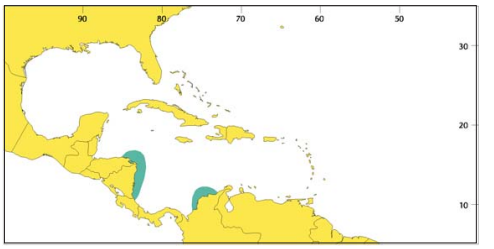
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Porichthys bathoiketes Gilbert, 1968

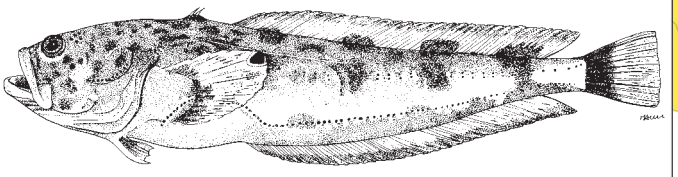
Maximum size to 103 mm standard length. Known from the southern and western Caribbean Sea, from Honduras to Colombia at depths of 183 to 320 m.

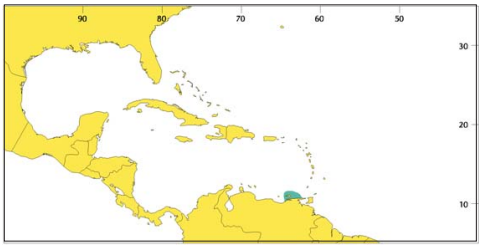




Porichthys oculofrenum Gilbert, 1968

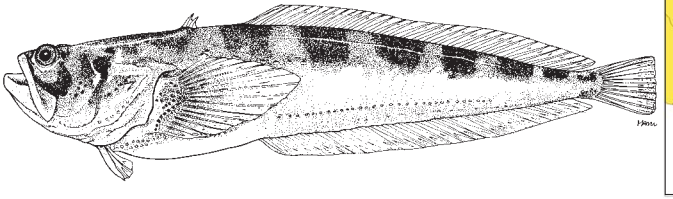
Maximum size to 93 mm standard length. Known only from the 2 type specimens from off the coasts of Venezuela and Brazil at depths of 57 to 62 m.

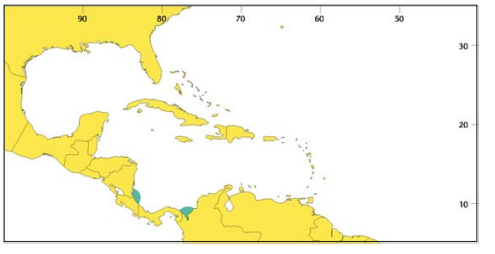




Porichthys pauciradiatus Caldwell and Caldwell, 1963

Maximum size to 66 mm standard length. Known from only a few specimens collected along the coasts of Costa Rica, Panama, and Brazil from the shoreline to 55 m.

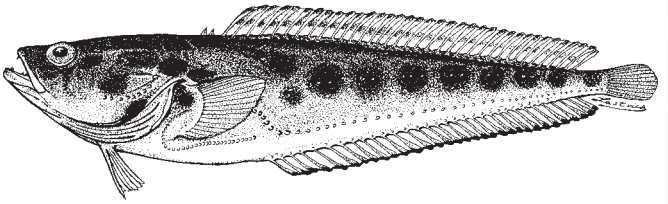


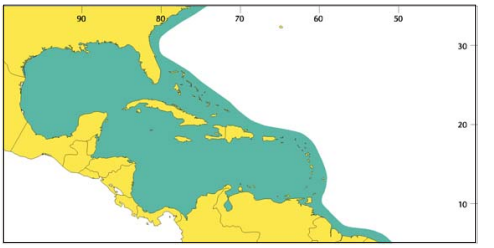


Porichthys plectrodon Jordan and Gilbert, 1882

En - Atlantic midshipman.

Maximum size to 218 mm standard length. Cape Henry, Virginia south throughout the Gulf of Mexico and Caribbean Sea to northern Brazil. Replaced by *P. porosissimus* in southern Brazil and Argentina.



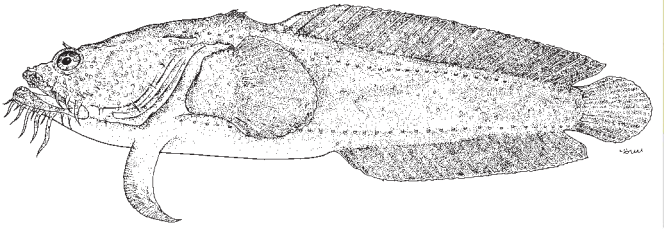


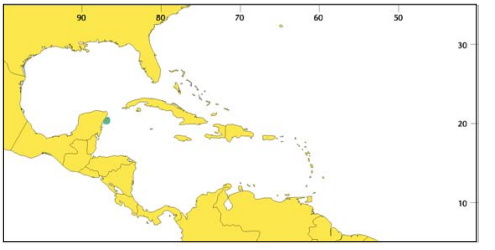
Sanopus astrifer (Robins and Starck, 1965)

BSU

En - Starry toadfish.

Maximum size to 245 mm standard length. Lives in caves or hollows beneath corals. Known only from the reefs at Turneffe Island and Glovers Reef, Belize.



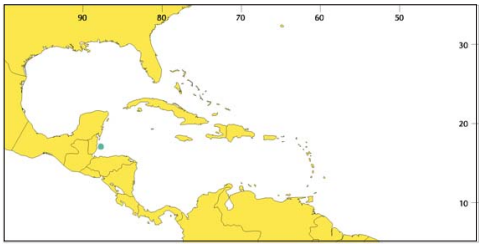


Sanopus greenfieldorum Collette, 1983

En - Whitelined toadfish.

Maximum size to over 280 mm standard length; very similar to *Sanopus astrifer* in lateral view. Lives in depressions in the sand under corals. Feeds on crabs, gastropods, and small fishes. Known only from the reef at Carrie Bow Cay, Belize.

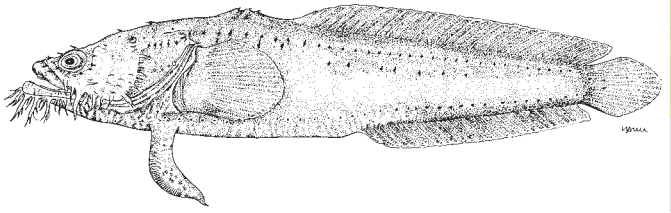


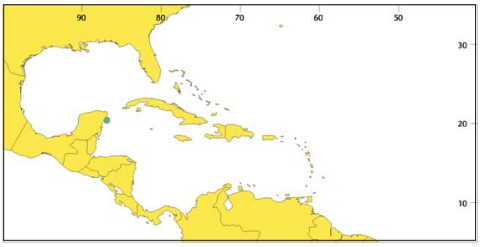


Sanopus johnsoni Collette and Starck, 1974

En - Johnson's coral toadfish (AFS: Cozumel toadfish).

Maximum size to 253 mm standard length. Lives in small caves under coral heads. Feeds on sea urchins. Known only from the holotype from Palancar Reef in Cozumel, Mexico.

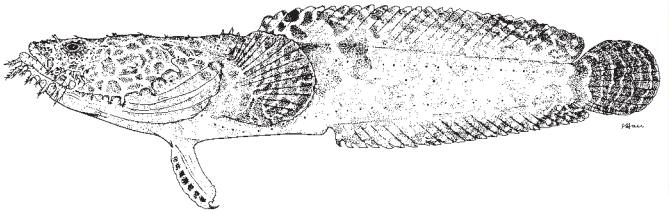


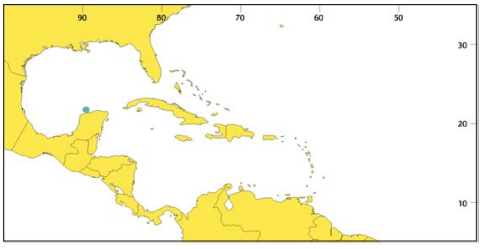


Sanopus reticulatus Collette, 1983

En - Reticulate toadfish.

Maximum size to 236 mm standard length. Feeds on crabs and snails. Known only from Progreso, Yucatán, Mexico.

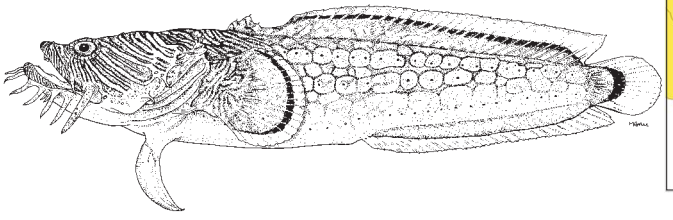


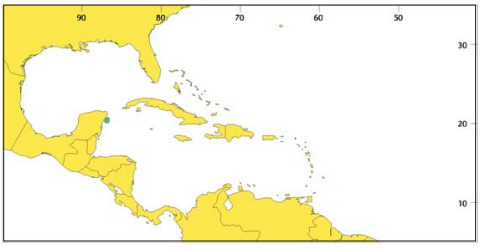


Sanopus splendidus Collette, Starck, and Phillips 1974

En - Splendid coral toadfish (AFS: Splendid toadfish).

Maximum size to 252 mm standard length. Lives in small caves under coral heads at depths of 10 to 25 m. Feeds on small fishes and gastropods. Known only from Cozumel Island, Mexico.

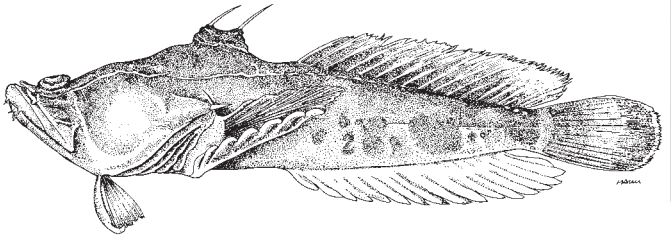


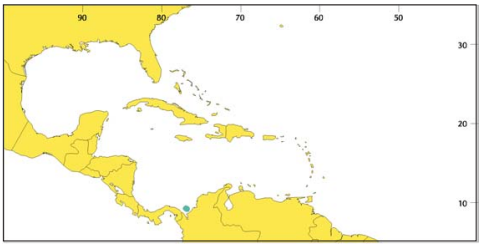


Thalassophryne megalops Bean and Weed, 1910

En - Bigeye venomous toadfish.

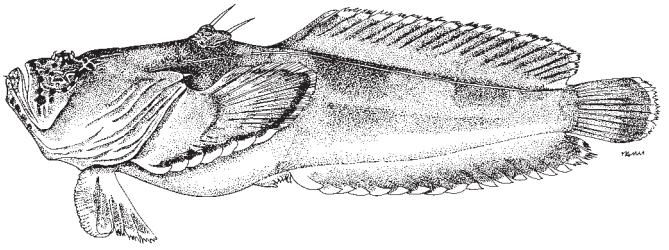
Maximum size to 63 mm standard length. Known only from the Gulf of Darien off Panama and Colombia at depths of 76 to 183 m.

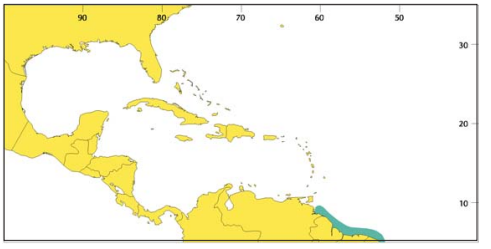




Thalassophryne nattereri Steindachner, 1876

Maximum size to 149 mm standard length. Found in coastal waters to 73 m. Tobago and the coast of South America from Guyana to San Salvador, Brazil.

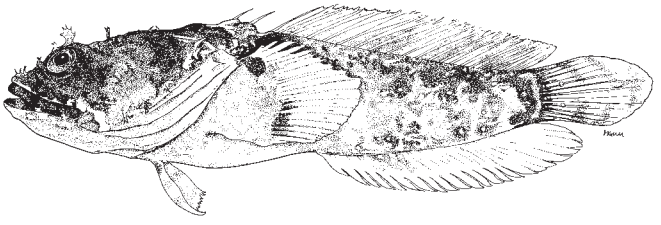


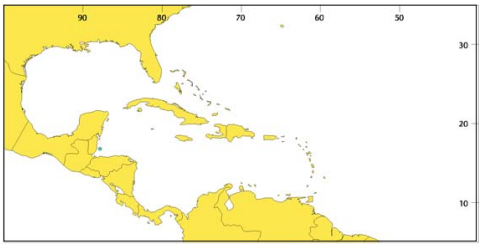


Triathalassothia gloverensis Greenfield and Greenfield, 1973

En - Glovers Reef toadfish.

Maximum size to 56 mm standard length, probably the smallest species of toadfish. Known from Glovers Reef and Carrie Bow Cay, Belize and Bay Islands, Honduras.





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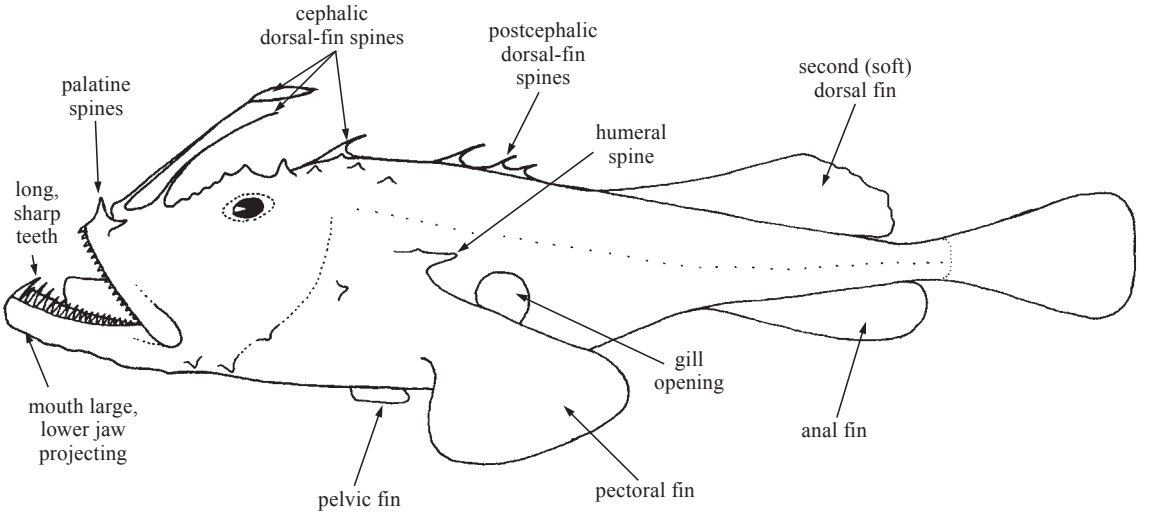
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Order LOPHIIFORMES
LOPHIIDAE

Anglerfishes (goosefishes, monkfishes)

by J.H. Caruso, University of New Orleans, Louisianna, USA

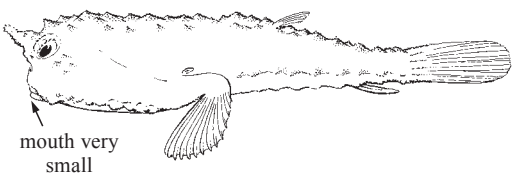
Diagnostic characters: Head and anterior part of body much depressed and very broad, posterior portion of body tapering; maximum size to about 200 cm, about 120 cm in the area, commonly 25 to 45 cm. **Head rounded, bearing numerous sharp spines and ridges on dorsal and lateral surfaces**, the most conspicuous of which are the following: 1 very large prominent spine or group of spines immediately anterior to each pectoral-fin base (humeral spines); 1 pair of sharp prominent spines on either side of snout, immediately behind mouth (palatine spines); a bony ridge above eyes with 2 or 3 short spines (frontal spines); and 2 bony ridges on snout running forward from eyes (frontal ridges); interorbital space slightly concave. **Mouth very large and wide, upper jaw protractile and the lower projecting, both bearing numerous long, sharp, depressible teeth**; gill openings fairly large, low in pectoral-fin axil, sometimes extending forward in front of pectoral-fin base. **Two separate dorsal fins, the first composed of 2 or 3 isolated slender spines on head (cephalic spines) and of 1 to 3 spines (often connected by a membrane, at least in juveniles), at the level of pectoral fins (postcephalic spines); first 2 cephalic spines located at anterior end of snout, the foremost modified into an angling apparatus, usually bearing a fleshy appendage (esca) at tip**; the third cephalic spine, when present, is located at level of humeral spines; anal fin with 6 to 11 soft rays, below second dorsal fin; caudal fin with 8 rays, the 2 outer rays unbranched; pectoral-fin rays unbranched, terminating in small fleshy filaments; pelvic fins on ventral surface of head, anterior to pectoral fins. Lateral line present, but usually indistinct. **Skin smooth, naked, often with fleshy flaps on head and/or body** (well visible only when fish is immersed in liquid). **Colour:** dorsal surface usually uniform light to dark brown or grey (changing with substrate), lighter on ventral surface; distinctive markings present in some species.



Habitat, biology, and fisheries: Most monkfishes inhabit soft bottoms of the continental slope, usually at depths beyond 200 m, with some species inhabiting depths in excess of 1 000 m. North of Area 31, *Lophius americanus* also inhabits very shallow depths, occasionally entering high-salinity bays and estuaries during the winter months. Two species, *Lophius americanus* and *Lophius gastrophysus*, are at present exploited off the Atlantic coast of the USA, although the largest part of the catch is taken to the north of Area 31. They are highly esteemed as food fishes.

Similar families occurring in the area

Ogcocephalidae: fishing lure small, placed in a depression between snout tip and mouth; head broader and more strongly depressed, devoid of long, slender dorsal-fin spines; mouth very small, without long sharp teeth.

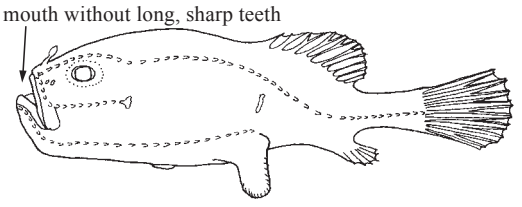


Ogcocephalidae

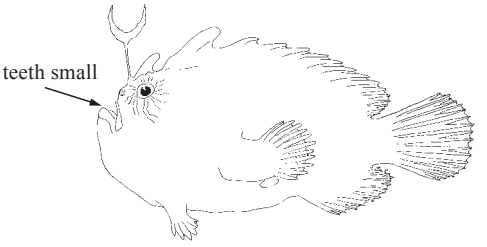
Chaunacidae: body rounded, not flattened; head cuboid, devoid of long, slender dorsal-fin spines; mouth large, but without long, sharp teeth; skin very loose and flaccid, bearing small spiny scales; lateral-line canals conspicuous, especially on head; colour deep pink or reddish.

Antennariidae: body short, globose, slightly compressed; teeth small, villiform.

Bathypelagic anglerfish families: no pelvic fins; second and third dorsal-fin spines greatly reduced or absent; also, body shape different.



Chaunacidae



Antennariidae

Key to the species of Lophiidae occurring in the area

1a. Third (cephalic) dorsal-fin spine present . . . . . → *2*

1b. Third (cephalic) dorsal-fin spine absent . . . . . *Sladenia shaefersi*

2a. Gill opening not extending in front of pectoral fin; bony ridge on snout rugose; soft dorsal-fin rays 9 to 12; anal-fin rays 8 to 11; pectoral-fin rays 22 to 28; vertebrae 27 (Fig. 1) . . . *(Lophius)* → *3*

2b. Gill opening extending in front of pectoral fin; bony ridge on snout smooth; soft dorsal-fin rays 8; anal-fin rays 6; pectoral-fin rays 14 to 21; vertebrae 19 (Fig. 2) . . . . . *(Lophiodes)* → *4*

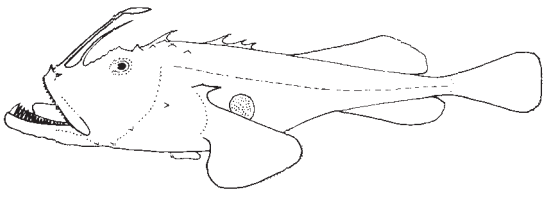


Fig. 1 ***Lophius***

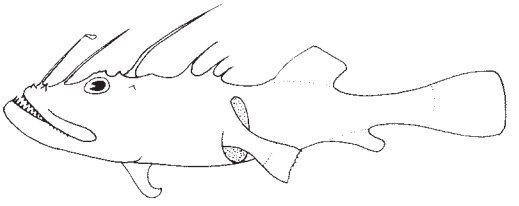


Fig. 2 ***Lophiodes***

3a. Underturned posterior margin of pectoral fin black, distal portion of ventral surface of pectoral fin turning gradually darker; 9 or 10 dorsal-fin rays; 22 to 26 pectoral-fin rays . . . . . *Lophius gastrophysus*

3b. Underturned posterior margin of pectoral fin not black, distal portion of ventral surface of pectoral fin changing abruptly from pale colour to dark brown or grey; 11 or 12 dorsal-fin rays; 25 to 28 pectoral-fin rays . . . . . *Lophius americanus*

4a. Spinous portion of dorsal fin with 6 spines, 3 cephalic, 3 post-cephalic (last postcephalic spine may be very small and very close to previous spine); dorsal surface of head, body, and pectoral fins covered with fine mesh- or chain-like pattern . . . . . ***Lophiodes reticulatus***

4b. Spinous portion of dorsal fin with 5 spines, 3 cephalic, 2 postcephalic; chain-like colour pattern absent . . . . . → ***5***

5a. First dorsal-fin spine (illicium) darker than surrounding skin on head; bait (esca) a pale, unpigmented bulb . . . . . ***Lophiodes beroe***

5b. First dorsal-fin spine (illicium) pale, not darker than surrounding skin on head; bait (esca) with pigment becoming progressively darker toward tip . . . . . ***Lophiodes monodi***

List of species occurring in the area

The symbol is given when species accounts are included.

Lophiodes beroe Caruso, 1981.
Lophiodes monodi Le Danois, 1971.
Lophiodes reticulatus Caruso and Suttkus, 1979.

Lophius americanus Valenciennes in Cuvier and Valenciennes, 1837.
Lophius gastrophysus Miranda-Ribeiro, 1915.

Sladenia shaefersi Caruso and Bullis, 1976.

References

Caruso, J.H. 1981. The systematics and distribution of the lophiid anglerfishes. I: A revision of the genus *Lophiodes* with the description of two new species. *Copeia*, 1981(3):522-549.

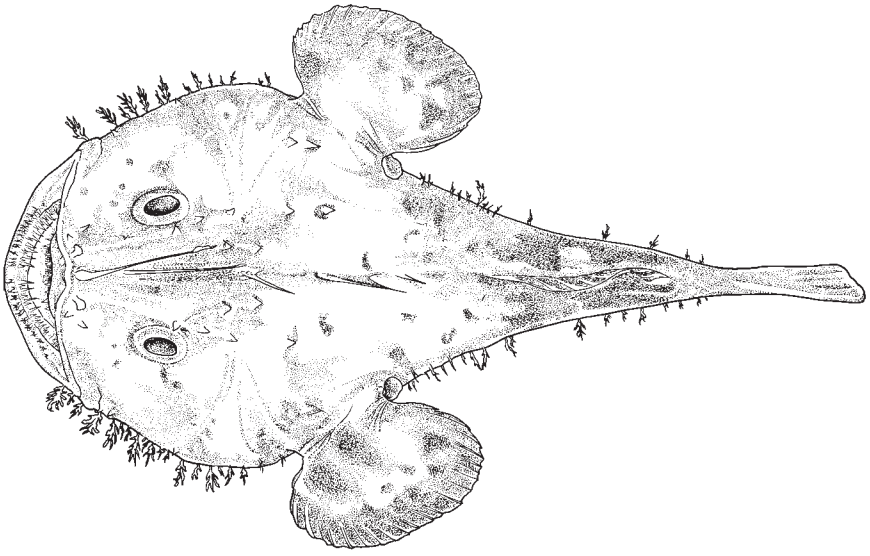
Caruso, J.H. 1983. The systematics and distribution of the lophiid anglerfishes. II: Revisions of the genera *Lophiomus* and *Lophius*. *Copeia*, 1983(1):11-30.

Caruso, J.H. 1985. The systematics and distribution of the lophiid anglerfishes. III: Intergeneric relationships. *Copeia*, 1985(4):870-875.

Lophius americanus Valenciennes, 1837 ANG

Frequent synonymn / misidentifications: None / None.

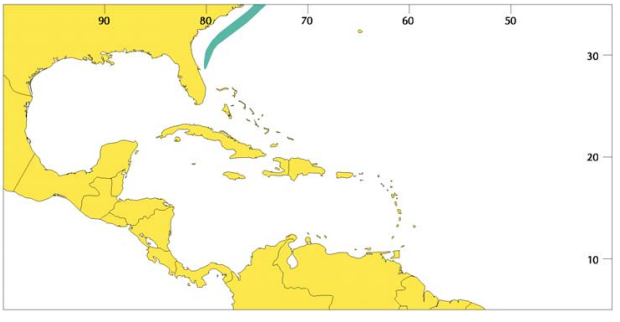
FAO Names: En - American angler (AFS: Goosefish); **Fr** - Baudroie d'Amérique; **Sp** - Rape americano.



Diagnostic characters: Head and anterior part of body much depressed and very broad, posterior portion of body tapering. Head appearing rounded from above, bearing numerous sharp spines on dorsal and lateral surfaces; humeral spines (in front of pectoral-fin bases) long, straight, well developed, with 2 smaller spines arising from sides; inner and outer sphenotic spines (behind eyes) well developed; **frontal ridges (running forward from eyes) rough; gill openings below and behind pectoral-fin bases**. First dorsal fin consisting of 3 isolated spines on head (cephalic spines), the foremost modified into an angling apparatus, and a group of short, slender spines behind head **(postcephalic spines) connected by a black membrane; length of last (third) cephalic spine and of first (anteriormost) post-cephalic spine less than least distance between frontal ridges; second (soft) dorsal fin with 11 or 12 rays; pectoral fins with 25 to 28 rays; anal fin with 9 or 10 rays. Colour:** dorsal surface uniform dark brown, ventral surface light tan; ventral surface of pectoral fins becoming abruptly darker distally.

Size: Maximum to 120 cm, commonly to 90 cm.

Habitat, biology, and fisheries: Bottom-dwelling on both hard and soft substrates (hard sand, gravel, pebble, or shell bottoms to soft mud) from inshore waters (including high-salinity bays and estuaries when temperature is suitable) to continental slope at depths to at least 840 m; temperature range 0 to 24 C (in Area 31, greatest winter concentrations at depths of 180 to 225 m (3 to 6 C), greatest summer concentrations at 25 to 220 m, with the greatest abundance at 25 to 92 m (5 to 9 C). Feeds mainly upon fishes, but known to take a variety of marine birds; attracts fishes by rapidly moving angling apparatus (illicium and esca); capable of swallowing very large prey; spawning from spring to early autumn; eggs contained within long (up to 12 m long by 1.5 m wide), ribbon-like, gelatinous mass called egg veil; a single female may produce over 1.3 million eggs. A goodfood fish, marketed fresh or frozen; present fishing grounds along the Atlantic coast of the USA, with main fishing grounds to the north of Area 31; caught mainly with trawls; separate statistics are not reported for this species from Area 31.

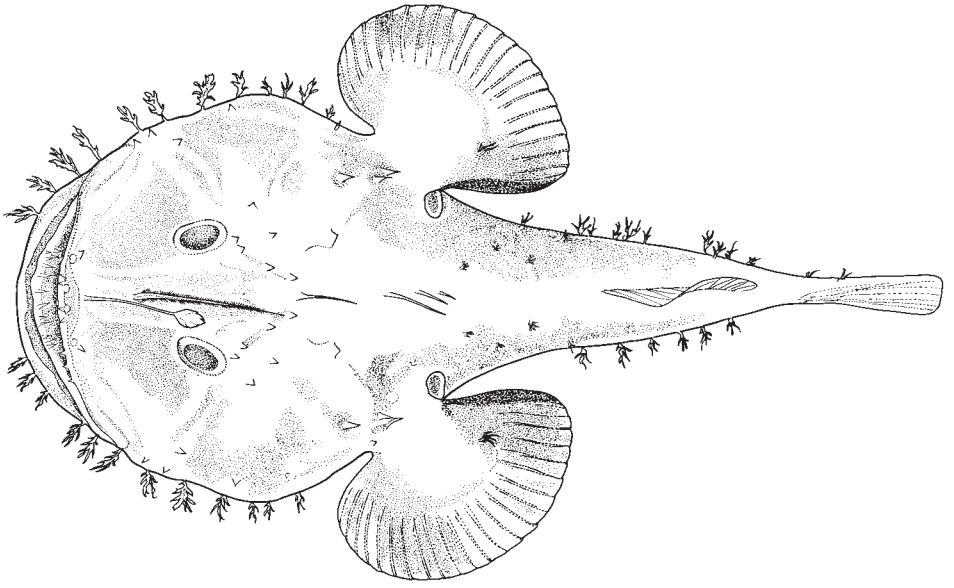


Distribution: Coast of eastern North America from the southern and eastern parts of the Grand Banks off Newfoundland, and the northern side of the Gulf of St. Lawrence southward to the coast of Florida (approximately 29 N).

Lophius gastrophysus Miranda-Ribeiro, 1915

Frequent synonyms / misidentifications: None / None.

FAO Names: En - Blackfin goosefish; **Fr** - Baudroie pêcheuse; **Sp** - Rape pescador.

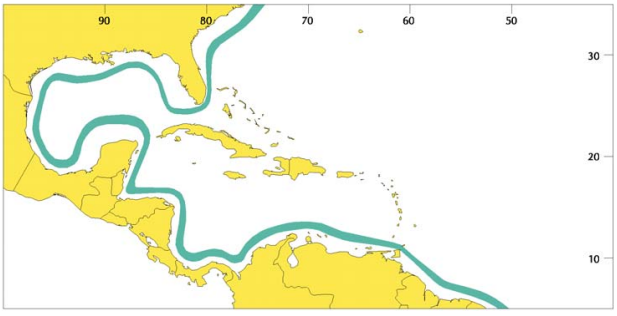


Diagnostic characters: Head and anterior part of body much depressed and very broad, posterior portion of body tapering. Head appearing rounded from above, bearing numerous sharp spines on dorsal and lateral surfaces; humeral spines (in front of pectoral-fin bases) long, straight, well developed, with 2 smaller spines arising from sides; inner and outer sphenotic spines (behind eyes) well developed; frontal ridges (running forward from eyes) rough; gill openings below and behind pectoral-fin bases. First dorsal fin consisting of 3 isolated spines on head (cephalic spines), the foremost modified into an angling apparatus, and a group of short, slender spines behind head **(postcephalic spines) with dark brown or black bases but lacking connecting membranes; length of last (third) cephalic spine greater than least distance between frontal ridges, approximately equal to distance between frontal spines; length of first (anteriormost) postcephalic spine approximately equal to or greater than least distance between frontal ridges; second (soft) dorsal fin with 9 or 10 rays; anal fin with 8 or 9 rays; pectoral fins with 22 to 26 rays. Colour:** dorsal surface uniform dark brown or grey, with occasional pattern of fine reticulations; ventral surface dusky, slightly lighter than dorsal surface and without reticulations; **pectoral fins with ventral surface becoming gradually darker distally, and underturned posterior margin with a distinct black band** (which may be difficult to distinguish on darker specimens).

Size: Maximum: 60 cm; commonly to 45 cm.

Habitat, biology, and fisheries: Bottom-dwelling at depths between 200 and 700 m. Feeds mainly on fishes. A good foodfish, marketed fresh or frozen, but the fishery potential of this species is not yet known; present fishing grounds along the Atlantic coast of the USA; caught with bottom trawls; separate statistics are not reported for this species from Area 31.

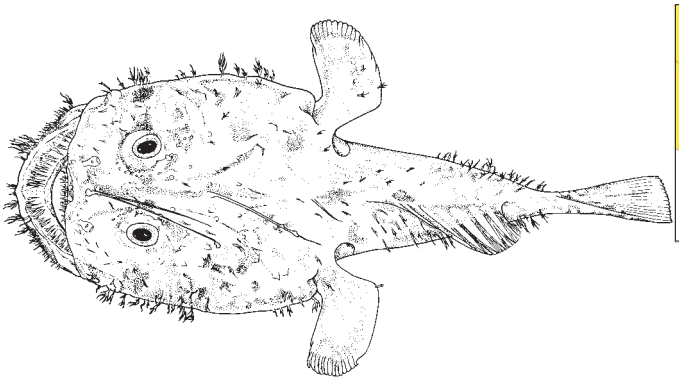
Distribution: Off continental coasts throughout the area, northward extending to Cape Hatteras and southward to northern coast of Argentina.

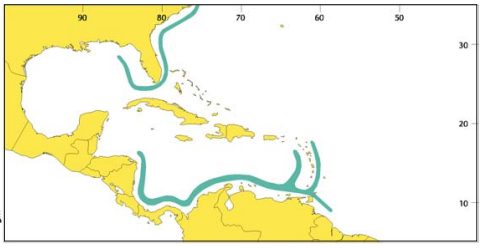


Lophiodes beroe Caruso, 1981

En - White anglerfish.

Maximum size 30 cm, commonly 15 cm. Northeastern Gulf of Mexico (ca. 27.5 N) to northern coast of South America (about 7.75 N). Depth range: 345 to 860 m; temperature range: 9 to 11 C. A continental slope species caught occasionally when trawling at appropriate depths.

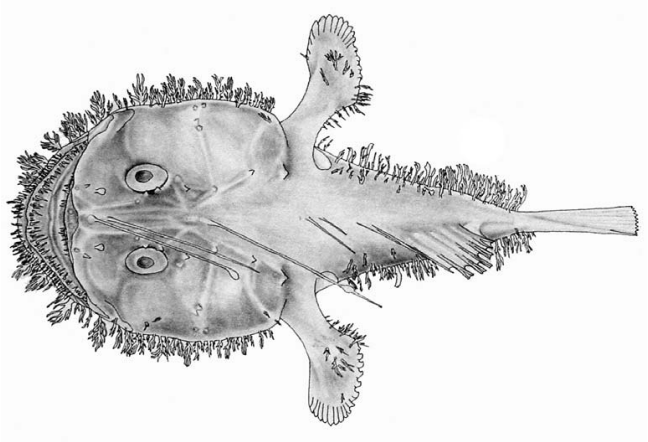


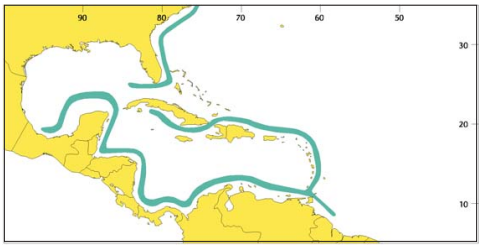


Lophiodes monodi Le Danois, 1971

En - Club bait anglerfish.

Maximum size 30 cm, commonly 14 cm; Gulf of Mexico and Atlantic Ocean off southern Florida (ca. 25 N) to northern coast of South America (about 7 N). Depth range: 365 to 550 m. A continental slope species caught occasionally when trawling at appropriate depths.

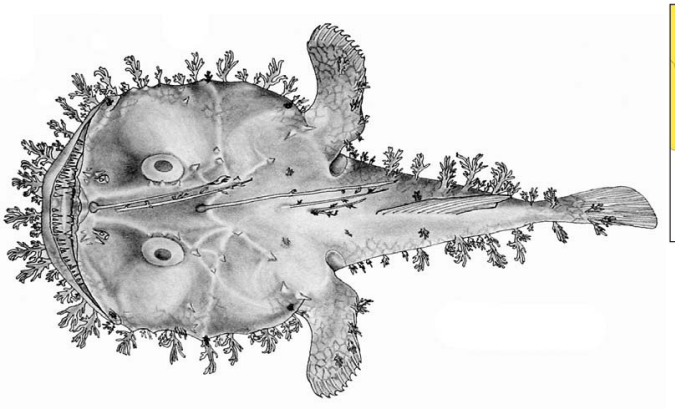


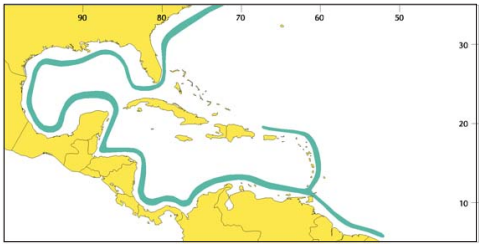


Lophiodes reticulatus Caruso and Suttkus, 1979

En - Reticulated goosefish; **Fr** - Baudroie reticulée; **Sp** - Rape chato.

Maximum size 30 cm, commonly 15 cm, Atlantic coast off North Carolina (about 33.5 N) and northern Gulf of Mexico (about 30 N) to northern coast of South America (ca. 7.25 N), Depth range: 65 to 370 m; temperature range: 12 to 19 C; A continental slope species occasionally taken on outer continental shelf. Caught occasionally when trawling at appropriate depths.

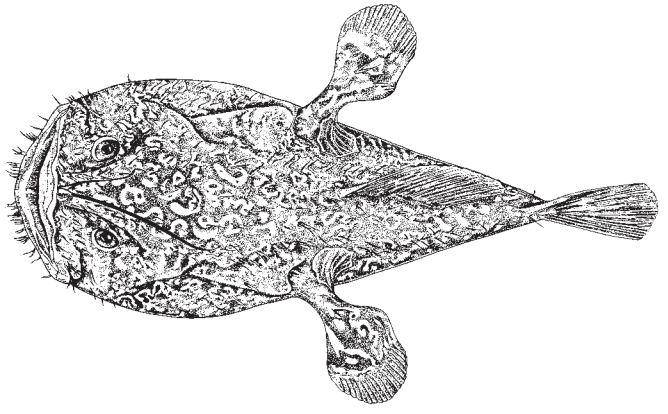


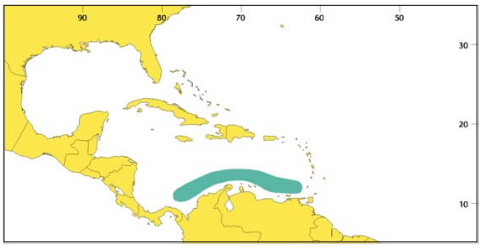


Sladenia shaefersi Caruso and Bullis, 1976

En - Shaefer's anglerfish.

Known from only 2 specimens: holotype (397 mm standard length) collected off Point Baru, Colombia at 1 200 m, and paratype (146 mm standard length) collected northwest of Aruba at 850 m.



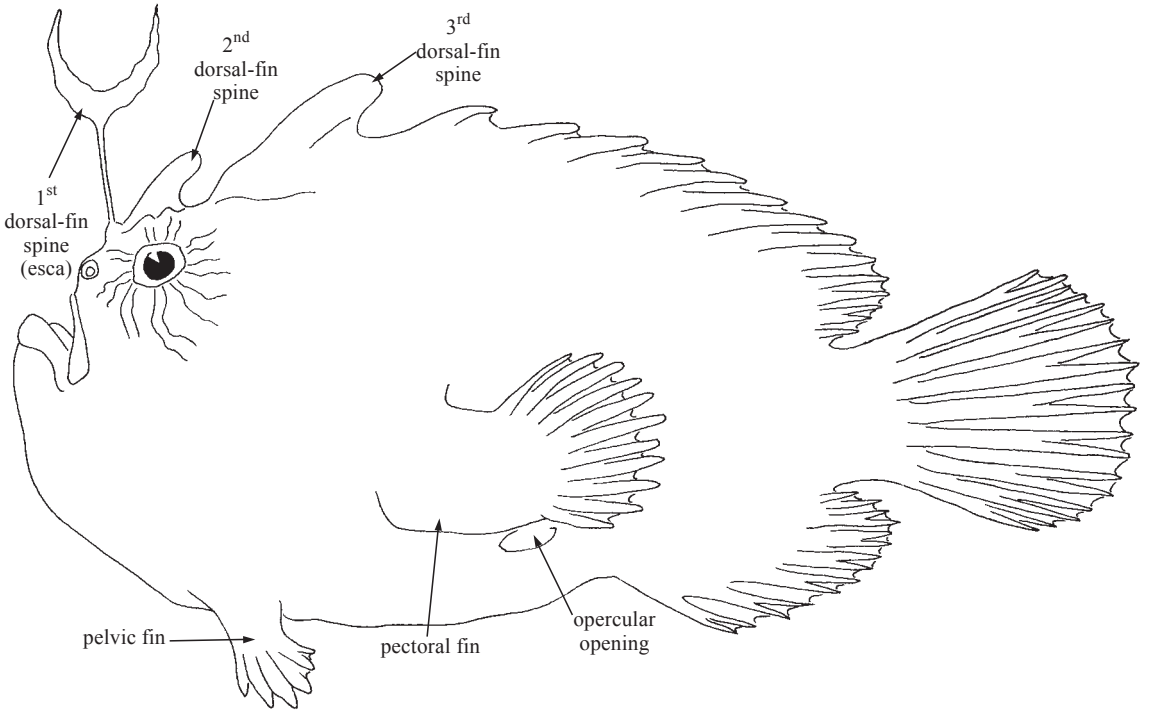


ANTENNARIIDAE

Frogfishes (sea mice, anglerfishes)

by T.W. Pietsch, University of Washington, USA

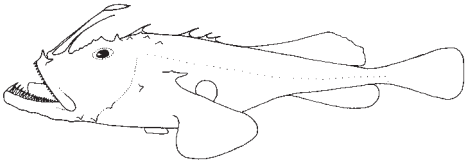
Diagnostic characters: Some reaching a total length of over 50 cm, but most species do not exceed 20 cm. **Body short, deep, globose, slightly compressed**. Mouth large, oblique to vertical, with numerous small, villiform teeth. Eyes small, lateral. **Opercular (gill) opening restricted to a small pore** located behind and below pectoral-fin base. Spinous dorsal fin of 3 spines, widely separated from soft part of fin. **First dorsal-fin spine (illicium) free from rest of fin, nearly always bearing a well-developed terminal bait (esca)**; second and third dorsal-fin spines also free from rest of fin, well developed, and covered by thick skin. **Pectoral-fin lobe elongate, leg-like**; fin single, not divided into upper and lower portions. Skin spinulose or naked, often with membranous filaments or flaps. **Colour:** usually in 2 phases: a more common light phase with light tan to yellow, brown, or rust background usually overlaid with black, brown, pink, or bright yellow streaks, bars, and/or spots on head, body, and fins; a dark phase with dark brown to black background with streaks, bars, or spots showing through as deeper black, tips of rays of paired fins often white.



Habitat, biology, and fisheries: Frogfishes spend the greater part of their lives squatting on the bottom in shallow water or, as in the case of *Histrio*, clinging to floating sargassum weed. Frogfishes are found worldwide in tropical and subtropical waters. Despite their sedentary nature, nearly all are voracious carnivores that sit quietly waiting for smaller fishes to pass by, at which time they enticingly wriggle their bait to attract the potential prey to their cavernous mouths. Their ovaries are tightly rolled like a double scroll, and eggs are released embedded in a single, large, buoyant gelatinous mass. Besides their value in the aquarium trade, they are of no significant economic interest in Area 31.

Similar families occurring in the area

Lophiidae: body greatly depressed (flattened dorsoventrally), not globose.

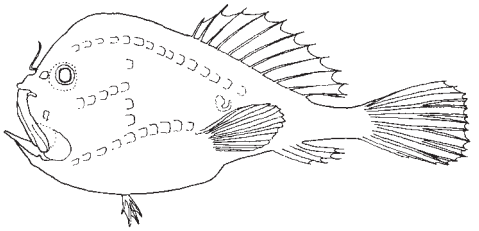


Lophiidae

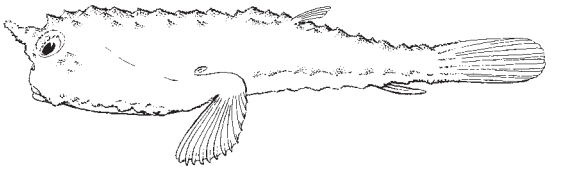
Chaunacidae: second and third dorsal-fin spines reduced and embedded beneath skin; pelvic fins of 1 spine and 4 soft rays; body globose, slightly compressed.

Ogcocephalidae: remnant of second dorsal-fin spine embedded beneath skin, third dorsal-fin spine absent; body greatly depressed, not globose.

Meso- and bathypelagic anglerfish families: pelvic fins absent; second and third dorsal-fin spines greatly reduced or absent.



Chaunacidae



Ogcocephalidae

Key to the genera of Antennariidae occurring in the area

1a. Skin of body rough, everywhere covered with extremely close-set spinules; pectoral-fin lobe broadly connected to body (Fig. 1); pelvic fins short, considerably less than 25% standard length; benthic in coral or rocky reefs, or on muddy or sandy bottoms . . . . . ***Antennarius***

1b. Skin of body smooth, appearing naked (dermal spinules, if present, difficult to detect without microscopic aid); pectoral-fin lobe free from body (Fig. 2); pelvic fins long, greater than 25% standard length; pelagic in floating sargassum weed . . . . . ***Histrio***



Fig. 1 pectoral-fin lobe (*Antennarius*)

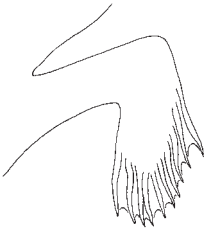


Fig. 2 pectoral-fin lobe (*Histrio*)

List of species occurring in the area

Antennarius bermudensis Schultz, 1957. To 6.1 cm SL. Tropical NW Atlantic.

Antennarius multiocellatus (Valenciennes, 1837). To 11.3 cm SL. Tropical and subtropical NW Atlantic.

Antennarius ocellatus (Bloch and Schneider, 1801). To 32 cm SL. Tropical NW Atlantic.

Antennarius pauciradiatus Schultz, 1957. To 4 cm SL. Tropical NW Atlantic.

Antennarius radiosus Garman, 1896. To 18 cm SL. N Atlantic.

Antennarius striatus (Shaw, 1794) [= *Antennarius scaber* (Cuvier, 1817)]. To 15.5 cm SL. Atlantic, Indian, and W Pacific.

Histrio histrio (Linnaeus, 1758). To 14.1 cm SL. Atlantic, Indian, and W Pacific.

References

Pietsch, T.W. 1984. The genera of frogfishes (family Antennariidae). *Copeia*, 1984(1):27-44.

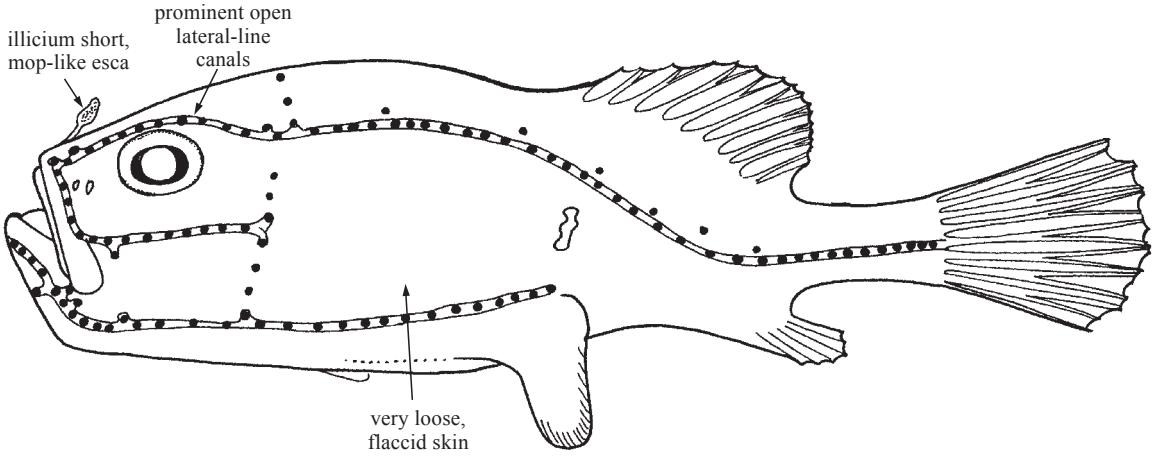
Pietsch, T.W. and D.B. Grobecker. 1987. *Frogfishes of the world: systematics, zoogeography, and behavioral ecology.* Stanford University Press, Stanford, California, 420 p.

CHAUNACIDAE

Sea toads (gapers, coffinfishes)

by J.H. Caruso, University of New Orleans, Louisiana, USA

Diagnostic characters: Maximum size 30 cm, common to 15 cm; body rounded and very slightly compressed with very loose, flaccid skin; body tapers to small rounded tail. **Head very large** and globose, roughly cuboid and **bearing especially prominent open lateral-line canals**; eyes dorsolateral and covered with a clear 'window' of skin; mouth large, oblique to nearly vertical, with relatively small, sharp, slender teeth. **Spinous dorsal fin represented by single short spine modified as angling apparatus (illicium) and located just behind snout in front of an ovoid, scaleless patch, or depression** into which it can be retracted, **bait (esca) consists of dense cluster of numerous, short, thread-like cirri giving angling apparatus the appearance of a short mop**; 2 additional cephalic dorsal-fin spines present as embedded vestiges, and postcephalic dorsal-fin spines absent; soft dorsal fin with 10 to 12 rays, anal fin with 5 to 7 soft rays, pectoral fins narrow and paddle-like, with 10 to 15 soft rays. Skin densely covered with small to minute spine-like scales that are somewhat similar both in shape and feel to the placoid scales of some sharks. Single open lateral-line canal on body joins conspicuous canals on head and extends posteriorly to proximal portion of caudal fin; lateral line proper with 17 to 42 neuromasts. **Colour:** generally pink, reddish, orange, or rose-coloured; some species with pale diffuse spots of yellow or olive green.

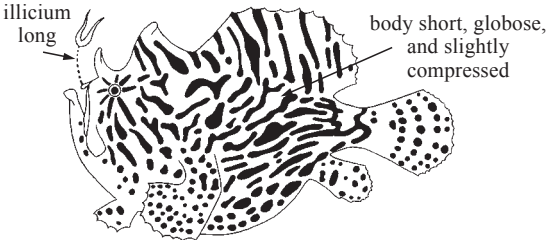


Habitat, biology, and fisheries: Bottom dwellers on hard to soft substrates of the continental slope at depths of 90 to 2 600 m.

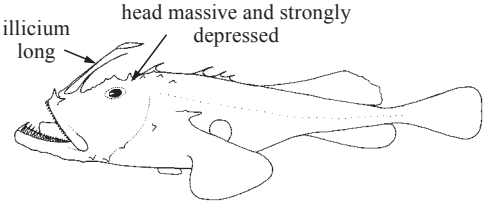
Similar families occurring in the area

Antennariidae: illicium long, not short and mop-like; body short, globose, slightly compressed; teeth small, villiform.

Lophiidae: head massive and strongly depressed, appearing rounded from above; body depressed and tapering; mouth large, bearing long, slender, depressible teeth; fishing apparatus long and slender, other slender dorsal spines located on and behind head; skin scaleless and bearing fleshy tendrils.



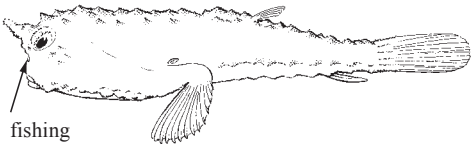
Antennariidae



Lophiidae

Ogcocephalidae: fishing apparatus small, placed in a depression between snout tip and mouth; head broader and more strongly depressed, devoid of long, slender dorsal-fin spines; mouth very small, without long and sharp teeth; head and body covered with tight skin rather than loose, flabby skin, usually with large plate-like or blunt spine-like scales.

Bathypelagic anglerfish families: no pelvic fins; second and third dorsal fin spines greatly reduced or absent; colour dark, usually black or brown, not shades of red or orange.



Ogcocephalidae

Key to the species of Chaunacidae occurring in the area

1a. Skin coarsely spinose, dermal denticles widely spaced; anal-fin soft rays 5 or 6, usually 6; lateral line (BI) with 17 to 21 neuromasts, other neuromast counts AB 9, BD 1, DG 2, GH 3 (Fig. 1) . . . . . ***Bathychaunax roseus***

1b. Skin finely spinose, dermal denticles closely spaced; anal-fin soft rays 6 or 7, usually 7; lateral line (BI) with 29 to 42 neuromasts, other neuromast counts AB 10 to 13, BD 2 to 4, DG 3 to 5, GH 10 to 13 (Fig. 2) . . . . . ***→ 2***

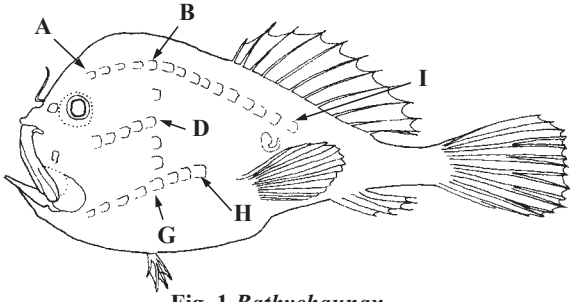


Fig. 1 ***Bathychaunax***

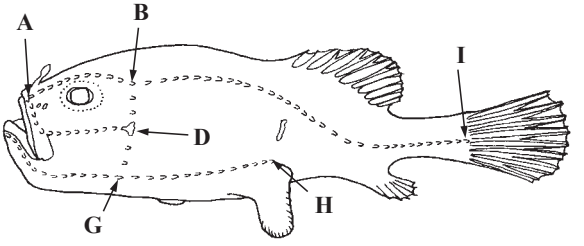


Fig. 2 ***Chaunax***

2a. Illicial cavity (scaleless area behind illicium) dark brown or black and strongly concave; front surface of esca black, rear surface translucent or white . . . . . ***Chaunax pictus***

2b. Illicial cavity (scaleless area behind illicium) pale, not differing from surrounding pigmentation, and flat or very slightly concave; esca pale or dusky with uniform pigmentation all around . . . . . ***Chaunax suttkusi***

List of species occurring in the area

Bathychaunax roseus (Barbour, 1941). To 22 cm. W Atlantic just S of the Sable Island Bank to the Caribbean Sea W of the Windward Passage; depth range: 900 to 2 200 m.

Chaunax pictus Lowe, 1846. To 35 cm, common 15 to 18 cm. South Carolina to Guatemala in W Atlantic, Madeira to Gambia in E Atlantic at depths ranging from 275 to 625 m.

Chaunax suttkusi Caruso, 1989. To 30 cm, common 15 to 18 cm. South Carolina to Rio Grande Plateau in W Atlantic, Ireland to Angola in E Atlantic; depth range: 220 to 1 060 m.

Reference

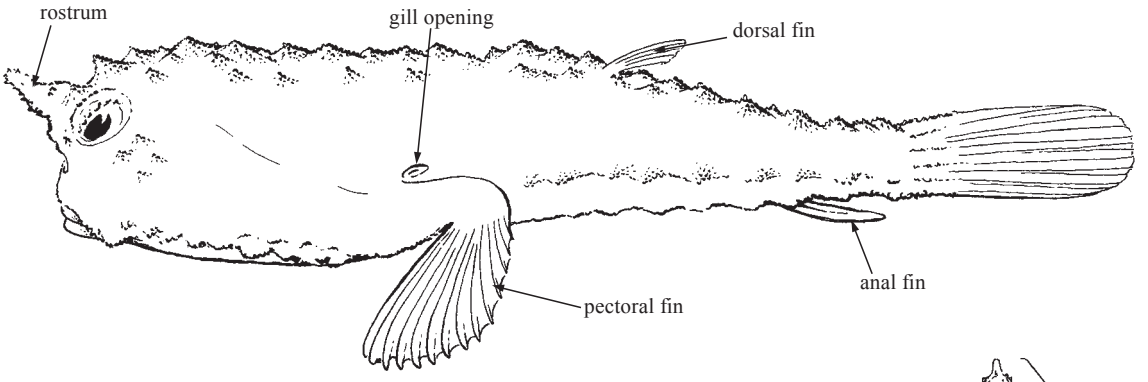
Caruso, J.H. 1989. Systematics and distribution of the Atlantic chaunacid anglerfishes (Pisces: Lophiiformes). *Copeia,* 1989(1):153-165.

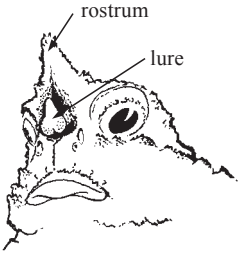
OGCOCEPHALIDAE

Batfishes

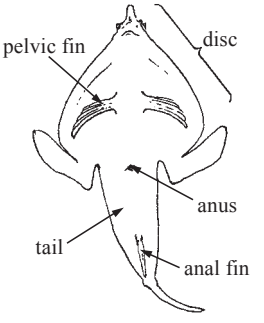
M.G. Bradbury, Moss Landing Marine Laboratories, CA, USA

Diagnostic characters: Small to medium-sized fishes (to 25 cm), **flattened like skates. Seen from above, large head triangular or circular in outline** (called the disc). **A fishing lure in cavity just above mouth**, the lure a smooth-skinned glandular structure that can be extended in front of the mouth a short distance. **Roof of cavity usually juts out in front of head, forming the rostrum**, which can be short and shelf-like to long and horn-like. Eyes of moderate size, about 7 to 15% of standard length, skin surrounding the iris often covered with prickle-like scales. Mouth small, lips usually thickened, teeth very tiny, arranged in rows on pads on jaws. **Gill openings small, round, located behind the pectoral fin attachments**. Dorsal fin small, only 4 to 7 short rays, located on tail halfway between disc and caudal fin. **Anal fin slender, lappet-like, only 3 or 4 rays. Pectoral fins attached to sides of disc, appearing leg-like**. Pelvic fins attached to ventral surface of disc in advance of pectoral fins. Lateral-line organs appear as smooth mounds about size of pinhead, nested in shallow pits with small protective flaps of skin, most visible on underside of disc along its edges, and on sides of tail. Scales highly modified to form an armour of prominent cones, sometimes with sharp spines, sometimes with rough granular surfaces. In many species, scales on underside of body are small prickles densely arranged, like shark shagreen. Short hair-like extensions of skin (cirri) often present, especially around edges of disc and sides of tail. **Colour:** species with rostrum horn-shaped and disc triangular in shape (*Ogcocephalus, Zalieutes*, and *Malthopsis*) pale to dark grey or brown on dorsal surface; underside of body cream to orange or red; pink to red colouring sometimes on lips and/or pectoral fins; often with spots or network pattern on face, shoulders, tail, pectoral fins. Species with rostrum small and disc more circular in shape (*Halieutichthys* and *Dibranchus*) coloured light tan to pinkish; in *Halieutichthys* the upper surface often overlain by a dark network pattern. Pectoral fins in *Halieutichthys* with intense black markings, background colour sometimes yellow. Sharp tips of conical scales in some species coloured lighter or darker than background colour, giving a spotted appearance.





underside of head



ventral view

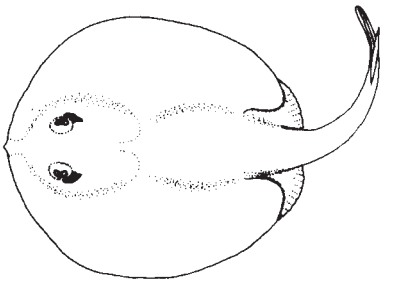
Habitat, biology, and fisheries: A few species of adult and adolescent batfishes found inshore on open bottoms among rocks or reefs to depths around 90 m, but most taken well offshore from mud or sand bottoms, usually in less than 200 m, a few species reaching 1 000 m or more. Diet includes small snails, small clams and scallops, a variety of worms and small crustaceans, and occasionally small fishes. As far as known, eggs, larvae, and postlarvae all pelagic, the postlarvae transparent, globular in shape, sometimes reaching 25 to 30 mm, metamorphosing upon settling to the bottom. Captive batfishes seldom move except wiggling their lures sporadically when food organisms are presented; lures appear to exude fluid, but it is not known which food organisms are attracted by such lures. Rarely eaten. No fishery.

Similar families occurring in the area

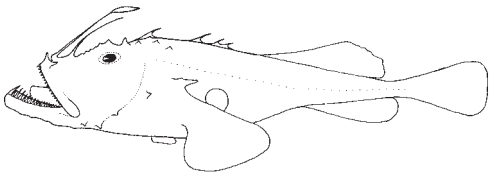
Urolophidae (and other batoid fishes): distinguished from batfishes by having 5 pairs of gill openings on ventral surface of disc and by having pelvic fins posterior to pectoral fins, not situated ventrally on centre of disc.

Lophiidae: tubercles or scales entirely absent; although lophiids have lures, these are attached to long spines on the front of the head, not nested in cavity over mouth.

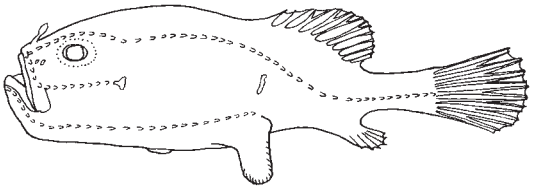
Chaunacidae: body not compressed, but rounded or cuboid; mouth large and oblique to nearly vertical; lure visible on snout, not nested in cavity over mouth.



Urolophidae



Lophiidae



Chaunacidae

Key to the genera of Ogcocephalidae occurring in the area

1a. Underside of body naked; pectoral-fin lobe attached to tail by skin (Fig. 1); lure in cavity above mouth very small, often obscured by puffy skin . . . . . ***Halieutichthys***

1b. Underside of body completely covered by small prickle-like and/or rough cone-shaped scales; pectoral-fin lobes separated from tail, forming distinct elbow (Fig. 2); lure prominent in cavity above mouth . . . . . → ***2***

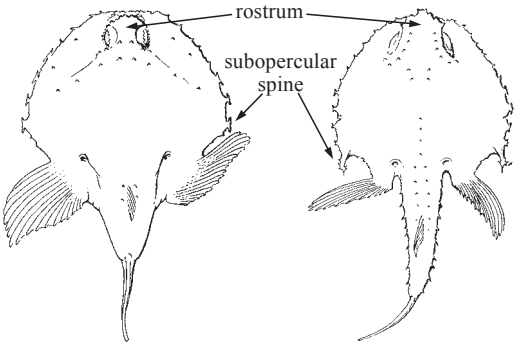


Fig. 1 ***Halieutichthys*** **Fig. 2** ***Dibranchus***

2a. A large, elongate subopercular spine ending in 4 to 8 sharp spinelets on each side (Fig. 2); rostrum like a shelf of sharp spines over the lure . . . . . ***Dibranchus***

2b. Subopercular spine blunt or little developed or, if large, without spinelets; rostrum horn-shaped, short to bizarrely long . . . . . → ***3***

3a. Underside of tail densely covered with small prickles; a few larger cone-shaped scales sometimes present, especially in midline (Fig. 3); most species more than 8 cm . . . . . ***Ogcocephalus***

3b. Underside of tail with dense small prickles as above, but also 2 longitudinal rows of larger cone-shaped scales, 1 row on either side of midline (Fig. 4); small species, usually 8 cm or less . . . . . → ***4***

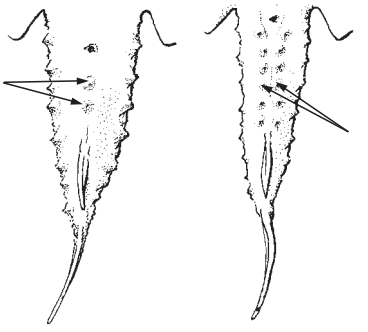


Fig. 3 ***Ogcocephalus*** **Fig. 4**

4a. When disc viewed from above, rostrum short, cone-shaped, pointed straight ahead, with an equal-sized cone flaring out on either side; subopercular spine not developed . . . . . ***Zalieutes***

4b. Rostrum short, slender, markedly upturned. Subopercular spine large, thick, flaring backwards . . . . . ***Malthopsis***

List of species occurring in the area

Dibranchus atlanticus Peters, 1876. 140 mm SL. E and W Atlantic.
Dibranchus tremendus Bradbury, 1999. 200 mm. SL. E and W Atlantic.

Halieutichthys aculeatus (Mitchill, 1818). 100 mm SL. Throughout Area 31.

Ogcocephalus corniger Bradbury, 1980. 140 mm SL. E Gulf Mexico and Atlantic coast US.
Ogcocephalus cubifrons (Richardson, 1836). 230 mm SL. E Gulf Mexico and Atlantic coast US.
Ogcocephalus declivirostris Bradbury, 1980. 140 mm SL. NW Gulf of Mexico.
Ogcocephalus nasutus (Cuvier, 1829). 240 mm SL. Bahamas and Caribbean.
Ogcocephalus notatus (Valenciennes, 1837). 140 mm SL. Area S31.
Ogcocephalus pantostictus Bradbury, 1980. 270 mm SL. N and NW Gulf Mexico.
Ogcocephalus parvus Longley and Hildebrand, 1940. 90 mm SL. Area 31 except W Gulf Mexico.
Ogcocephalus pumilus Bradbury, 1980. 70 mm SL. Area S31.
Ogcocephalus rostellum Bradbury, 1980. 160 mm SL. Atlantic coast U.S.

Malthopsis gnoma Bradbury, 1998. 60 mm SL. Area 31 from N Cuba and N Puerto Rico toward S.

Zalieutes mcgintyi (Fowler, 1952). 70 mm SL. Area 31, except W Gulf Mexico.

References

Bradbury, M.G. 1980. A revision of the fish genus *Ogcocephalus* with descriptions of new species from the western Atlantic Ocean (Ogcocephalidae; Lophiiformes). *Proc. Calif. Acad. Sci*., 42(7):229-285.

Bradbury, M.G. 1998. A new species of *Malthopsis* (Lophiiformes; Ogcocephalidae) from the western Atlantic Ocean. *Bull. Mar. Sci*., 63(1):207-211.

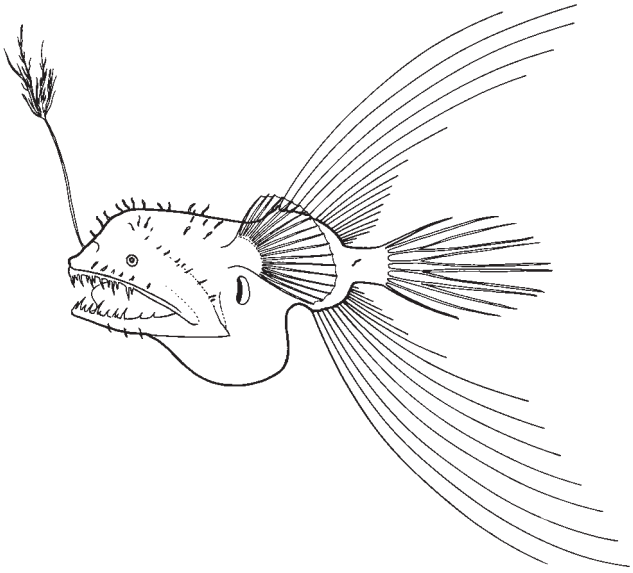
Bradbury, M.G. 1999. A review of the fish genus *Dibranchus* with descriptions of new species and a new genus, *Solocisquama*, (Lophiiformes; Ogcocephalidae). *Proc. Calif. Acad. Sci*., 15(5):259-310.

CAULOPHRYNIDAE

Fanfin anglerfishes (deepsea anglerfishes)

by T.W. Pietsch, University of Washington, USA

Diagnostic characters: Characterized by extreme sexual dimorphism in which males are dwarfed and reach only a fraction of the size of females. Females attaining a length of 17 cm, males 1.6 cm. Soft dorsal fin with 6 to 22 rays; anal fin with 5 to 19 soft rays; **8 caudal-fin soft rays**. Females with body short, globose; **first dorsal-fin spine (illicium) shorter than standard length, usually bearing slender cutaneous filaments along its length and numerous branched filaments at its terminus, but lacking a bulbous, bacteria-filled bioluminescent bait (esca); dorsal- and anal-fin soft rays extremely long; neuromasts of acoustico-lateralis system located at tips of extremely long filaments. Adult males parasitic on females**, with skin naked and denticular teeth of upper and lower jaw fused at base. **Larvae and free-living males with well-developed pelvic fins**; parasitic males and metamorphosed and adult females with pelvic fins absent. **Colour:** dark brown to black over entire surface of head, body, fins (except for the distal portion of the bait and sometimes the first dorsal-fin spine), and oral cavity; viscera unpigmented.



Habitat, biology, and fisheries: Solitary, meso- and bathypelagic anglerfishes, found worldwide. Females passively attracting prey by means of a first dorsal-fin spine modified to serve as a luring device; males actively seeking mates by means of highly developed sense organs, attaching themselves to the females by means of specialized tooth-bearing denticles born on the tips of the jaws and becoming parasitic through fusion of tissue and apparently blood vessels. They are of no economic interest.

Similar families occurring in the area

Other meso- and bathypelagic anglerfish families: caulophrynids easily distinguished by having extremely long dorsal- and anal-fin rays, a luring apparatus lacking a bulbous, bacteria-filled bioluminescent bait, and neuromasts of the acoustico-lateralis system located at the tips of extremely long cutaneous filaments.

List of species occurring in the area

Caulophryne jordani Goode and Bean, 1896. Females to 15.4 cm SL, males unknown. Worldwide.
Caulophryne polynema Regan, 1930. Females to 14.1 cm SL, males to 1.6 cm. NE Atlantic and NE Pacific.

Reference

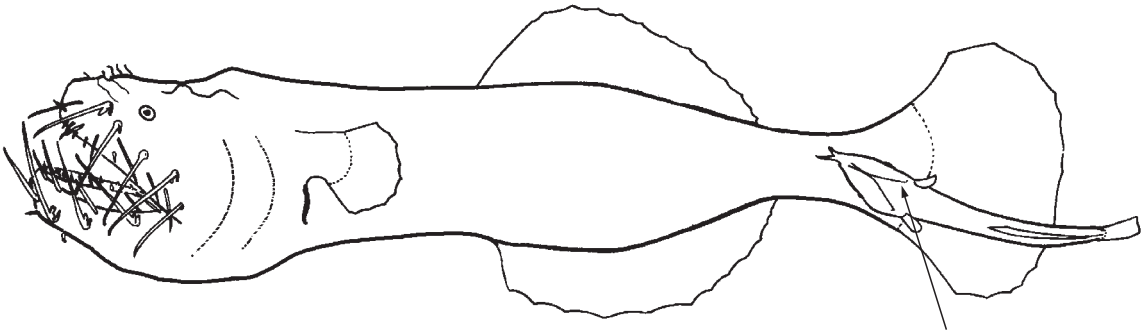
Pietsch, T.W. 1979. Systematics and distribution of ceratioid anglerfishes of the family Caulophrynidae with the description of a new genus and species from the Banda Sea. *Contrib. Sci. Nat. Hist. Mus. Los Angeles Co.*, 310:25 p.

NEOCERATIIDAE

Neoceratiid anglerfishes (deepsea anglerfishes)

by T.W. Pietsch, University of Washington, USA

Diagnostic characters: Characterized by extreme sexual dimorphism in which males are dwarfed and reach only a fraction of the size of females. Females attaining a length of 7.5 cm, males 1.9 cm. **Soft dorsal fin with 11 to 13 soft rays; anal fin with 10 to 13 soft rays; pelvic fins absent**. Females with body slender, elongate, slightly compressed; cleft of mouth horizontal, extending posteriorly beyond eyes; **2 or 3 series of mobile, hooked teeth on outer margin of jaws; first dorsal-fin spine (luring apparatus) absent; bioluminescent structures apparently absent**; lower jaw extending slightly beyond upper jaw; **a pair of prominent nasal papillae**; skin naked. **Adult males parasitic on females**; eyes and olfactory organs degenerate; lower denticular tooth-plate triradiate, each projection terminating in a double hook; upper denticular teeth absent; skin naked. **Colour:** dark red-brown to black over entire surface of head, body, and fins.



males smaller than and parasitic on females (attachment site variable; some females without attached males, some with multiple males)

Habitat, biology, and fisheries: Solitary, meso- and bathypelagic anglerfishes. Females feeding in some unknown way (luring apparatus, and apparently bioluminescent structures, absent), perhaps snagging soft-bodied, passive invertebrates with their elongate, hooked, external jaw teeth; males actively seeking mates by means of highly developed sense organs, attaching themselves to females by means of specialized tooth-bearing denticles born on the tips of the jaws and becoming parasitic through fusion of tissue and apparently blood vessels. They are of no economic interest.

Similar families occurring in the area

Other meso- and bathypelagic anglerfish families: neoceratiids are easily distinguished by having a slender, elongate, slightly compressed body; 2 or 3 series of mobile, hooked teeth on outer margin of the jaws; first dorsal-fin spine (luring apparatus) absent; a pair of prominent nasal papillae; and naked skin.

List of species occurring in the area

Neoceratias spinifer Pappenheim, 1914. Females to 7.5 cm, males to 1.9 cm. Worldwide.

Reference

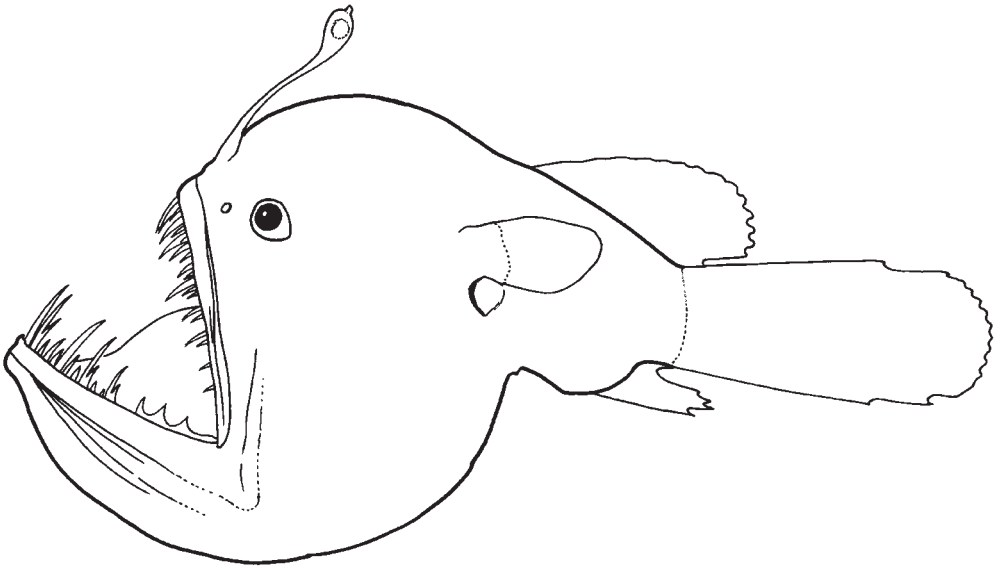
Bertelsen, E. 1951. The ceratioid fishes. Ontogeny, taxonomy, distribution, and biology. *Dana Rept.*, (39):276 p.

MELANOCETIDAE

Black devils (deepsea anglerfishes)

by T.W. Pietsch, University of Washington, USA

Diagnostic characters: Characterized by extreme sexual dimorphism in which males are dwarfed and reach only a fraction of the size of females. Females attaining a length of 12 cm, males 2.8 cm. **Soft dorsal fin with 12 to 17 rays; anal fin with 4 soft rays (very rarely 3 or 5); pelvic fins absent**. Females with body short, deep, globose; **first dorsal-fin spine (illicium) short, less than 70% length of head and body, bearing a conspicuous terminal bioluminescent bait (esca); bait without filaments or appendages**; snout and chin smooth, without papillae; sphenotic spines absent; skin smooth, appearing naked. **Males free-living, not becoming parasitic on females**, with eyes large, elliptical, directed laterally; olfactory organs large; skin spinulose; a median series and 2 or 3 transverse series of denticular teeth on snout, all fused at base; lower denticular teeth in a median and 2 lateral groups fused at base. **Colour:** dark brown to black over entire surface of head and body (except for distal portion of bait); fins colourless in adolescent females.



Habitat, biology, and fisheries: Solitary, meso- and bathypelagic anglerfishes. Females passively attracting prey by means of a first dorsal-fin spine modified to serve as a luring device; males actively seeking mates by means of highly developed sense organs, apparently attaching themselves to females by means of specialized tooth-bearing denticles born on the tips of the jaws, but not becoming parasitic. They are of no economic interest.

Similar families occurring in the area

Other meso- and bathypelagic anglerfish families: melanocetids are distinguished by a combination of features including a short, deep, globose body; a long dorsal fin containing 12 to 17 rays; a short anal fin with 4 soft rays (very rarely 3 or 5); sphenotic spines absent; and skin smooth, appearing naked.

List of species occurring in the area

Melanocetus johnsonii Günther, 1864. Females to 13.5 cm, males to 2.8 cm. Worldwide.
Melanocetus murrayi Günther, 1887. Females to 12 cm, males to 2 cm. Worldwide.

Reference

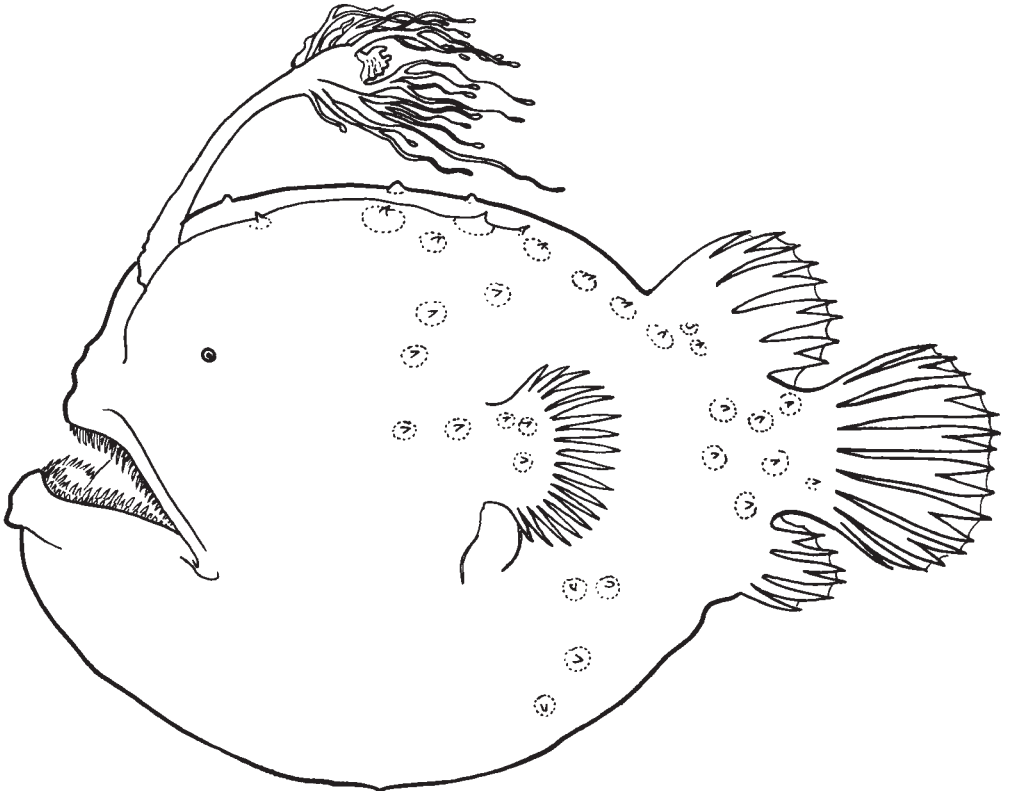
Pietsch, T.W. and J.P. Van Duzer. 1980. Systematics and distribution of ceratioid anglerfishes of the family Melanocetidae, with the description of a new species from the Eastern North Pacific Ocean. *Fish. Bull.*, 78(1):59-87.

HIMANTOLOPHIDAE

Footballfishes (deepsea anglerfishes)

by T.W. Pietsch, University of Washington, USA

Diagnostic characters: Characterized by extreme sexual dimorphism in which males are dwarfed and reach only a fraction of the size of females. Females attaining a length of 46.5 cm, males 4 cm. Soft dorsal fin with 5 or 6 rays; anal fin with 4 or 5 soft rays; **pelvic fins absent**. Females with body short, deep, globose; **first dorsal-fin spine (illicium) stout, short, less than head length to nearly equal to length of head and body, bearing a conspicuous terminal bioluminescent bait (esca)**; snout and chin blunt, usually covered with small rounded papillae; sphenotic spines present; **skin of head and body with widely spaced, bony plates, each bearing a median spine. Males free-living, not becoming parasitic on females**; eyes large, directed laterally; olfactory organs large, skin spinulose; denticular teeth on upper and lower jaw in 2 to 4 transverse series, fused at base. **Colour:** dark brown to black over entire surface of head, body, fins (except for distal portion of bait), and oral cavity; irregular, white or faintly pigmented patches sometimes present on the snout, chin, and upper surface of head and body.



Habitat, biology, and fisheries: Solitary, meso- and bathypelagic anglerfishes, found worldwide. Females passively attracting prey by means of a first dorsal-fin spine modified to serve as a luring device; males actively seeking mates by means of highly developed sense organs, apparently attaching themselves to the females by means of specialized tooth-bearing denticles born on the tips of the jaws, but not becoming parasitic. They are of no economic interest.

Similar families occurring in the area

Other meso- and bathypelagic anglerfish families: himantolophids are distinguished by a combination of characters including a short, deep, globose body; blunt snout and chin, usually covered with small rounded papillae; sphenotic spines present; and skin of the head and body with widely spaced, bony plates, each bearing a median spine.

List of species occurring in the area

Himantolophus albinares Maul, 1961. Females to 19 cm SL, males unknown. Tropical and subtropical Atlantic.

Himantolophus brevirostris group (males only). Males to 3.8 cm SL, females unknown. Worldwide.

Himantolophus cornifer Bertelsen and Krefft, 1988. Females to 9 cm SL, males unknown. Tropical Atlantic and Pacific.

Himantolophus groenlandicus Reinhardt, 1837. Females to 46.5 cm SL, males unknown. Atlantic and possibly E Indian Ocean.

Himantolophus mauli Bertelsen and Krefft, 1988. Females to 15.5 cm SL, males unknown. N Atlantic.

Himantolophus melanolophus Bertelsen and Krefft, 1988. Females to 9.4 cm SL, males unknown. Tropical N Atlantic.

Himantolophus multifurcatus Bertelsen and Krefft, 1988. Females to 12.2 cm SL, males unknown. Tropical N Atlantic.

Himantolophus paucifilosus Bertelsen and Krefft, 1988. Females to 16.3 cm SL, males unknown. Tropical Atlantic.

Himantolophus rostratus group (males only). Males to 3.9 cm SL, females unknown. Tropical and subtropical Atlantic and Pacific.

Reference

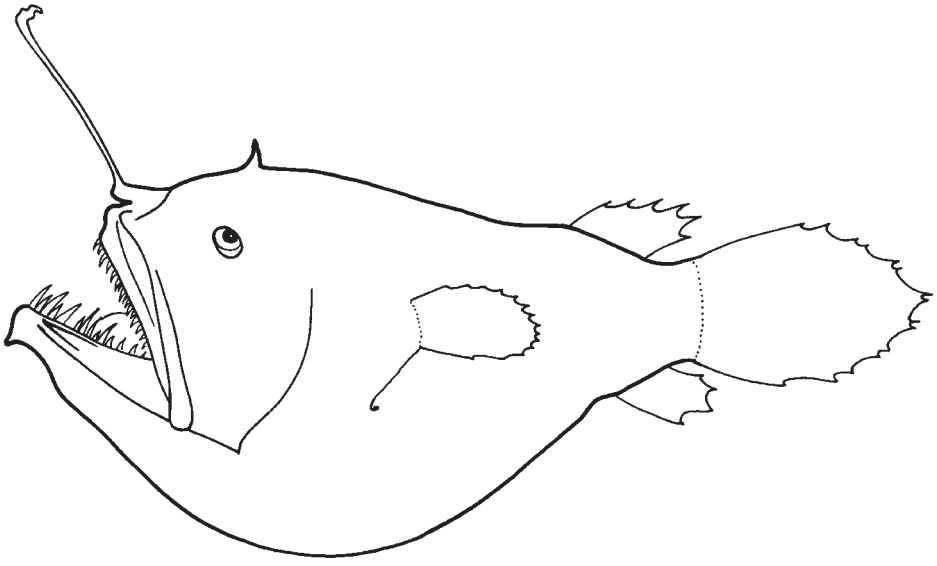
Bertelsen, E. and G. Krefft. 1988. The ceratioid family Himantolophidae (Pisces, Lophiiformes). *Steenstrupia*, 14(2):9-89.

DICERATIIDAE

Diceratid anglerfishes (deepsea anglerfishes)

by T.W. Pietsch, University of Washington, USA

Diagnostic characters: Characterized by extreme sexual dimorphism in which males are dwarfed and reach only a fraction of the size of females. Females attaining a length of 23.5 cm, males 1.4 cm. Soft dorsal fin with 5 to 7 rays; anal fin with 4 soft rays; **pelvic fins absent.** Females with body short, globose; **first dorsal-fin spine (illicium) less than 1/2 length of head and body to more than twice this length, bearing a conspicuous terminal bioluminescent bait (esca); a short, exposed second dorsal-fin spine present** just behind base of first spine, bearing a terminal light organ (conspicuous in adolescents, but difficult to find in adults); strong sphenotic spines present; **no caruncles** (modified dorsal-fin rays, each bearing a bioluminescent gland) **on back**; skin rough, everywhere covered with minute, close-set spinules. **Males free-living, not becoming parasitic on females**; eyes large; olfactory organs small, well separated from eye; a pair of slender, curved denticular teeth on snout, 9 similar denticular teeth on tip of lower jaw, all teeth mutually free without expanded connecting bases; skin spinulose. **Colour:** dark brown to black over entire surface of head, body, fins (except for distal portion of bait), and oral cavity.



Habitat, biology, and fisheries: Solitary, meso- and bathypelagic anglerfishes. Widely distributed in Atlantic, Indian, and western Pacific waters. Females passively attracting prey by means of a first dorsal-fin spine modified to serve as a luring device; males actively seeking mates by means of highly developed sense organs, apparently attaching themselves to the females by means of specialized tooth-bearing denticles born on the tips of the jaws, but not becoming parasitic. They are of no economic interest.

Similar families occurring in the area

Other meso- and bathypelagic anglerfish families: diceratiids are distinguished by having a combination of characters that includes a short, globose body; an exposed second dorsal-fin spine situated just behind the base of the first spine, bearing a terminal light organ; strong sphenotic spines; and the skin everywhere covered with minute, close-set spinules.

List of species occurring in the area

Bufoceratias wedli (Pietschmann, 1926). Females to 23.5 cm SL, males unknown. Tropical and subtropical N Atlantic.

Diceratias pileatus Uwate, 1979. Females to 17.8 cm SL, males unknown. Tropical and subtropical N Atlantic.

Reference

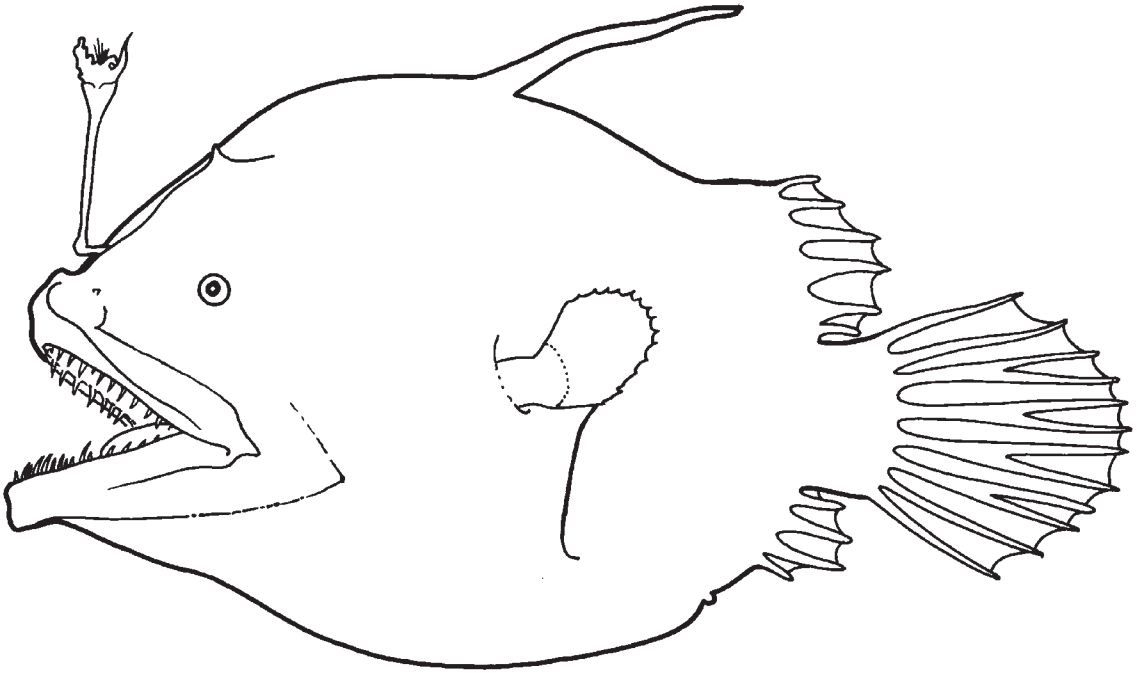
Uwate, K.R. 1979. Revision of the anglerfish family Diceratiidae, with description of two new species. *Copeia*, 1979(1):129-144.

ONEIRODIDAE

Dreamers (deepsea anglerfishes)

by T.W. Pietsch, University of Washington, USA

Diagnostic characters: Characterized by extreme sexual dimorphism in which males are dwarfed and reach only a fraction of the size of females. Females attaining a total length of 28 cm, males 1.8 cm. **Soft dorsal fin with 4 to 8 rays; anal fin with 4 to 7 soft rays; pelvic fins absent**. Females highly variable in shape, with body short, globose to elongate, slender, and compressed; first dorsal-fin spine (illicium) extremely short (bait nearly sessile on snout) to longer than total length of fish, bearing a conspicuous terminal bioluminescent bait (esca); **second dorsal-fin spine not exposed, embedded beneath skin of head**; strong sphenotic spines usually present (absent in *Chaenophryne*); **no caruncles** (modified dorsal-fin soft rays, each bearing a bioluminescent gland) **on back**; skin usually smooth, appearing naked (rough, everywhere covered with minute, close-set spinules in *Spiniphryne*). Males free-living, not becoming parasitic on females (except those of *Leptacanthichthys*); eyes large, directed laterally; olfactory organs large, anterior nostrils close together, directed anteriorally; skin naked. **Colour:** dark brown to black over entire surface of head, body, fins (except for distal portion of bait), and oral cavity.



Habitat, biology, and fisheries: Solitary, meso- and bathypelagic anglerfishes, found worldwide. Females passively attracting prey by means of a first dorsal-fin spine modified to serve as a luring device; males actively seeking mates by means of highly developed sense organs, apparently attaching themselves to the females by means of specialized tooth-bearing denticles born on the tips of the jaws, but not becoming parasitic (except for those of *Leptacanthichthys*). They are of no economic interest.

Similar families occurring in the area

Other meso- and bathypelagic anglerfish families: the numerous and highly diverse genera of the Oneirodidae are distinguished by a combination of features including first dorsal-fin spine emerging well behind the tip of the snout and bearing a well developed bioluminescent bait; second dorsal-fin spine greatly reduced, embedded beneath skin of the head; no caruncles (modified dorsal-fin soft rays, each bearing a bioluminescent gland) on back; no hyoid barbel; snout and chin smooth, not covered with close-set cutaneous papillae; soft dorsal and anal fins with 4 to 8 rays; and skin without conical bony plates.

List of species occurring in the area

Chaenophryne draco Beebe, 1932. Females to 4.2 cm SL, males unknown. Worldwide.
Chaenophryne longiceps Regan, 1925. Females to 17 cm SL, males unknown. Worldwide.

Danaphryne nigrifilis (Regan and Trewavas, 1932). Females to 8.2 cm SL, males unknown. N Atlantic and W Pacific.

Dolopichthys allector Garman, 1899. Females to 15.4 cm SL, males unknown. Atlantic and E Pacific.
Dolopichthys danae Regan, 1926. Females to 11.5 cm SL, males unknown. Tropical E Atlantic.
Dolopichthys karsteni Leipertz and Pietsch, 1987. Females to 9.9 cm SL, males unknown. NW Atlantic.
Dolopichthys longicornis Parr, 1927. Females to 15.9 cm, males unknown. Worldwide.
Dolopichthys pullatus Regan and Trewavas, 1932. Females to 11.5 cm SL, males unknown. Worldwide.

Leptacanthichthys gracilispinis (Regan, 1925). Females to 5.6 cm SL, males to 0.8 cm. NW Atlantic and Pacific.

Lophodolos acanthognathus Regan, 1925. Females to 7 cm SL, males unknown. Worldwide.

Microlophichthys microlophus (Regan, 1925). Females to 10.6 cm SL, males to 1.8 cm. Worldwide.

Oneirodes anisacanthus (Regan, 1925). Females to 17.3 cm SL, males unknown. N Atlantic.
Oneirodes bradburyae Grey, 1956. Females to 2.4 cm SL, males unknown. Gulf of Mexico.
Oneirodes carlsbergi (Regan and Trewavas, 1932). Females 15.9 cm SL, males unknown. Tropical Atlantic and Pacific.
Oneirodes eschrichtii Lütken, 1871. Females to 21.3 cm SL, males unknown. Worldwide.
Oneirodes macronema (Regan and Trewavas, 1932). Females to 2.7 cm SL, males unknown. Caribbean Sea.
Oneirodes macrosteus Pietsch, 1974. Females to 18.5 cm SL, males unknown. Atlantic.
Oneirodes melanocauda Bertelsen, 1951. Female larvae to 1.6 cm SL, male larvae to 0.5 cm. Caribbean Sea and E Indies.

Phyllorhinichthys micractis Pietsch, 1969. Females to 11.8 cm SL, males unknown. Worldwide.

Spiniphryne gladisfenae (Beebe, 1932). Females to 6.3 cm SL, males unknown. Atlantic.

References

Bertelsen, E. 1951. The ceratioid fishes. Ontogeny, taxonomy, distribution, and biology. *Dana Rept*., (39):276 p.

Pietsch, T.W. 1974. The osteology and relationships of ceratioid anglerfishes of the family Oneirodidae with a review of the genus *Oneirodes* Lütken. *Bull. Los Angeles Co. Mus. Nat. Hist. Sci*., 18:1-113.

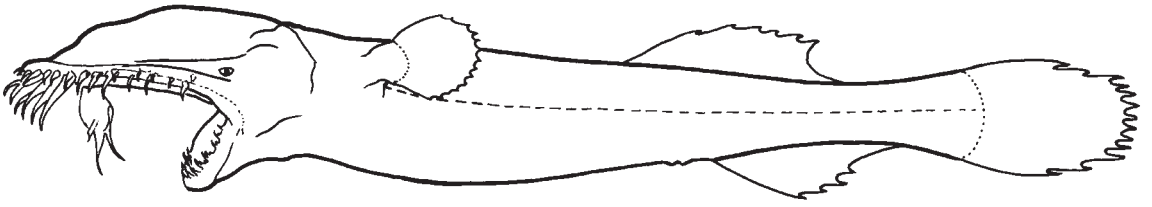
Bertelsen, E. and T.W. Pietsch. 1977. Results of the research cruises of the FRV "Walther Herwig" to South America. XLVII. Ceratioid anglerfishes of the family Oneirodidae collected by the FRV "Walther Herwig." *Arch. Fisch Wiss*., 27(3):171-189.

THAUMATICHTHYIDAE

Wonderfishes (deepsea anglerfishes)

by T.W. Pietsch, University of Washington, USA

Diagnostic characters: Characterized by extreme sexual dimorphism in which males are dwarfed and reach only a fraction of the size of females. Females attaining a length of 30 cm, males 3.2 cm. Soft dorsal fin with 5 to 7 rays; anal fin with 4 or 5 soft rays; **pelvic fins absent**. Females with body slender, elongate; head narrow (*Lasiognathus*) or conspicuously depressed and broad (*Thaumatichthys*); **upper jaw extending anteriorly far beyond lower jaw**; first dorsal-fin spine (illicium) long, with terminal bioluminescent bait (esca), emerging from dorsal surface of head (*Lasiognathus*), or extremely short, embedded in skin of snout, bait hanging from roof of mouth (*Thaumatichthys*); **bait with 1 to 3 bony hook-like denticles**; skin naked (*Lasiognathus*), or spinulose on lower part of head and body (*Thaumatichthys*). **Males free-living, not becoming parasitic on females**; body elongate, slender; eyes large; olfactory organs very large; jaw teeth absent; snout with 4 separate denticles arranged in 2 pairs, one above the other; tip of lower jaw with 7 denticles, a lower transverse series of 4 and an upper transverse series of 3, all fused at base. **Colour:** dark red-brown to black over entire surface of head, body, fins (except for distal portion of bait), and oral cavity.



Habitat, biology, and fisheries: Solitary, meso- and bathypelagic (*Lasiognathus*) and benthic (*Thaumatichthys*) anglerfishes, found worldwide. Females passively attracting prey by means of a first dorsal-fin spine modified to serve as a luring device; males actively seeking mates by means of highly developed sense organs, apparently attaching themselves to the females by means of specialized tooth-bearing denticles born on the tips of the jaws, but not becoming parasitic. Adults collected in midwater trawls at depths of about 800 to 1 800 m (*Lasiognathus*) or in bottom trawls at depths of 1 100 to 3 200 m (*Thaumatichthys*). They are of no economic interest.

Similar families occurring in the area

Other meso- and bathypelagic anglerfish families: thaumatichthyids are easily distinguished by having a slender, elongate body; upper jaw extending anteriorly far beyond lower; and bait (either situated at the tip of an elongate first dorsal-fin spine, emerging from the dorsal surface of the head, or hanging from the roof of the mouth) with 1 to 3 bony hook-like denticles.

List of species occurring in the area

Lasiognathus beebei Regan and Trewavas, 1932. Females to 11.2 cm SL, males unknown. N Atlantic and NE Pacific.

Lasiognathus intermedius Bertelsen and Pietsch, 1996. Females to 12.9 cm SL, males unknown. Atlantic and NE Pacific.

Lasiognathus saccostoma Regan, 1925. Females to 7.7 cm SL, males unknown. N Atlantic and NE Pacific.

Thaumatichthys binghami Parr, 1927. Females to 29.4 cm SL, males unknown. NW Atlantic.

References

Bertelsen, E. and P.J. Struhsaker. 1977. The ceratioid fishes of the genus *Thaumatichthys*: Osteology, relationships, distribution, and biology. *Galathea Rept.*, 14:7-40.

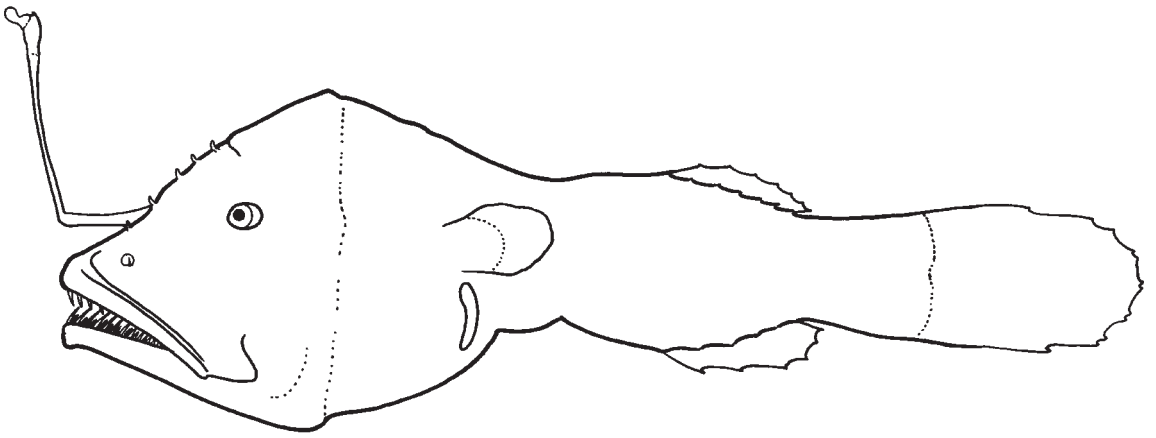
Bertelsen, E. and T.W. Pietsch. 1996. A revision of the deep-sea anglerfish genus *Lasiognathus* (Lophiiformes: Thaumatichthyidae), with the description of a new species. *Copeia*, 1996(2):401-409.

CENTROPHRYNIDAE

Deepsea anglerfishes

by T.W. Pietsch, University of Washington, USA

Diagnostic characters: Characterized by extreme sexual dimorphism in which males are dwarfed and reach only a fraction of the size of females. Females attaining a length of 23 cm, males 1.3 cm. Soft dorsal fin with 6 or 7 rays; anal fin with 5 or 6 soft rays; **pelvic fins absent. Females with body elongate, compressed; first dorsal-fin spine (illicium) shorter than standard length, bearing a conspicuous terminal bioluminescent bait (esca)**; sphenotic spines absent; **no caruncles** (modified dorsal-fin rays, each bearing a bioluminescent gland) **on back**; skin rough, everywhere covered with small, close-set spinules. **Males free-living, not becoming parasitic on females**; eyes small; olfactory organs large, directed laterally; 3 upper and 4 lower denticular teeth, fused at base; skin naked. **Males and juvenile females with a simple papilliform hyoid barbel. Colour:** dark red-brown to black over entire surface of head, body, fins (except for distal portion of bait), and oral cavity.



Habitat, biology, and fisheries: Solitary, meso- and bathypelagic anglerfishes. Females passively attracting prey by means of a first dorsal-fin spine modified to serve as a luring device; males actively seeking mates by means of highly developed sense organs, apparently attaching themselves to the females by means of specialized tooth-bearing denticles born on the tips of the jaws, but not becoming parasitic. They are of no economic interest.

Similar families occurring in the area

Other meso- and bathypelagic anglerfish families: centrophrynids distinguished by combination of characters including an elongate, slender, laterally compressed body; sphenotic spines absent; first dorsal-fin spine emerging from behind tip of snout; no caruncles (modified dorsal-fin rays, each bearing a bioluminescent gland) on back; skin rough, everywhere covered with small, close-set spinules.

List of species occurring in the area

Centrophryne spinulosa Regan and Trewavas, 1932. Females to 23 cm, males to 1.3 cm. Worldwide.

Reference

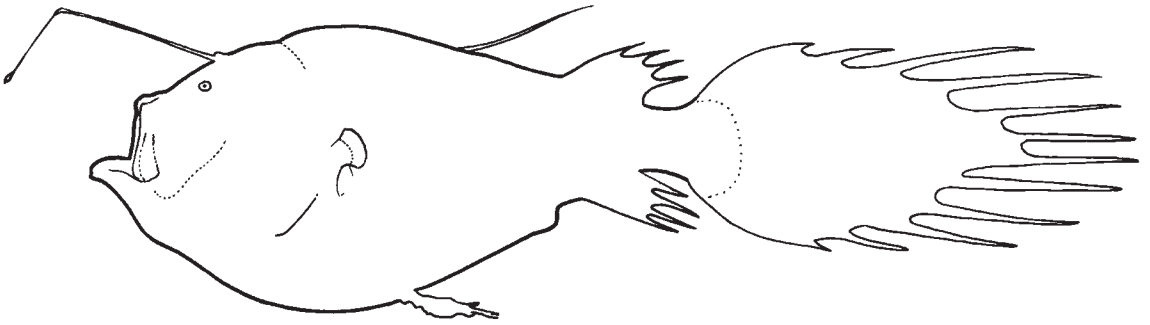
Pietsch, T.W. 1972. A review of the monotypic deep-sea anglerfish family Centrophrynidae: Taxonomy, distribution, and osteology. *Copeia*, 1972(1):17-47.

CERATIIDAE

Sea devils (deepsea anglerfishes)

by T.W. Pietsch, University of Washington, USA

Diagnostic characters: Characterized by extreme sexual dimorphism in which males are dwarfed and reach only a fraction of the size of females. Females attaining a length of 77 cm, males 1.6 cm. Soft dorsal fin with 3 to 5 rays; anal fin with 4 soft rays; **pelvic fins absent**; caudal soft rays 8 or 9. Females with body elongate, compressed; **first dorsal-fin spine (illicium) shorter than standard length, bearing a terminal bioluminescent bait (esca); 2 or 3 caruncles** (modified dorsal-fin soft rays, each bearing a bioluminescent gland) **on the dorsal midline of the trunk just anterior to the origin of the soft dorsal fin** (often inconspicuous in large adult females); skin covered with numerous close-set dermal spines. **Adult males parasitic on females; eyes large, bowl-shaped, directed laterally**; a pair of large denticular teeth on snout, 2 pairs of denticular teeth on tip of lower jaw; skin naked and unpigmented in adolescent stages, spinulose and darkly pigmented in parasitic stages. **Colour:** dark red-brown to black over entire surface of head, body, fins (except for the distal portion of the bait), and oral cavity.



Habitat, biology, and fisheries: Solitary, meso- and bathypelagic anglerfishes, found worldwide. Females passively attracting prey by means of a first dorsal-fin spine modified to serve as a luring device; males actively seeking mates by means of highly developed sense organs, attaching themselves to the females by means of specialized tooth-bearing denticles born on the tips of the jaws and becoming parasitic through fusion of tissue and apparently blood vessels. They are of no economic interest.

Similar families occurring in the area

Other meso- and bathypelagic anglerfish families: ceratiids are distinguished by having a combination of characters that includes an elongate, compressed body; 2 or 3 caruncles (modified dorsal-fin rays, each bearing a bioluminescent gland) on the dorsal midline of the trunk just anterior to the origin of the soft dorsal fin; and skin covered with numerous close-set dermal spines.

List of species occurring in the area

Ceratias holboelli Krøyer, 1845. Females to 77 cm, males unknown. Worldwide.

Ceratias uranoscopus Murray, In Thomson, 1877. Females to 24 cm, males to 11.8 cm. Worldwide.

Cryptopsaras couesii Gill, 1883. Females to 29 cm, males to 7.3 cm. Worldwide.

Reference

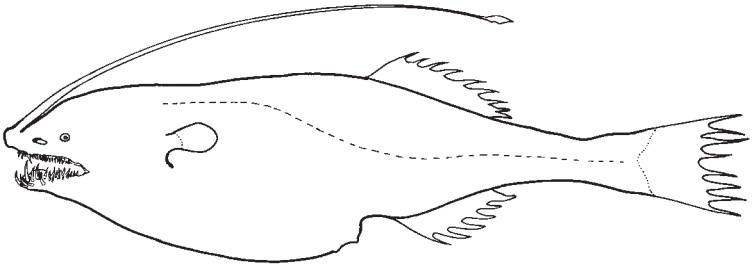
Pietsch, T.W. 1986. Systematics and distribution of bathypelagic anglerfishes of the family Ceratiidae (order: Lophiiformes). *Copeia*, 1986(2):479-493.

GIGANTACTINIDAE

Whipnose anglerfishes (deepsea anglerfishes)

by T.W. Pietsch, University of Washington, USA

Diagnostic characters: Characterized by extreme sexual dimorphism in which males are dwarfed and reach only a fraction of the size of females. Females attaining a length of 40 cm, males 2.2 cm. Soft dorsal fin with 4 to 10 soft rays; anal fin with 4 to 8 soft rays; **pelvic fins absent. Females with body slender, elongate, compressed**, head less than 35% length of head and body**, base of tail-fin long, greater than 20% length of head and body. First dorsal-fin spine (illicium) greater than 1/2 length of head and body, emerging from extreme tip of snout, and bearing a conspicuous terminal bioluminescent bait (esca)**. Upper jaw extending slightly beyond lower jaw; sphenotic spines absent; **no caruncles** (modified dorsal-fin rays, each bearing a bioluminescent gland) **on back**; skin rough, everywhere covered with small, close-set spinules. **Males free-living, not becoming parasitic on females**, with eyes minute, olfactory organs large, jaw teeth absent, denticular teeth all or nearly mutually free, not fused at base. **Colour:** dark red-brown to black over entire surface of head, body, fins (except for distal portion of bait), and oral cavity.



Habitat, biology, and fisheries: Solitary, meso- and bathypelagic anglerfishes, found worldwide. Females passively attracting prey by means of a first dorsal-fin spine modified to serve as a luring device; males actively seeking mates by means of highly developed sense organs, apparently attaching themselves to the females by means of specialized tooth-bearing denticles born on the tips of the jaws, but not becoming parasitic. They are of no economic interest.

Similar families occurring in the area

Other meso- and bathypelagic anglerfish families: female gigantactinids distinguished by having a combination of characters including an elongate, slender laterally compressed body; the first dorsal-fin spine length greater than half the body length and emerging from the extreme tip of the snout; the upper jaw extending slightly beyond the lower jaw; no caruncles (modified dorsal-fin soft rays, each bearing a bioluminescent gland) on the back; and the skin rough, everywhere covered with small, close-set spinules.

List of species occurring in the area

Gigantactis gibbsi Bertelsen, Pietsch, and Lavenberg, 1981. Females to 5 cm SL, males unknown. Tropical and subtropical N Atlantic.

Gigantactis gracilicauda Regan, 1925. Females to 8.2 cm SL, males unknown. Tropical N Atlantic.

Gigantactis longicirra Waterman, 1939. Females to 22.1 cm SL, males to 1.5 cm. Tropical Atlantic and tropical E Pacific.

Gigantactis macronema Regan, 1925. Females to 35.4 cm SL, males unknown. Atlantic and Pacific.

Gigantactis perlatus Beebe and Crane, 1947. Females to 22.3 cm SL, males unknown. Worldwide.

Gigantactis vanhoeffeni Brauer, 1902. Females to 34 cm SL, males unknown. Worldwide.

Rhynchactis leptonema Regan, 1925. Females to 11.8 cm SL, males unknown. W Atlantic and E Pacific.

Rhynchactis macrothrix Bertelsen and Pietsch, 1998. Females to 13 cm SL, males unknown. Atlantic and W Indian oceans.

References

Bertelsen, E., T.W. Pietsch, and R.J. Lavenberg. 1981. Ceratioid anglerfishes of the family Gigantactinidae: Morphology, systematics, and distribution. *Nat. Hist. Mus. Los Angeles Co., Contrib. Sci*., 332:1-74.

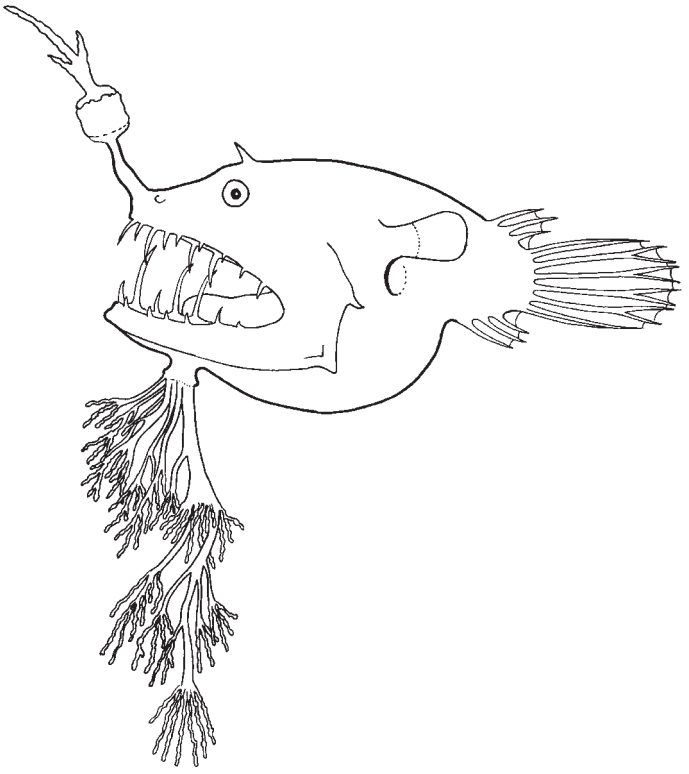
Bertelsen, E. and T.W. Pietsch. 1998. Revision of the deepsea anglerfish genus *Rhynchactis* Regan (Lophiiformes: Gigantactinidae), with descriptions of two new species. *Copeia*, 1998(3):583-590.

LINOPHRYNIDAE

Netdevils (deepsea anglerfishes)

by T.W. Pietsch, University of Washington, USA

Diagnostic characters: Characterized by extreme sexual dimorphism in which males are dwarfed and reach only a fraction of the size of females. Females attaining a length of 23 cm, males 2.9 cm. **Soft dorsal fin with 3 rays (rarely 2 or 4); anal fin with 3 soft rays (rarely 2 or 4); pelvic fins absent**. Females with body short, globose; **first dorsal-fin spine (illicium) short, less than length of head and body in most specimens, bearing a conspicuous terminal bioluminescent bait (esca); an elongate hyoid barbel** (absent in *Haplophryne* and *Photocorynus*), bearing numerous, small, globular light organs; sphenotic spines present; skin naked. **Adult males parasitic on females**; eyes large, slightly tubular, directed anteriorly; olfactory organs large; skin naked. **Colour**: dark brown to black over entire surface of head, body, fins (except for the distal portion of the bait) in *Linophryne* and *Photocorynus*; skin unpigmented in *Haplophryne*.



Habitat, biology, and fisheries: Solitary, meso- and bathypelagic anglerfishes, found worldwide. Females passively attracting prey by means of a first dorsal-fin spine modified to serve as a luring device; males actively seeking mates by means of highly developed sense organs, attaching themselves to the females by means of specialized tooth-bearing denticles born on the tips of the jaws and becoming parasitic through fusion of tissue and apparently blood vessels. They are of no economic interest.

Similar families occurring in the area

Other meso- and bathypelagic anglerfish families: linophrynids distinguished by a combination of characters including a short, globose body; short soft dorsal and anal fins, consisting of only 3 soft rays (rarely 2 or 4); an elongate hyoid barbel (absent in *Haplophryne* and *Photocorynus*), bearing numerous, small, globular light organs; sphenotic spines present; and skin naked.

List of species occurring in the area

Haplophryne mollis (Brauer, 1902). Females to 7 cm SL, males to 1.5 cm. Worldwide.

Linophryne algibarbata Waterman, 1939. Females to 18.2 cm SL, males to 2.9 cm. N Atlantic.
Linophryne arborifera Regan and Trewavas, 1932. Females to 7.7 cm SL, males to 1.5 cm. Atlantic.
Linophryne bicornis Parr, 1927. Females to 18.5 cm SL, males to 3 cm. NW Atlantic and SE Indian.
Linophryne brevibarbata Beebe, 1932. Females to 10 cm SL, males to 1.9 cm. N Atlantic.
Linophryne coronata Parr, 1927. Females to 22.5 cm SL, males to 2.6 cm. Atlantic and NE Pacific.
Linophryne densiramus Imai, 1941. Females to 6.7 cm SL, males to 0.9 cm. NW Atlantic and Pacific.
Linophryne macrodon Regan, 1925. Females to 9.1 cm SL, males to 2.2 cm. NW Atlantic and tropical NE Pacific.
Linophryne pennibarbata Bertelsen, 1980. Females to 4.7 cm SL, males unknown. N Atlantic and N Pacific.
Linophryne racemifera Regan and Trewavas, 1932. Females to 8.1 cm, males unknown. Atlantic and E Pacific.

Photocorynus spiniceps Regan, 1925. Females to 6.9 cm SL, males to 1.0 cm. Atlantic, Indian, and E Pacific.

References

Bertelsen, E. 1951. The ceratioid fishes. Ontogeny, taxonomy, distribution, and biology. *Dana Rept.,* (39):276 p.

Bertelsen, E. 1980. Notes on Linophrynidae V: A revision of the deep-sea anglerfishes of the *Linophryne arborifera*-group (Pisces, Ceratioidei). *Steenstrupia*, 6(6):29-70.

Bertelsen, E. 1982. Notes on Linophrynidae VIII: A review of the genus *Linophryne*, with new records and descriptions of two new species. *Steenstrupia*, 8(3):49-104.

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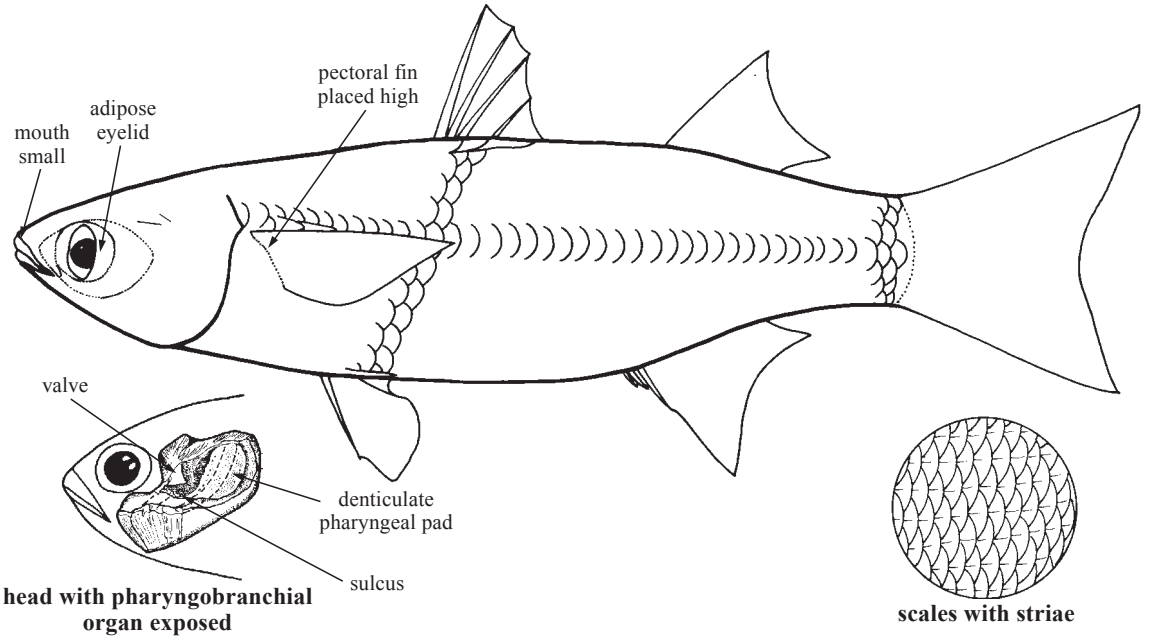
Order MUGILIFORMES

MUGILIDAE

Mullets

by I.J. Harrison, American Museum of Natural History, New York, USA

Diagnostic characters: Medium- to large-sized fishes, reaching a maximum size of 120 cm standard length, but commonly to about 30 cm standard length; elongate with subcylindrical body. **Head often broad and flattened dorsally** (rounded in *Agonostomus* and *Joturus*). **Eyes partly covered by adipose 'eyefold' tissue (translucent fatty extensions of anterior and posterior rims of eye socket) that may cover most of eye except for a small area over pupil; adipose eyefold can be seen by inserting a small pointer between surface of eye and overlying adipose tissue**; adipose eyefold absent in juveniles and in *Agonostomus* and *Joturus*. Snout short; **mouth small or moderate in size, terminal or inferior**; premaxillae protractile; teeth small, hidden, or absent. **Two short dorsal fins, well-separated; first with 4 slender spines**, second with 8 to 10 soft rays; anal fin short with 2 or 3 spines and 7 to 11 soft rays in adults (for species in area); caudal fin emarginate or forked; **pectoral fins inserted high on body, with dorsal ray appearing short and spinous (although not a true spine)**; pelvic fins with 1 spine and 5 soft rays, **inserted subabdominally, about equidistant between insertion of pectoral fin and origin of first dorsal fin. Lateral line absent**. Scales moderate to large size, with 1 or more longitudinal rows of striae (grooves) on each scale; scales ctenoid except for those on anterior predorsal and lateral parts of head, which may be cycloid. Scales in longitudinal series on midline 29 to 47, counted from just behind operculum, above pectoral fin, to point of caudal flexure (i.e., not including scales on caudal fin). Scales in transverse series 10.5 to 15, counted from origin of pelvic fin to origin of first dorsal fin. Scales in circumpeduncular series entirely around caudal peduncle, just anterior to point of caudal flexure, 16 to 23; circumpeduncular series starts at scale row on ventral surface of caudal peduncle, and is taken vertically up scale rows on one flank, over dorsum, and vertically down opposite flank (zig-zagging between adjacent, overlapping scale rows, so that all rows are included in count). **Large, modified scales may be present at insertion of pectoral and pelvic fins (axillary scales) and origin of first dorsal fin (dorsal obbasal scales)**. Oral and branchial filter-feeding mechanism involving gill rakers and a **specialized 'pharyngobranchial organ' comprising large, denticulate 'pharyngeal pad' and pharyngeal 'sulcus' on each side of pharyngobranchial chamber** (less developed in *Joturus* and not developed in *Agonostomus*). Pharyngobranchial organ may be seen by lifting operculum and pulling first 3 gill arches forward from fourth arch. The pharyngeal pad is a large, rounded structure with numerous, fine denticulate teeth giving an apparently "furry" surface. The sulcus is deep groove anterior to denticulate pad. In *Mugil* there is a large flap of tissue (a "valve") on lower to midpart of sulcus and lying back against sulcus wall. Sulcus and valve best seen by pulling first 2 gill arches forward from third and fourth arches. **Stomach with muscular "gizzard"** (except in *Agonostomus* and *Joturus*) and pyloric caeca positioned ventrally (2 caeca in all species from area). Stomach and caeca can be seen by cutting fish along abdomen

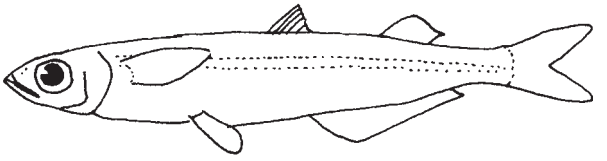


and removing the liver, lying ventral to the alimentary tract. **Intestine elongate and elaborately coiled** (except in *Agonostomus* and *Joturus*). Vertebrae 24 to 26. **Colour:** dorsally greyish blue, or greyish green; head and operculum with bronze or yellowish blotches in some species; **flanks silvery**, often with more or less distinct dark stripes (*about* 3 to 9) following rows of scales; ventral parts of body also silvery, pale, or yellowish; dorsal and caudal fins usually dusky (sometimes yellowish); anal and pelvic fins may be yellowish; dark spot sometimes dorsally at base of pectoral fins.

Habitat, biology, and fisheries: Most species are euryhaline; inhabiting coastal marine waters, brackish water lagoons, estuaries, and may enter fresh water; usually to depths of 20 m, but have been reported to depths of over 300 m. Some species usually inhabit fresh water but can also be found in brackish waters. Coastal species usually spawn offshore; fres- water species spawn in brackish waters. Feeds by rowsing on submerged surfaces and filtering large quantities of benthic detritus; ingesting microalgae, detritus, small invertebrates, microorganisms, and particulate organic material. Relatively important foodfishes; caught with diverse net types. FAO statistics report capture prodcution from 23 789 to 37 659 t from 1995 to 1999. Small-scale and subsistence fisheries are probably also relatively large. The hardiness, simple diet, and rapid growth of mullets has made some species the object of aquaculture.

Similar families occurring in the area

Atherinidae: body more slender with a prominent silvery stripe along the flanks; eyes larger; anal-fin rays usually more than 10 (usually, but not always, less than 10 in Mugilidae).

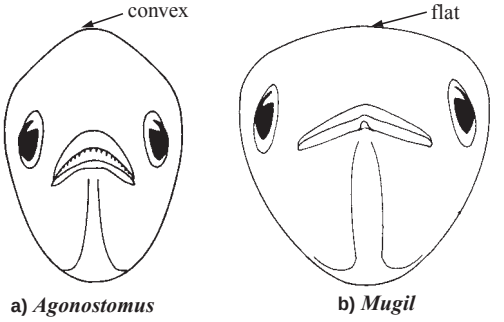


Atherinidae

Key to the species of Mugilidae occurring in the area

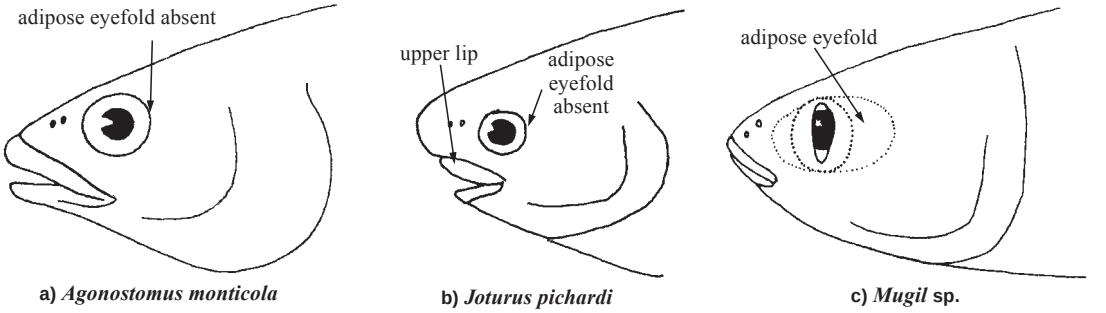
1a. Dorsal surface of head convex across posterior interorbit (Fig. 1a) translucent adipose eyefold absent in juveniles and adults (Fig. 2a, b); anal fin with 2 spines and 10 or 11 soft rays; teeth small and rigidly inserted directly onto the premaxilla and dentary bones (Fig. 3a, b); pharyngobranchial organ lacking a large denticulate, pharyngeal pad or a distinct sulcus with valve (Fig. 4a, b); 38 to 46 scales in longitudinal series; adults usually in fresh water . . . . . → *2*

1b. Dorsal surface of head relatively flat across posterior interorbit (Fig. 1b); translucent adipose eyefold present in specimens over about 30 mm (Fig. 2c); anal fin with 3 spines (first spine very short, and may be hidden by overlying scales) and 8 or 9 soft rays in adults (2 spines and 9 or 10 soft rays in specimens less than about 50 mm standard length); teeth attached to the edges of the lips, and small or not visible to naked eye; pharyngobranchial organ with a large denticulate pharyngeal pad, and a distinct sulcus with valve (Fig. 4c); 29 to 47 scales in longitudinal series; adults usually in inshore coastal waters, estuaries and sometimes entering fresh water . . . . . → *3*



a) *Agonostomus* b) *Mugil*

Fig. 1 anterior view of head



a) *Agonostomus monticola* b) *Joturus pichardi* c) *Mugil* sp.

Fig. 2 lateral view of head

2a. Mouth terminal (Fig. 2a); 9 soft rays in second dorsal fin; adults with 10 soft rays in anal fin; second dorsal and anal fins with small scales on anterior basal parts, otherwise naked; 16 to 23 gill rakers on lower part of first gill arch; teeth on opposite sides of lower jaw almost meeting at dentary symphysis (Fig. 3a); dorsal fins and caudal fin dusky yellowish, and anal fin pale . . . . . ***Agonostomus monticola***

2b. Mouth inferior, snout projecting anteriorly beyond upper lip (Fig. 2b) (except in specimens less than 6 cm); 10 soft rays in second dorsal fin; adults with 11 (rarely 10) soft rays in anal fin; second dorsal and anal fins well-covered by small scales in adults; 27 to 40 gill rakers on lower part of first gill arch; opposite sides of lower jaw with teeth in 2 more or less oval patches, reasonably well separated at dentary symphysis (Fig. 3b); dorsal fins and caudal fin with dark bars and yellowish or green patches . . . . . ***Joturus pichardi***

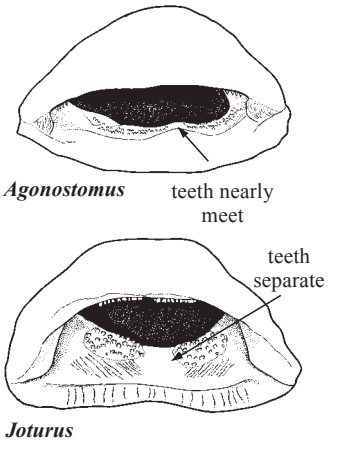


Fig. 3 frontal view of mouth

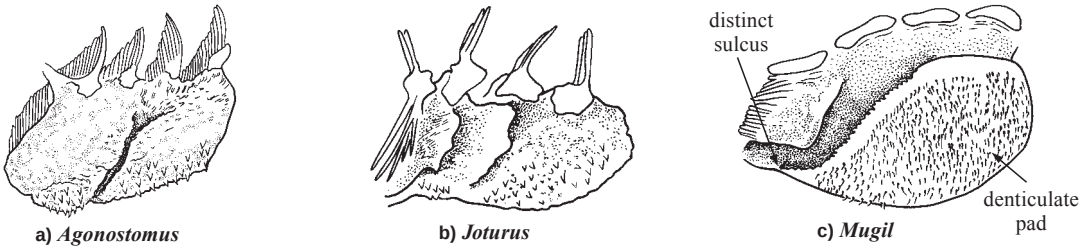


Fig. 4 lateral view of pharyngobranchial organs

3a. Anal fin with 3 spines (first spine very short) and 8 soft rays in adults, or 2 spines and 9 soft rays in specimens less than 50 mm standard length . . . . . → *4*

3b. Anal fin with 3 spines (first spine very short) and 9 soft rays in adults, or 2 spines and 10 soft rays in specimens less than 50 mm standard length . . . . . → *7*

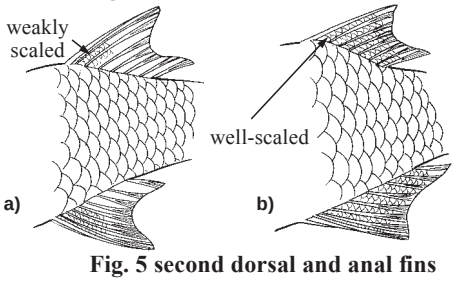


Fig. 5 second dorsal and anal fins

4a. Second dorsal and anal fins weakly scaled, with small scales only on anterior basal parts (Fig. 5a); upper lip with very small teeth, either not visible to naked eye, or just visible, appearing as a fine fringe (Fig. 6a); upper lip, when viewed under microscope, with an outer row of unicuspid teeth and 1 to 6 inner rows of bicuspid teeth (Fig. 7) . . . . . → *5*

4b. Second dorsal and anal fins well-scaled, with small scales over all parts of the fin (Fig. 5b) (except in specimens under about 60 mm standard length where the distal part of the fin may lack scales); teeth on upper lip usually just visible to naked eye (Fig. 6b, c); upper lip, when viewed under microscope, with an outer row of moderately long and more or less recurved unicuspid teeth, and an inner row of unicuspid teeth present or absent; no bicuspid teeth (Fig. 8) . . . . . → *6*

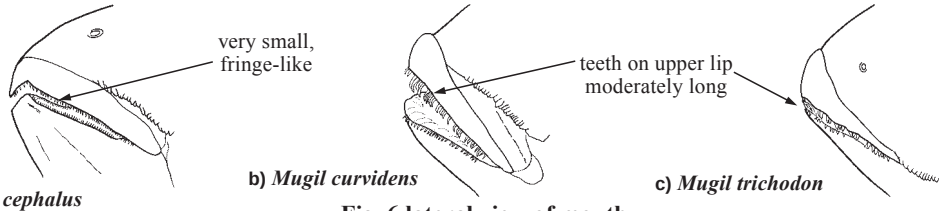


Fig. 6 lateral view of mouth

5a. Thirty-six or more scales in longitudinal series; body depth at origin of first dorsal fin usually 24 to 28% standard length; body depth at origin of anal fin usually 20 to 24% standard length; head depth equal to or greater than head width at level of posterior of operculum; origin of fully erected second dorsal fin just posterior to vertical level of origin of anal fin . . . . . ***Mugil cephalus***

5b. Thirty-six or fewer (usually 29 to 34) scales in longitudinal series; body depth at origin of first dorsal fin usually 17 to 23% standard length; body depth at origin of anal fin usually 19 to 20%; head depth less than head width at level of posterior of operculum; origin of fully erected second dorsal fin on vertical through anterior quarter to third of anal fin . . . . . ***Mugil liza***

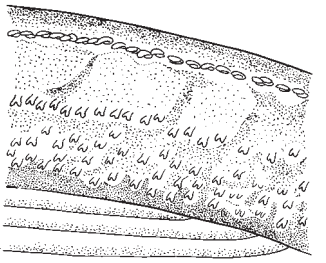
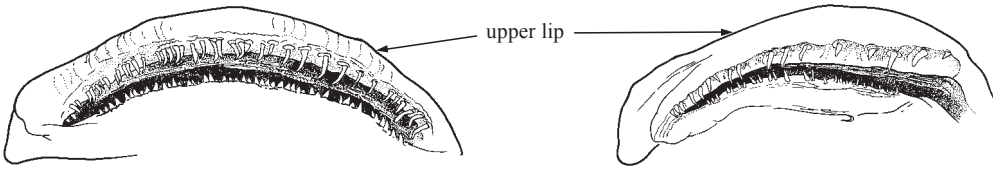


Fig. 7 inner surface of upper lip (*Mugil cephalus*)

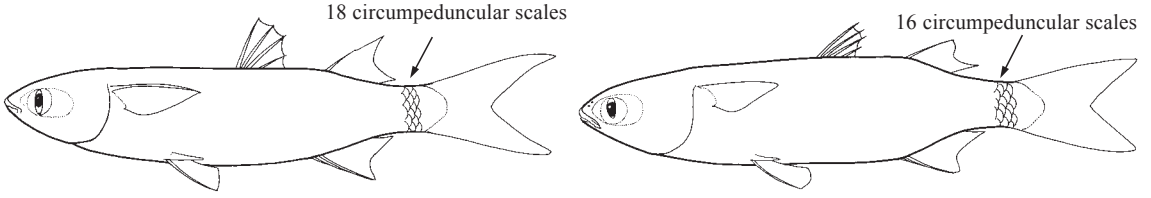


a) ***Mugil curvidens*** **b)** ***Mugil trichodon***

Fig. 8 ventral view of mouth (right side)

6a. Nine soft rays in second dorsal fin; usually 34 to 37 (rarely 33) scales in longitudinal series and 18 (rarely 17) in circumpeduncular series (Fig. 9a); upper lip, when viewed under a microscope, with an outer row of close-set, long, unicuspid teeth which have their tips recurved in towards the mouth; lower lip, viewed under a microscope, with a single row of close-set, usually long, unicuspid teeth with recurved tips (Figs 6b, 8a); depth of medial part of upper lip 5% or less of head length . . . . . ***Mugil curvidens***

6b. Eight (or very rarely 9) soft rays in second dorsal fin; 28 to 34 scales in longitudinal series and 16 in circumpeduncular series (Fig. 9b); upper lip, when viewed under a microscope, with an outer row of moderately large and sturdy unicuspid teeth, reasonably spaced from each other and usually with the tips only weakly recurved; lower lip, viewed under a microscope, with single row of smaller unicuspid teeth, with weakly recurved tips (Figs 6c, 8b); depth of medial part of upper lip 5 to 8% of head length . . . . . ***Mugil trichodon***



a) ***Mugil curvidens*** **b)** ***Mugil trichodon***

Fig. 9 lateral view

7a. Forty-three to 47 scales in longitudinal series and 21 to 23 in circumpeduncular series; origin of first dorsal fin usually slightly closer to tip of snout than to base of caudal fin (Fig 10a) . . . ***Mugil incilis***

7b. Thirty-five to 40 scales in longitudinal series and 17 to 19 in circumpeduncular series; origin of first dorsal fin midway between tip of snout and base of caudal fin or slightly closer to base of caudal fin (Fig. 10b, c) . . . . . → ***8***

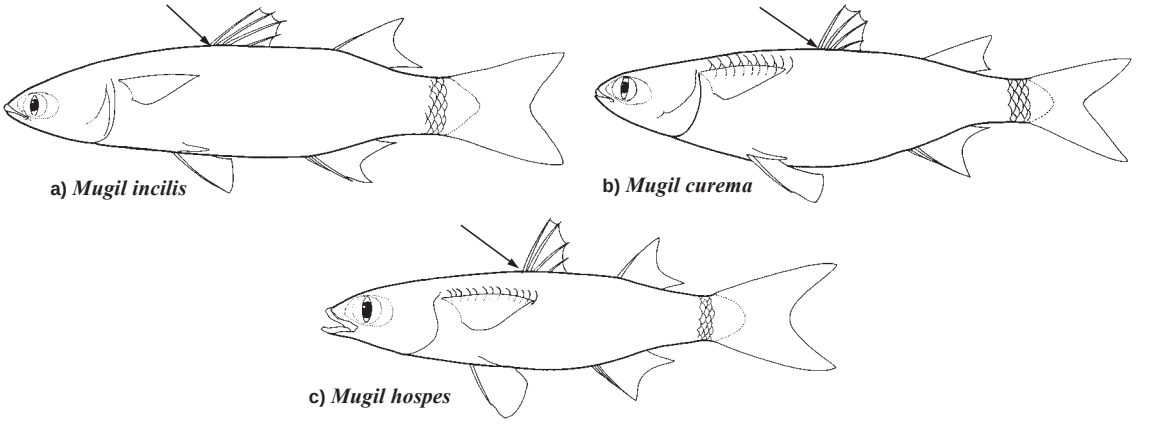


Fig. 10 lateral view

8a. Body depth at origin of first dorsal fin usually 26 to 30% standard length; body depth at origin of anal fin usually 21 to 27% standard length; pectoral fin with 15 to 17 soft rays, usually not quite reaching level of origin of first dorsal fin (pectoral fin 16 to 21% standard length, 70 to 82% head length); 8 to 10 scales in longitudinal series anterior to tip of pectoral fin (Fig. 10b); upper lip with very small teeth, either not visible to naked eye, or just visible, appearing as a fine fringe (Fig. 11a); upper lip, when viewed under microscope, with an outer row of moderately close-set unicuspid teeth, and an inner row of less closely-set and slightly smaller teeth sometimes present (Fig. 12a) . . . . . ***Mugil curema***

8b. Body depth at origin of first dorsal fin usually 22 to 26% standard length; body depth at origin of anal fin usually 21 to 23% standard length; pectoral fin with 13 or 14 soft rays, long, reaching level of origin of first dorsal fin or extending just beyond this (pectoral fin 21 to 24% standard length, 80 to 96% head length); 11 to 13 scales in longitudinal series anterior to tip of pectoral fin (Fig. 10c); upper lip with minute teeth (Fig. 11b), usually not visible to naked eye; upper lip, when viewed under microscope, with an outer row of moderately spaced, very fine teeth, and an inner row of extremely small teeth sometimes present (Fig. 12b) . . . . . ***Mugil hospes***

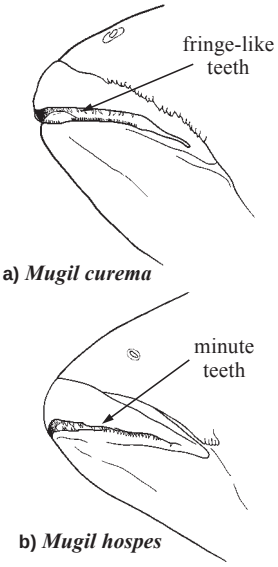


Fig. 11 lateral view of mouth

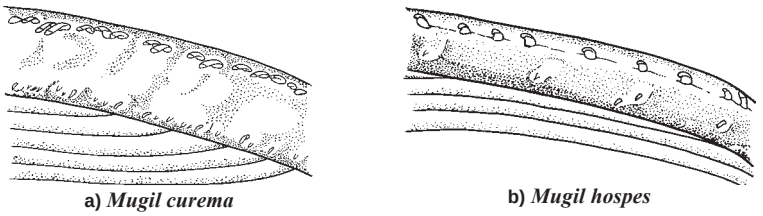


Fig. 12 inner surface of upper lip

List of species occurring in the area

The symbol is given when species accounts are included.

Agonostomus monticola (Bancroft in Griffith and Smith, 1834).

Joturus pichardi Poey, 1860.

Mugil cephalus Linnaeus, 1758.
Mugil curema Valenciennes in Cuvier and Valenciennes, 1836.
Mugil curvidens Valenciennes in Cuvier and Valenciennes, 1836.
Mugil hospes Jordan and Cuvier in Jordan, 1895.
Mugil incilis Hancock, 1830.
Mugil liza Valenciennes in Cuvier and Valenciennes, 1836.
Mugil trichodon Poey, 1875.

References

Alvarez-Lajonchere, L., E. Trewavas, and G.J. Howes. 1992. *Mugil curema* and *M. liza* Valenciennes in Cuvier and Valenciennes, 1836 (Osteichthyes, Perciformes): proposed conservation of the specific names. *Bull. Zoo. Nom.,* 49(4):271-275.

Harrison, I.J. 1993. Comment on the proposed conservation of the specific names of *Mugil curema* and *M. liza.* Valenciennes in Cuvier and Valenciennes, 1836 (Osteichthyes, Perciformes). *Bull. Zoo. Nom.,* 50(2):144-147.

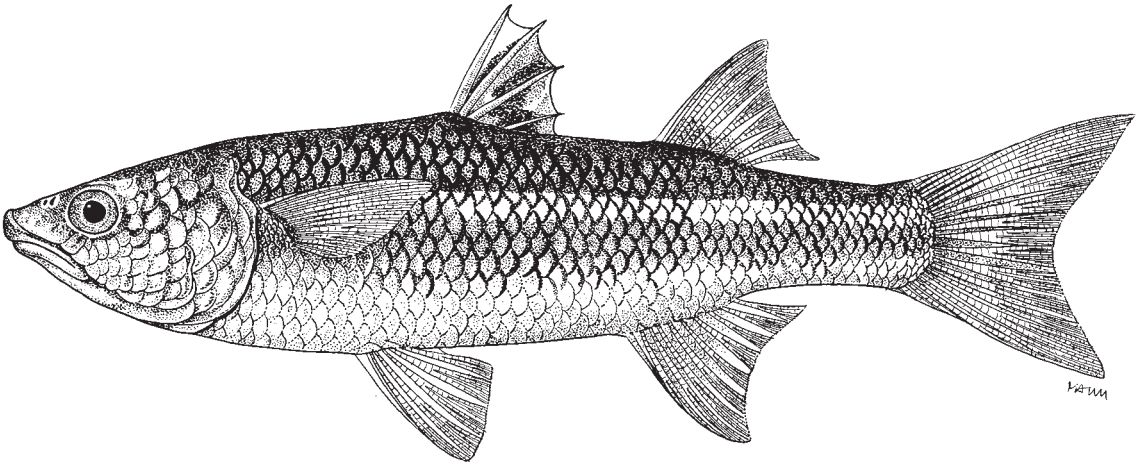
Menezes, N.A. 1983. Guia prático para conhecimento e identifição das tainhas e paratis (Pisces, Mugilidae) do litoral brasileiro. *Revista Brasiliera de Zoologia, São Paulo* 2(1):1-12.

Thomson, J.M. 1997. The Mugilidae of the World. *Mem. Queens. Mus.,* 41(3):457-562.

Agonostomus monticola (Bancroft in Griffith and Smith, 1834)

Frequent synonyms / misidentifications: *Agonostomus hancocki* Seale, 1932 / None.

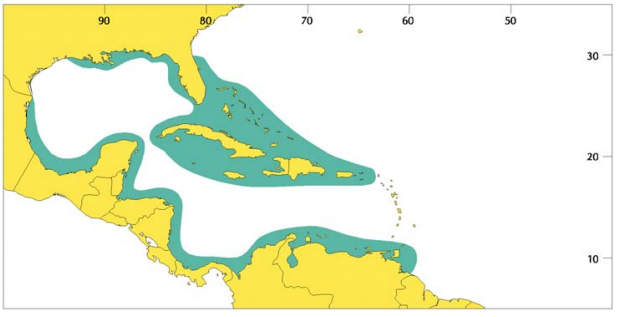
FAO names: En - Mountain mullet; **Fr** - Mulet de fleuve; **Sp** - Lisa de río.



Diagnostic characters: Body depth greater at origin of first dorsal fin (24 to 30% standard length) than at origin of anal fin (20 to 25% standard length). **Head deeper than wide at level of posterior of operculum; dorsal surface of head convex across posterior interorbit** (head flattened across interorbit in *Mugil*). **Teeth small and attached directly to jaw bones (not born on edge of lip). Upper jaw (under microscope) with several rows of teeth with unicuspid, bicuspid, or tricuspid tips. Lower jaw (under microscope) with 2 or more rows of unicuspid or bicuspid teeth; teeth on opposite sides of lower jaw almost meeting at dentary symphysis. Translucent adipose eyefold absent** (present in *Mugil* over 30 mm standard length). **Gill rakers on lower part of first gill arch 16 to 23** (27 or more in other mullets). **Second dorsal and anal fins with small scales on anterior basal parts, otherwise naked**. Second dorsal fin with 9 soft rays. **Anal fin with 2 spines and 10 soft rays in adults**. Pectoral fin with 1 'spine' and 14 or 15 soft rays, reaching to level of origin of first dorsal fin or just anterior to this; pectoral fin 17 to 22% standard length, **70 to 78% head length. Scales in longitudinal series 38 to 45 (mode 40); 11 to 13 in transverse series**; 9 to 11 scales in longitudinal series anterior to tip of pectoral fin; 20 to 22 scales in circumpeduncular series. Pharyngobranchial organ not developed (well developed with large denticulate area, broad sulcus, and valve in *Mugil*). **Colour:** brownish dorsally, flanks silvery and abdomen off-white; silvery band may be present from base of pectoral fin to caudal fin. First dorsal fin yellowish, with darker pigmentation over spines; second dorsal fin yellowish, dusky along distal margin. Anal fin pale, with indistinct dark band near distal margin. Caudal fin dusky yellowish, with dark spot at centre of its origin, and with dark distal margins. Pectoral fins with small dark spot at origin.

Size: Reported to about 36 cm total length.

Habitat, biology, and fisheries: Adults inhabit fresh-water streams but probably spawn in lower reaches of rivers or the sea. Spawning is correlated with peak rainfall. Larval and juvenile specimens have been collected from river mouths and offshore waters. Omnivorous, feeding mainly on insects, prawns, fruits, and algae. Small commercial and subsistence fishery in the West Indies and Central America.



Distribution: Fresh-water streams of the Bahamas, Greater Antilles (perhaps also the Lesser Antilles), the Atlantic and Pacific slopes of Central America and Colombia, and Atlantic draining rivers of Venezuela. Rarely reported from rivers and streams of the southern USA (Florida and Louisiana). Also known from the Galapagos Islands.

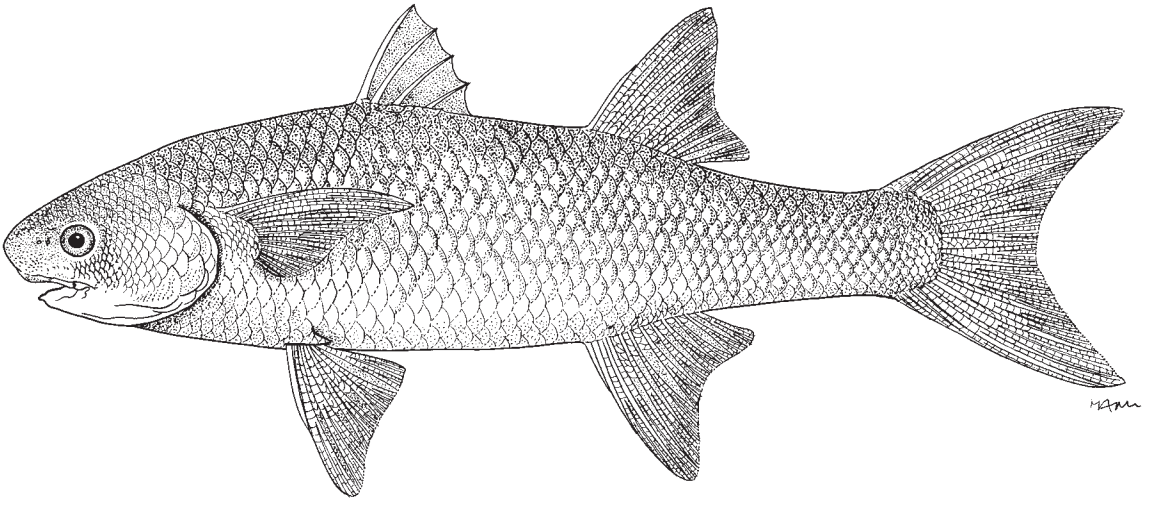
Remarks: It is possible that *A. monticola*, as currently recognized, includes more than 1 species.

Joturus pichardi Poey, 1860

MUA

Frequent synonyms / misidentifications: None / None.

FAO names: En - Bobo mullet; **Fr** - Mulet bobo; **Sp** - Lisa bobo (Cuyamel).

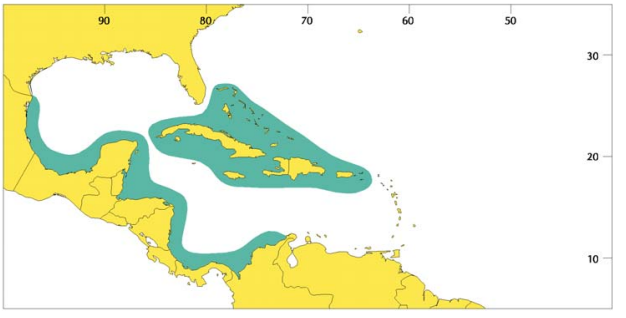


Diagnostic characters: Body depth greater at origin of first dorsal fin (about 28% standard length) than at origin of anal fin (about 24% standard length). **Head considerably deeper than wide at level of posterior of operculum; dorsal surface of head distinctly convex across posterior interorbit** (head flatened across interorbit in *Mugil*). **Mouth inferior, with snout projecting anteriorly beyond upper lip (except in specimens less than 6 cm). Teeth small and attached directly to jaw bones (not born on edge of lip). Upper jaw (under microscope) with about 3 rows of multicuspid teeth. Opposite sides of lower jaw with a more or less oval patch of teeth; these 2 patches reasonably well separated at dentary symphysis. Translucent adipose eyefold absent. Gill rakers on lower part of first gill arch 27 to 40. Second dorsal and anal fins well-covered by small scales in adults. Second dorsal fin with 10 soft rays. Anal fin with 2 spines and 11** (rarely 10) **soft rays in adults**. Caudal fin forked. **Pectoral fin** with 1 'spine' and around 15 to 18 soft rays, reaching to level of origin of first dorsal fin; pectoral fin 19 to 22% standard length, **80 to 99% head length. Scales in longitudinal series 42 to 46; 13 or 14 in transverse series**; 11 to 13 scales in longitudinal series anterior to tip of pectoral fin; 20 scales in circumpeduncular series. Pharyngobranchial organ very poorly developed, represented only by a shallow, rudimentary sulcus between the second and third pharyngobranchials (well developed with large denticulate area, broad sulcus, and valve in *Mugil*). **Colour:** specimens less than 15 cm are silvery white, with dark bars on the dorsal, anal, and caudal fins. Body coloration changes with growth to a silvery grey, and later dark greenish grey; ventral parts of head may be yellowish. Dorsal fins dark at base (perhaps reddish on second dorsal fin), with yellowish green margins; anal and caudal fins also dark at base and covered with irregular black and yellow blotches. Pelvic and pectoral fins dark at base (perhaps reddish on pectoral fin) and yellowish near tips.

Size: Largest reported specimen is 49.1 cm standard length (61.4 cm total length).

Habitat, biology, and fisheries: Adults inhabit fresh-water streams but probably spawn in lagoons or the sea. Spawning perhaps correlated with peak rainfall. Juvenile *J. pichardi* feed on insects and algae; adults are principally herbivorous, browsing algae from rock surfaces. FAO statistics report capture production from 283 to 572 t from 1995 to 1999.

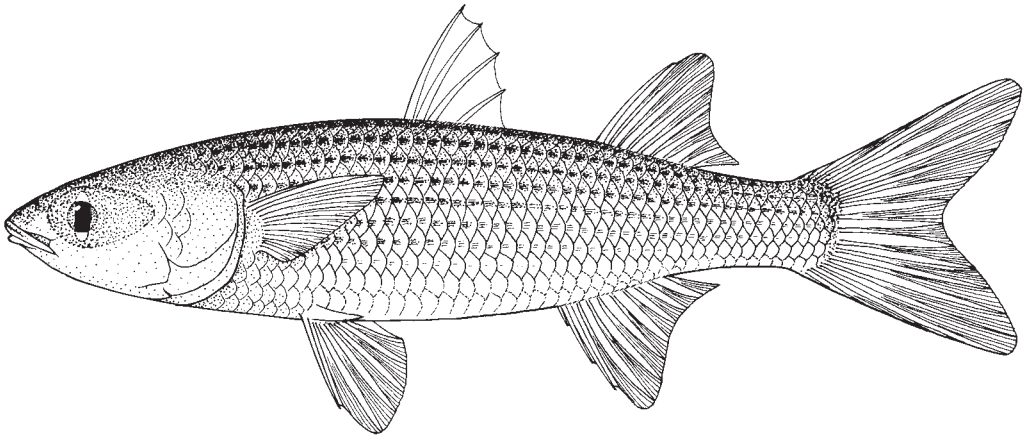
Distribution: Fresh-water streams of the Bahamas and Greater Antilles (perhaps also the Lesser Antilles), and the Atlantic and Pacific slopes of Central America and Colombia.



Mugil cephalus Linnaeus, 1758 MUF

Frequent synonyms / misidentifications: *Mugil our* Forsskål, 1775; *Mugil platanus* Günther, 1880 / *Mugil brasiliensis* Spix in Spix and Agassiz, 1831.

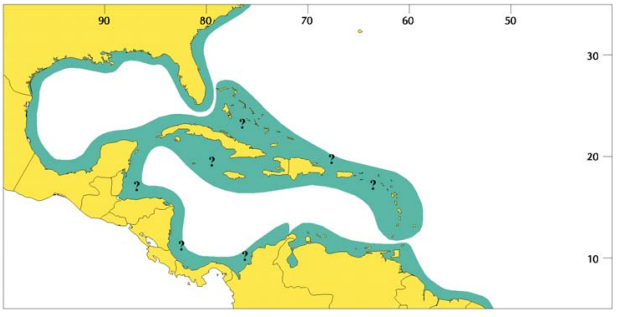
FAO names: En - Flathead mullet (AFS: Striped mullet); **Fr** - Mulet à grosse tête; **Sp** - Lisa pardete.



Diagnostic characters: Body depth greater at origin of first dorsal fin (24 to 28% standard length) than at origin of anal fin (20 to 24% standard length). Head depth equal to or greater than head width at level of posterior of operculum. Teeth very small, either not visible to naked eye, or just visible, appearing as a fine fringe. Upper lip (under microscope) with outer row of moderately close-set, unicuspid teeth, and 1 to 6 inner rows of smaller, bicuspid teeth. Lower lip (under microscope) with outer row of moderately close-set unicuspid teeth, and 1 to 6 inner rows of smaller, bicuspid teeth either present or absent (these rows usually less numerous than the inner rows of bicuspid teeth of the upper lip). **Origin of fully erected second dorsal fin just posterior to vertical level of origin of anal fin. Second dorsal and anal fins with small scales on anterior basal parts, otherwise naked. Anal fin with 3 spines and 8 soft rays in adults** (first spine very short, and may be hidden by overlying scales); usually 2 spines and 9 soft rays in juveniles about 30 mm or less in standard length. **Pectoral fin with 1 'spine' and 15 or 16** (rarely 17) **soft rays, not reaching level of origin of first dorsal fin**; pectoral fin 16 to 19% standard length, 67 to 76% head length. Longitudinal series scale count **usually 36 to 40 (mode 38)** for specimens from Western Central Atlantic (global range is 36 to 44); **13 to 15 in transverse series**; 8 to 11 scales in longitudinal series anterior to tip of pectoral fin; **19 or 20 scales in circumpeduncular series. Colour:** specimens from sea greyish olive or greyish brown dorsally, flanks silvery, and abdomen off-white; **about 7 to 10 longitudinal dark stripes along flanks, following rows of scales; these stripes less conspicuous ventrally**. Estuarine fish may be a duller blue or dirty brown dorsally and flanks are duller. Dorsal fins and caudal fin dusky; pelvic and anal fins pale. Pectoral fins with dark spot at origin.

Size: Maximum reported length is 120 cm (standard length); common to 35 cm total length.

Habitat, biology, and fisheries: Adults in inshore marine waters, estuaries, lagoons, and rivers. Forms schools. Juveniles feed on plankton; adults feed on organic detritus. Large fisheries from Venezuela and Atlantic coast of Mexico (5 151 and 4 872 t respectively in 1999). Commercial fishery off Florida. Caught using gill nets, seines, etc. Used in aquaculture in the Gulf of Mexico. Marketed fresh, salted, and frozen; roe sold fresh or smoked. May be marketed as "lisa."

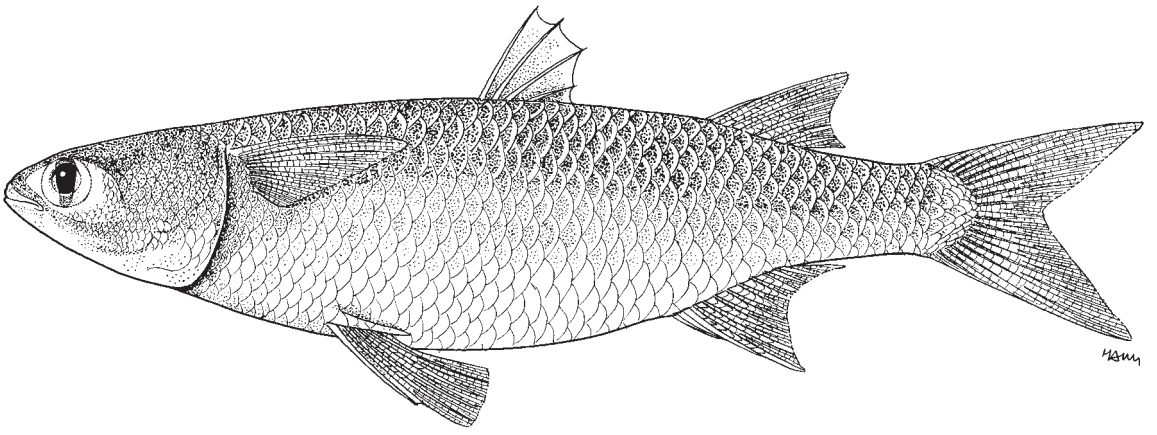


Distribution: Worldwide from 51 N to 42 S, although less abundant in tropics. In western Atlantic from Nova Scotia to Argentina, including Gulf of Mexico. Usually reported as absent from the Bahamas, Antilles, and Caribbean coast of Central America and Colombia (but perhaps misidentified as *M. brasiliensis*).

Mugil curema Valenciennes in Cuvier and Valenciennes, 1836 MGU

Frequent synonyms / misidentifications: *Querimana harengus* (Günther, 1861) / *Mugil brasiliensis* Spix in Spix and Agassiz, 1831; *Mugil gaimardianus* Desmarest in Bory de Saint-Vincent, 1831.

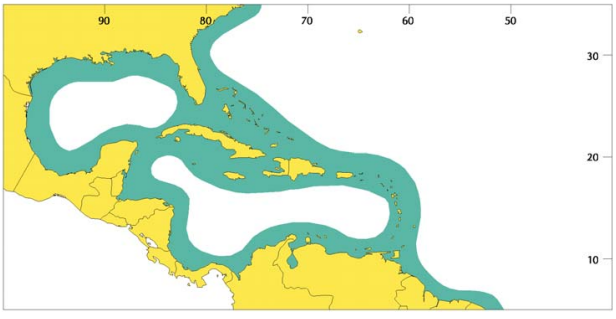
FAO names: En - White mullet; **Fr** - Mulet blanc; **Sp** - Lisa blanca.



Diagnostic characters: Body depth greater at origin of first dorsal fin (26 to 30% standard length) than at origin of anal fin (21 to 27% standard length). Head deeper than wide at level of posterior of operculum. Teeth very small, either not visible to naked eye or just visible, appearing as a fine fringe. Upper lip (under microscope) with outer row of moderately close-set, unicuspid teeth, and an inner row of less closely-set and slightly smaller teeth may be present just posterior to the outer row. Lower lip (under microscope) with single row of unicuspid teeth, which are usually smaller than teeth in outer row on upper lip. Origin of first dorsal fin midway between tip of snout and base of caudal fin, or slightly closer to latter. **Second dorsal and anal fins well-scaled in adults, with small scales over all parts of the fins** (less densely scaled in specimens under about 50 mm standard length). **Anal fin with 3 spines and 9 soft rays in adults** (first spine very short, and may be hidden by overlying scales); usually 2 spines and 10 soft rays in juveniles about 30 mm or less in standard length. **Pectoral fin with 1 'spine' and 15 to 17** (usually 16) **soft rays, usually not quite reaching level of origin of first dorsal fin** (see remarks below); **pectoral fin 16 to 21% standard length, 70 to 82% head length. Scales in longitudinal series 35 to 40 (mode 37)** for specimens from Western Central Atlantic; **11.5 to 13** (rarely 14.5) **in transverse series; 8 to 10 scales in longitudinal series anterior to tip of pectoral fin**; 17 to 19 scales in circumpeduncular series. **Colour:** specimens from sea bluish green or olive dorsally, flanks silvery, and abdomen off-white. Yellowish blotch between eye and upper edge of operculum. Dorsal fins dusky, second dorsal fin may be slightly darker than first dorsal fin. Caudal fin yellowish at origin and with blackish margin. Anal and pelvic fins pale yellowish. Pectoral fins with dark spot at origin.

Size: Maximum reported total length about 91 cm, but more common to 35 cm total length.

Habitat, biology, and fisheries: Adults in inshore marine waters and estuaries; not usually found in fresh waters Forms schools; spawns offshore. Juveniles feed on plankton; adults feed on organic detritus and small particulate materials. Major commercial fishery; caught using gill nets, seines, etc. Used in aquaculture in Caribbean, Colombia and Brazil. Marketed fresh, salted, and frozen; roe sold fresh or smoked. May be marketed as "lisa."

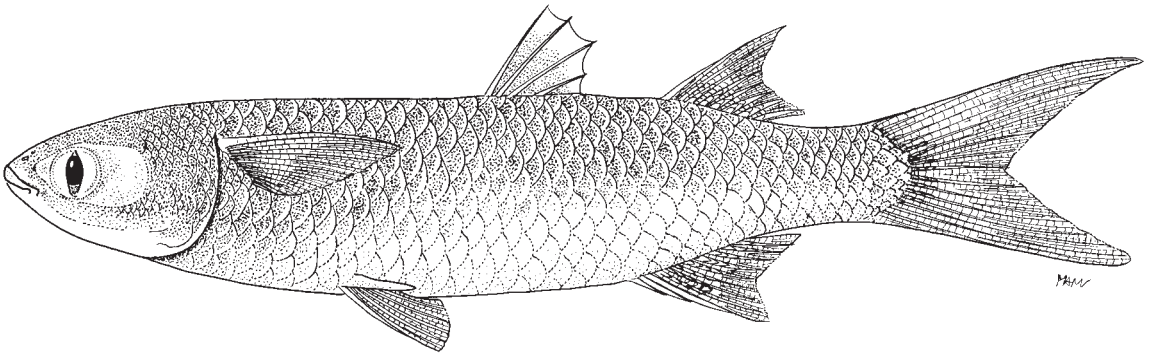


Distribution: Common through the Western Central Atlantic, including Bermuda, the Caribbean, and the Gulf of Mexico. Reported in the western Atlantic from Nova Scotia to southern Brazil. Also found in the eastern Atlantic from Senegal and the Cape Verde Islands to Namibia at about 20 S.

Mugil curvidens Valenciennes in Cuvier and Valenciennes, 1836

Frequent synonyms / misidentifications: *Myxus curvidens* (Valenciennes in Cuvier and Valenciennes, 1836); *Querimana curvidens* (Valenciennes in Cuvier and Valenciennes, 1836) / *Mugil trichodon* Poey, 1875.

FAO names: En - Dwarf mullet; **Fr** - Mulet mignon; **Sp** - Lisa enana.

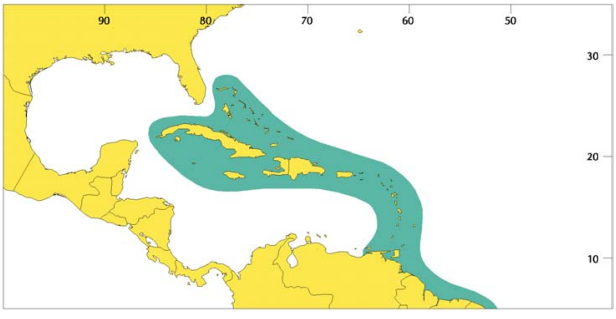


Diagnostic characters: Body depth greater at origin of first dorsal fin (usually 25 to 29% but may reach 33% standard length) than at origin of anal fin (usually 21 to 25% but may reach 27% standard length). Head deeper than wide at level of posterior of operculum. Depth of medial part of upper lip 5% or less of head length; lower lip may have its anterior margin slightly turned out and down. **Teeth usually just visible to naked eye (except in small specimens). Upper lip (under microscope) with outer row of close-set, long, unicuspid teeth which have their tips recurved in towards the mouth (these teeth usually visible to naked eye as fringe along the lip), and an inner row of less closely-set and smaller unicuspid teeth. Lower lip (under microscope) with single row of close-set, long, unicuspid teeth with recurved tips (teeth on lower lip sometimes smaller than those on upper lip). Second dorsal and anal fins well-scaled in specimens over 60 mm standard length, with small scales over all parts of the fins; in specimens under 60 mm standard length the distal parts of the fins may not be scaled. Second dorsal fin with 9 soft rays** (usually 8 in *Mugil trichodon*). **Anal fin with 3 spines and 8** (rarely 7) **soft rays in adults** (first spine very short, and may be hidden by overlying scales); 2 spines and 9 soft rays in some specimens under 58 mm standard length. **Pectoral fin with 1 'spine' and 14 or 15** (rarely 16) **soft rays in adults; pectoral fin not quite reaching level of origin of first dorsal fin**; pectoral fin 20 to 23% standard length, 70 to 80% head length. **Scales in longitudinal series 34 to 37 (mode 35), rarely 33 or 38; 11.5 to 12.5 in transverse series; 9 or 10 (rarely 8) scales in longitudinal series anterior to tip of pectoral fin; 18 (rarely 17) scales in circumpeduncular series. Colour:** dark bluish grey dorsally, flanks silvery and abdomen off-white. Pectoral fins with dark bluish spot at origin.

Size: Largest observed specimen for Western Central Atlantic area is 18 cm standard length (27 cm specimen collected from Brazil). More common under 10 cm.

Habitat, biology, and fisheries: An uncommon species. Perhaps caught incidentally with other mullets.

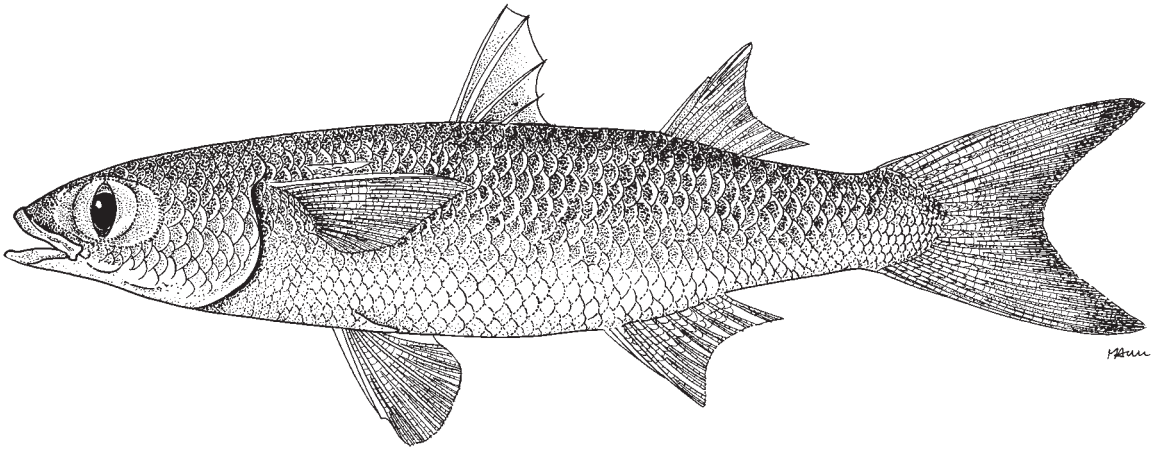
Distribution: In the western Atlantic from Bermuda, the Bahamas, the Antilles, and south to Rio de Janeiro, Brazil. Also collected from Ascension Island in the mid-Atlantic.



Mugil hospes Jordan and Cuvier in Jordan, 1895

Frequent synonyms / misidentifications: None / *Mugil curema* Valenciennes in Cuvier and Valenciennes, 1836.

FAO names: En - Hospe mullet; **Fr** - Mulet hospe; **Sp** - Lisa hospe.

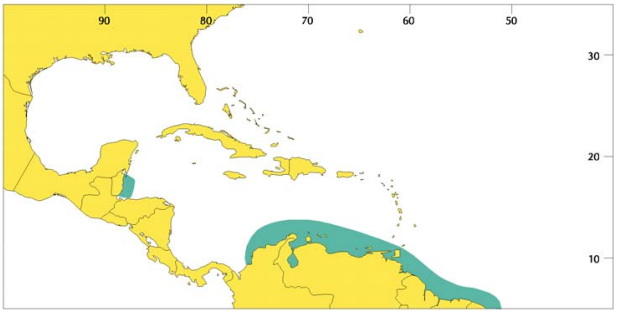


Diagnostic characters: Body elongate, snout appears slightly pointed. Body depth usually slightly greater at origin of first dorsal fin (22 to 26% standard length) than at origin of anal fin (21 to 23% standard length). Head deeper than wide at level of posterior of operculum. Upper and lower lips with a row of moderately spaced, minute teeth, not usually visible to naked eye. Usually only 1 row of teeth visible on both lips (under microscope), but upper lip sometimes has an inner row of extremely small teeth. Origin of first dorsal fin usually midway between tip of snout and base of caudal fin. **Second dorsal and anal fins with small scales over most or all parts of the fins in adults** (less densely scaled in specimens under about 50 mm standard length). **Anal fin with 3 spines and 9** (rarely 8) **soft rays in adults** (first spine very short, and may be hidden by overlying scales); usually 2 spines and 9 soft rays in juveniles about 30 mm or less in standard length. **Pectoral fin with 1 'spine' and 13 or 14 soft rays in adults; pectoral fin long, reaching level of origin of first dorsal fin or extending just beyond this; pectoral fin 21 to 24% standard length, 80 to 96% head length. Scales in longitudinal series 37 to 40 (mode 38, rarely 36); 11.5 to 14 in transverse series; 11 to 13 scales in longitudinal series anterior to tip of pectoral fin**; 19 scales in circumpeduncular series. **Colour:** dark green or grey dorsally, flanks silvery, and abdomen off-white. Dorsal fins and caudal fin dusky; distal tips of anterior rays of second dorsal fin slightly darker; pelvic and anal fins pale. Pectoral fins with dark spot at origin.

Size: Reaching about 25 cm standard length.

Habitat, biology, and fisheries: Adults inhabit inshore marine waters and may enter river mouths; reported over sand and mud bottoms. No fisheries data; apparently caught incidentally along the Atlantic coast of South America from Venezuela to French Guiana.

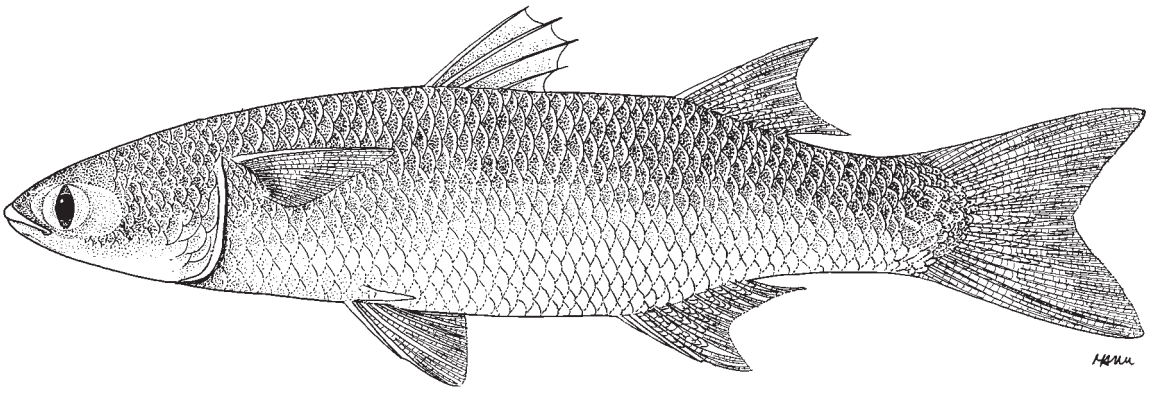
Distribution: Usually found in Atlantic coastal waters of South America, from Colombia to Brazil; the presence of *M. hospes* in the West Indies is not confirmed. Also collected from coastal waters around Belize City, and reported in the eastern Pacific from Mexico to Equador.



Mugil incilis Hancock, 1830 MGI

Frequent synonyms / misidentifications: None / None.

FAO names: En - Parassi mullet (Trench mullet); **Fr** - Mulet parassi; **Sp** - Lisa rayada.

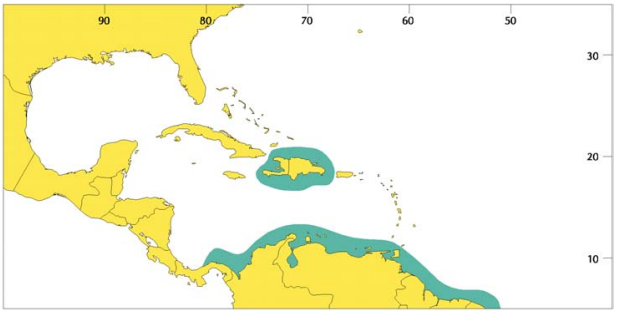


Diagnostic characters: Body depth greater at origin of first dorsal fin (21 to 28% standard length) than at origin of anal fin (20 to 24% standard length). Head usually deeper than wide at level of posterior of operculum. Teeth very small, not visible to naked eye or just visible, appearing as a fine fringe. Upper lip (under microscope) with an outer row of slightly recurved, unicuspid teeth, which are slightly spaced from each other, and an inner row of smaller teeth may be present just posterior to the outer row. Lower lip (under microscope) with single row of fine teeth, smaller than teeth in outer row on upper lip and sometimes absent. Origin of first dorsal fin usually slightly closer to tip of snout than base of caudal fin. Second dorsal and anal fins well-scaled in adults, with small scales over all parts of the fins. Anal fin with 3 spines and 9 soft rays in adults (first spine very short, and may be hidden by overlying scales); usually 2 spines and 9 soft rays in juveniles about 30 mm or less in standard length. **Pectoral fin with 1 'spine' and 15 or 16 soft rays, usually not quite reaching level of origin of first dorsal fin**; pectoral fin 19 to 22% standard length, 78 to 87% head length. **Scales in longitudinal series 43 to 47 (mode 45); 13 to 15 in transverse series; 10 or 11** (rarely 9) **scales in longitudinal series anterior to tip of pectoral fin; 21 to 23 scales in circumpeduncular series. Colour:** bluish grey or olivaceous dorsally, flanks silvery, and abdomen off-white. Dorsal fins and caudal fin dusky; distal tips of anterior rays of second dorsal fin are slightly darker; pelvic and anal fins pale. Pectoral fins with dark spot at origin.

Size: Reaching about 40 cm total length.

Habitat, biology, and fisheries: Adults inhabit inshore marine waters and estuaries; may enter fresh water. No fisheries data; apparently caught incidentally throughout its range.

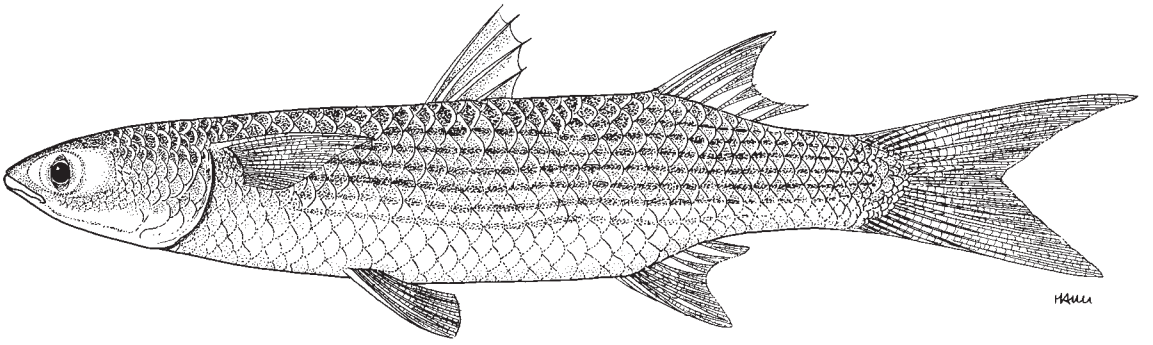
Distribution: Reported in the Caribbean from Haiti and Panama, and on the western Atlantic coast of South America to southeastern Brazil.



Mugil liza Valenciennes in Cuvier and Valenciennes, 1836 MUB

Frequent synonyms / misidentifications: *Mugil lebranchus* Poey, 1860 / *Mugil brasiliensis* Spix in Spix and Agassiz, 1831.

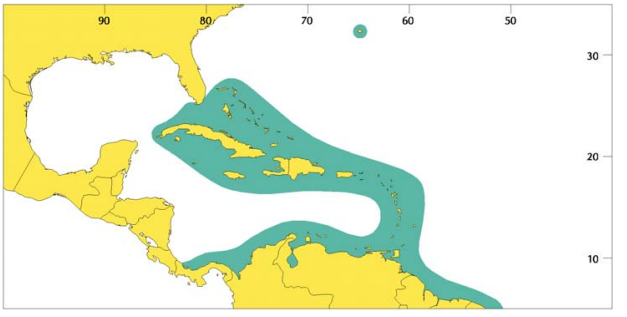
FAO names: En - Lebranche mullet (AFS: Liza); **Fr** - Mulet lébranche; **Sp** - Lebranche.



Diagnostic characters: Body moderately elongate; body depth usually slightly greater at origin of first dorsal fin (17 to 23% standard length) than at origin of anal fin (19 to 20% standard length). Head wider than deep at level of posterior of operculum. Teeth very small, either not visible to naked eye, or just visible, appearing as a fine fringe. Upper lip (under microscope) with outer row of moderately close-set, unicuspid teeth, and 1 to 6 inner rows of bicuspid teeth. Lower lip (under microscope) with outer row of close-set unicuspid teeth, and 1 to 5 inner rows of bicuspid teeth usually present (these rows are usually less numerous than the inner rows of bicuspid teeth of the upper lip, or may be absent). **Origin of fully erected second dorsal fin on vertical through anterior quarter to third of anal fin. Second dorsal and anal fins with small scales on anterior basal parts, otherwise naked. Anal fin with 3 spines and 8 soft rays in adults** (first spine very short, and may be hidden by overlying scales); usually 2 spines and 9 soft rays in juveniles about 30 mm or less in standard length. **Pectoral fin with 1 'spine' and 15 to 17** (usually 16) **soft rays, not reaching level of origin of first dorsal fin**; pectoral fin 16 to 19% standard length, 67 to 76% head length. **Scales in longitudinal series 29 to 34 (mode 33, rarely 35 or 36); 10.5 to 13 in transverse series**; 7 to 9 scales in longitudinal series anterior to tip of pectoral fin; 17 to 20 scales in circumpeduncular series. **Colour:** dusky bluish dorsally, flanks silvery, and abdomen off-white; **several indistinct longitudinal dark stripes along flanks, following rows of scales**. Pelvic fins pale or yellowish, all other fins dusky.

Size: Maximum reported total length is 100 cm, but more common to about 40 cm total length.

Habitat, biology, and fisheries: Adults inhabit inshore marine waters and brackish water lagoons; may occasionally enter fresh water but never ascends far upriver. Diet probably similar to *M. cephalus*. Fisheries also reported for Colombia, Cuba, and Brazil (Rio de Janeiro state). Large recorded fishery in Venezuela (2 855 t in 1999). Probably caught throughout its range with gill nets, seines, etc. Aquaculture of *M. liza* has been attempted in Cuba and Colombia. Marketed fresh and salted.

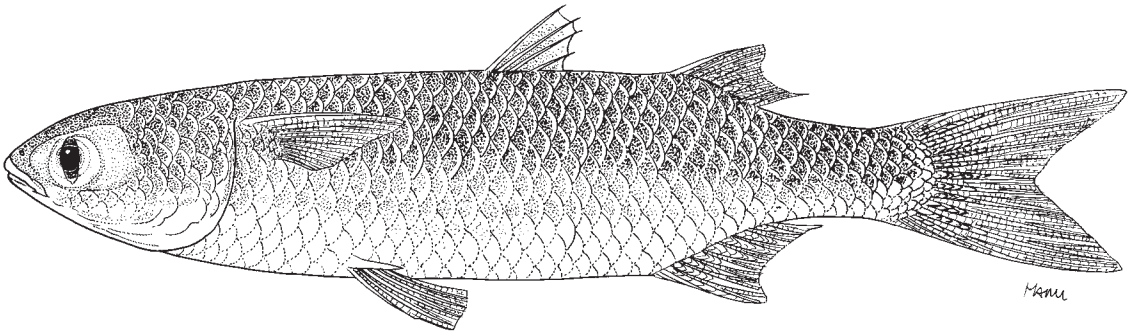


Distribution: Present in inshore waters around Bermuda and southern Florida, the West Indies, the Caribbean coast of Panama, Colombia and Venezuela, and the Atlantic coast of South America, extending south as far as Rio de Janeiro.

Mugil trichodon Poey, 1875 MMW

Frequent synonyms / misidentifications: ?*Querimana gyrans* Jordan and Gilbert, 1884; *Mugil brasiliensis* (of Jordan and Swain, 1884) / *Mugil curvidens* Valenciennes in Cuvier and Valenciennes, 1836).

FAO names: En - Fantail mullet; **Fr** - Mulet éventail; **Sp** - Lisa amarilla.

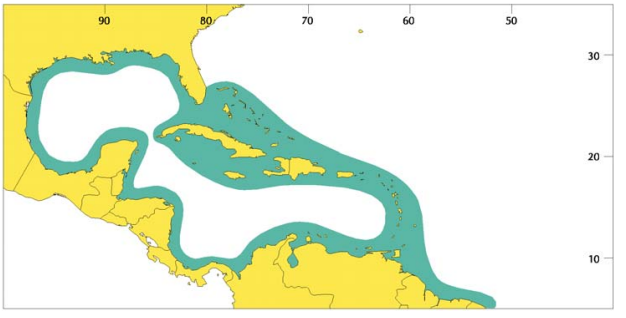


Diagnostic characters: Body depth greater at origin of first dorsal fin (26 to 32% standard length) than at origin of anal fin (25 to 29% standard length). Head deeper than wide at level of posterior of operculum. Depth of medial part of upper lip 5 to 8% of head length. Teeth usually just visible to naked eye (except in small specimens). Upper lip (under microscope) with outer row of moderately large and sturdy unicuspid teeth, reasonably spaced from each other and usually with the tips only weakly recurved; inner row of smaller, less recurved teeth sometimes present just posterior to the outer row. Lower lip (under microscope) with single row of unicuspid teeth, smaller than those on the upper lip and weakly recurved at tips. Second dorsal and anal fins well-scaled in specimens over 70 mm standard length, with small scales over all parts of the fins; in specimens under 70 mm standard length, distal parts of fins may not be scaled. Second dorsal fin with 8 (or very rarely 9) soft rays (usually 9 in other *Mugil*). **Anal fin with 3 spines and 8 soft rays in adults** (first spine very short, and may be hidden by overlying scales); 2 spines and 9 soft rays in specimens under 30 mm standard length. **Pectoral fin with 1 'spine' and 15 or 16** (rarely 14 or 17) **soft rays in adults; pectoral fin not quite reaching level of origin of first dorsal fin**; pectoral fin 18 to 22% standard length, 69 to 84% head length. **Scales in longitudinal series 28 to 34 (mode 32); 10.5 to 12 in transverse series; 8 to 10 scales in longitudinal series anterior to tip of pectoral fin; 16 scales in circumpeduncular series. Colour:** olive grey dorsally, with bluish reflections; flanks silvery, abdomen off-white. Dorsal fins dusky, anterodorsal margin of second dorsal fin and margin of caudal fin dusky. Anal and pelvic fins pale or yellowish. Pectoral fins with a dark bluish spot at origin. Young fish (less than 14 cm) reported with gold opercular spot and with dark stripes on flanks, which are absent in larger specimens.

Size: Reported to 25 cm standard length.

Habitat, biology, and fisheries: Adults inhabit inshore marine waters, brackish lagoons, and river mouths; perhaps entering fresh water. Apparently caught incidentally along the Atlantic coast of South America from Venezuela to French Guiana. No fisheries data, but an important component of the mullet fishery in the Caribbean and perhaps Colombia. Marketed fresh and salted.

Distribution: Present from Bermuda and southern Florida, through the Gulf of Mexico, the Bahamas, and Antilles, extending south to northeastern Brazil.



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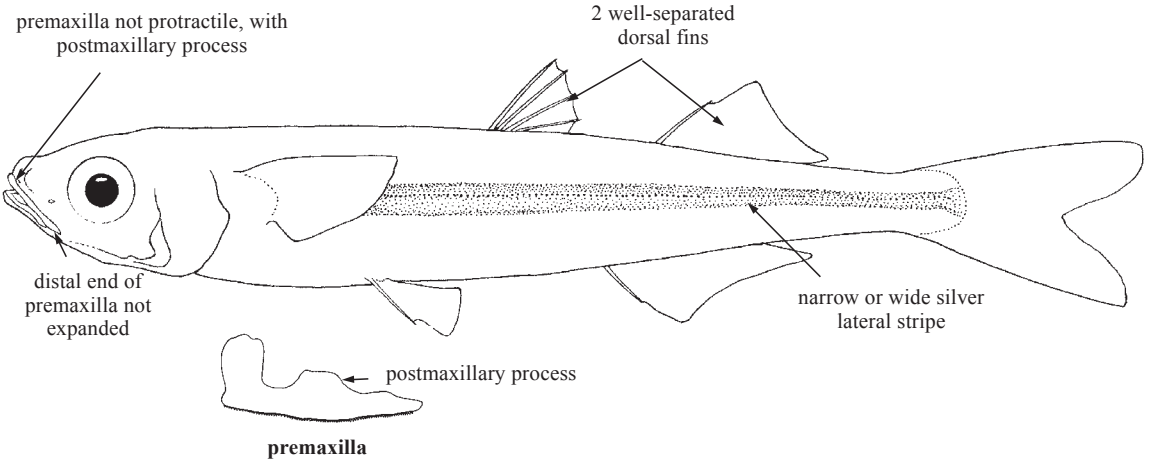
Order ATHERINIFORMES

ATHERINIDAE

Silversides

B. Chernoff, Department of Zoology, Field Museum, Chicago, Illinois, USA

Diagnostic characters: Small fishes less than 100 mm standard length. Terminal mouth, **premaxilla not protractile; distal end of premaxilla not expanded; premaxilla with a postmaxillary process**; small teeth present on both jaws and sometimes the vomer; gill rakers generally large; large eyes; opercular bones without spines. Lateral line sensory system not complete; **anterior infraorbital sensory canal connected to preopercular canal**. Two **well-separated dorsal fins**, the first with 2 to 5 spines, the second with a single anterior spine; anal fin with a single anterior spine; pelvic fin inserted high on body, above midlevel of eye; pelvic fin abdominal with 1 spine and 5 soft rays; caudal fin forked. Scales cycloid; moderately imbricated with smooth, crenate, or laciniate posterior margin. **Colour:** translucent or green-yellow on dorsal surface with dark mid-dorsal stripe; pale to slightly yellowish ventrally; **narrow or wide silver lateral stripe.**

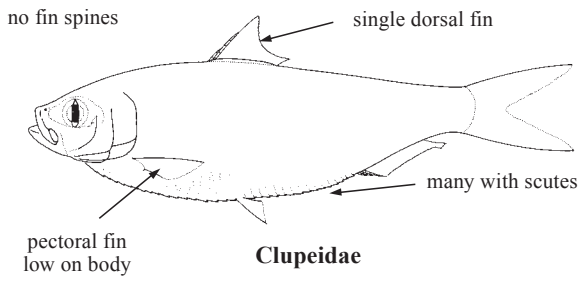


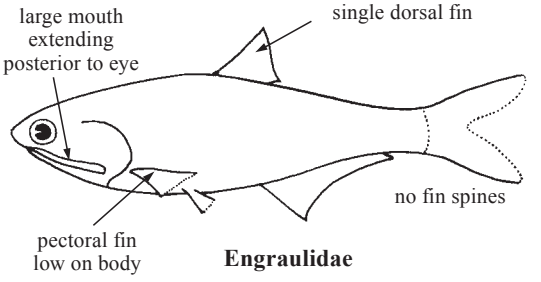
Habitat, biology, and fisheries: The true silversides often form large schools. These are generally omnivorous fishes but tend to consume many organisms in the plankton or those close to the surface. These are principally marine forms and estuarine forms but a few, such as the *Alepidomus evermanni*, also live in fresh water. Other species live among reefs and in surge channels of reefs and rocky coasts where it has been suggested that their silvery bodies are cryptic in the roiled waters of the surf. The economic importance of the true silversides has dwindled where they are now minimally consumed by people but are still used as bait.

Similar families occurring in the area

Clupeidae: a single dorsal fin; lacking fin spines; pectoral fins inserted low on the body; many species possess midventral scutes.

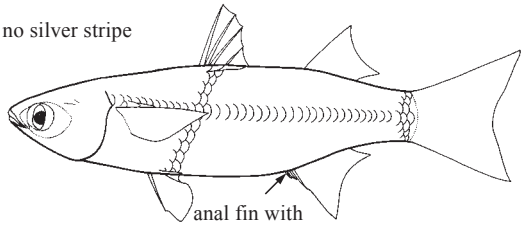
Engraulidae: a single dorsal fin; lacking fin spines; pectoral fins inserted low on the body; large mouth extending posterior to eye with a well-rounded, overslung snout.



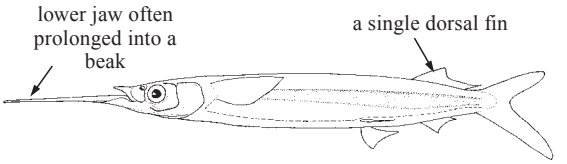


Mugilidae: anal fin with 2 or 3 spines (only 1 in Atherinidae); 24 to 26 vertebrae (more than 30 in Atherinidae); lacking a lateral silver stripe; much larger, exceeding 150 mm standard length.

Hemiramphidae: lower jaw often very proloned into a beak; only a single dorsal fin; lateral line present and runs along the lower portion of the body, just above the pelvic and anal fins.

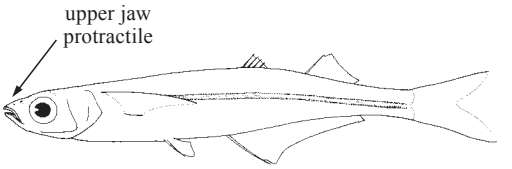


Mugilidae



Hemiramphidae

Atherinopsidae: upper jaw almost always protractile with a fleshy labial ligament (not protractile and ligament slender in Atherinidae); distal end of premaxilla usually very expanded (narrow and pointed in Atherinidae); premaxilla lacking a postmaxillary process (present in Atherinidae); preopercular sensory canal connects to mandibular canal (connects to anterior infraorbital canal in Atherinidae).



Atherinopsidae

Key to the species of Atherinidae occurring in the area

1a. Anterior part of breast to gular region naked; scale rows from side of anal fin to mid-dorsal row 10; gill rakers on first arch less than or equal to 21; lateral silver stripe less than or equal to half scale height below dorsal fin (Fig. 1) . . . . . ***Alepidomus evermanni***

1b. Anterior breast to gular region fully scaled; scale rows from side of anal fin to mid-dorsal row less than or equal to 7; gill rakers on first arch greater than or equal to 24; lateral silver stripe greater than or equal to 3/4 of scale height below dorsal fin . . . . . → ***2***

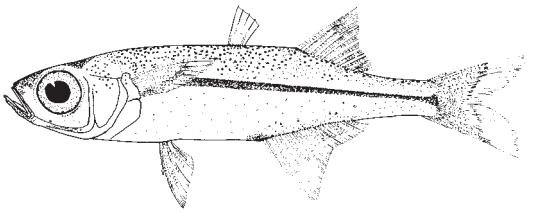


Fig. 1 ***Alepidomus evermanni***

2a. Coronoid process of mandible not elevated; patch of teeth in mandible projecting anteriorly near mental symphysis; vomerine and metapterygoid teeth numerous; bases of dorsal and anal fins scaled (Fig. 2) . . . . . ***Atherinomorus stipes***

2b. Coronoid process of mandible elevated; no patch of teeth on mandible projecting anteriorly; vomerine and metapterygoid teeth few or absent; bases of dorsal and anal fins not scaled (Fig. 3) . . . . . ***Hypoatherina harringtonensis***

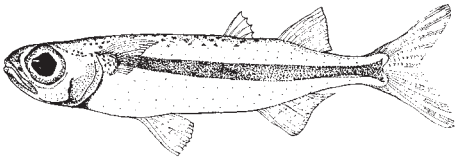


Fig. 2 ***Atherinomorus stipes***

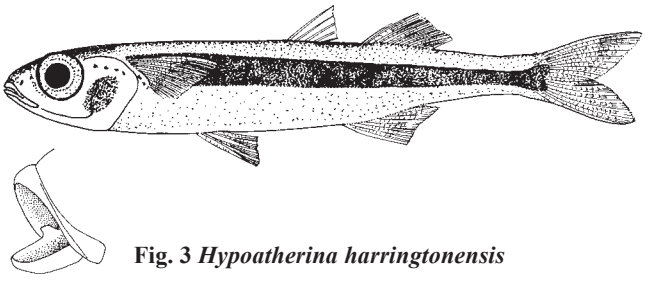


Fig. 3 ***Hypoatherina harringtonensis***

List of species occurring in the area

The symbol is given when species accounts are included.

Alepidomus evermanni (Eigenmann, 1903).

Atherinomorus stipes (Müller and Troschel, 1848).

Hypoatherina harringtonensis (Goode, 1877).

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Böhlke, J.E. and C.C.G. Chaplin. 1993. *Fishes of the Bahamas and Adjacent Tropical Waters. Second Edition.* Austin, Texas, University of Texas Press, 771 p.

Chernoff, B. 1986. Phylogenetic relationships and reclassification of menidiine silverside fishes, with emphasis on the tribe Membradini. *Proc. Acad. Nat. Sci.*, 138:189-249.

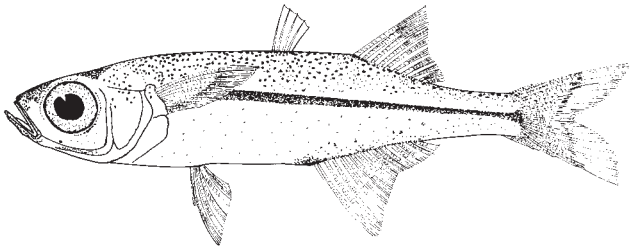
Dyer, B. and B. Chernoff. 1996. Phylogenetic relationships and reclassification of atheriniform fishes. *Zool. J. Linnean Society*, 117:1-69.

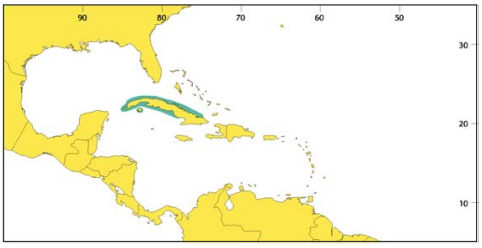
Schultz, L.P. 1948. A revision of six subfamilies of atherine fishes, with descriptions of new genera and species. *Proc. U.S. Nat. Mus.*, 98(3220):1-48.

Alepidomus evermanni (Eigenmann, 1903)

En - Cuban silverside.

Maximum length 50 mm standard length; commonly 35 mm standard length. Very lightly coloured; lateral stripe thin. Primarily fresh water but occasionally found in estuaries or on the coast near mouths of rivers and in flooded mangroves. Known only from Cuba.

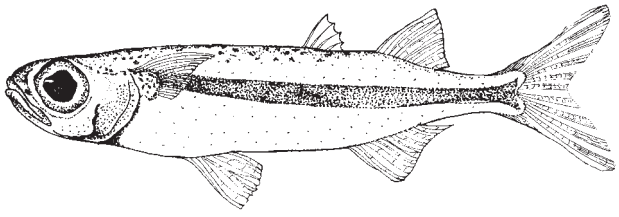


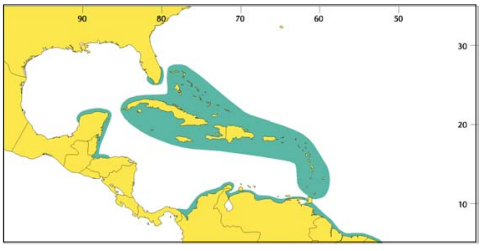


Atherinomorus stipes (Müller and Troschel, 1848)

En - Hardhead silverside; **Fr** - Athérine tête-dure; **Sp** - Tinícalo cabezón.

Maximum length 100 mm standard length; commonly 60 mm standard length. Olivaceous above with pale or translucent lower sides; dorsum and upper sides strongly crosshatched; caudal lobes often black in large specimens. One of the most abundant silverside species occupying pelagic costal habitats, especially over turtle grass beds and along the upper portions of coral reefs. Ranges from south Florida across the Caribbean to the Yucatán and down to Argentina.

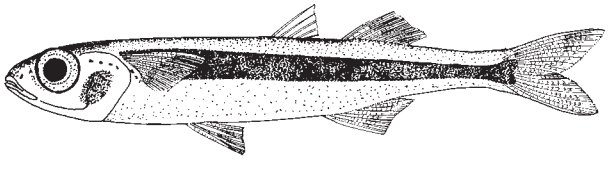


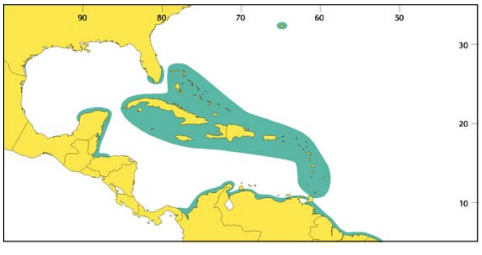


Hypoatherina harringtonensis (Goode, 1877)

En - Reef silverside; **Fr** - Athérine des récifs; **Sp** - Tinícalo de arrecife.

Maximum length 100 mm standard length; commonly 60 mm standard length. Colour in life is greenish dorsally to silver ventrally; upper sides and dorsum darkly peppered and occasionally crosshatched; silver stripe very wide and bordered dorsally by black. This species often lives in dense schools and is pelagic in coastal and offshore environments, entering turtle grass beds in the evening. Ranges from Bermuda, southern Florida, across the Caribbean to the Yucatán and down to Argentina.



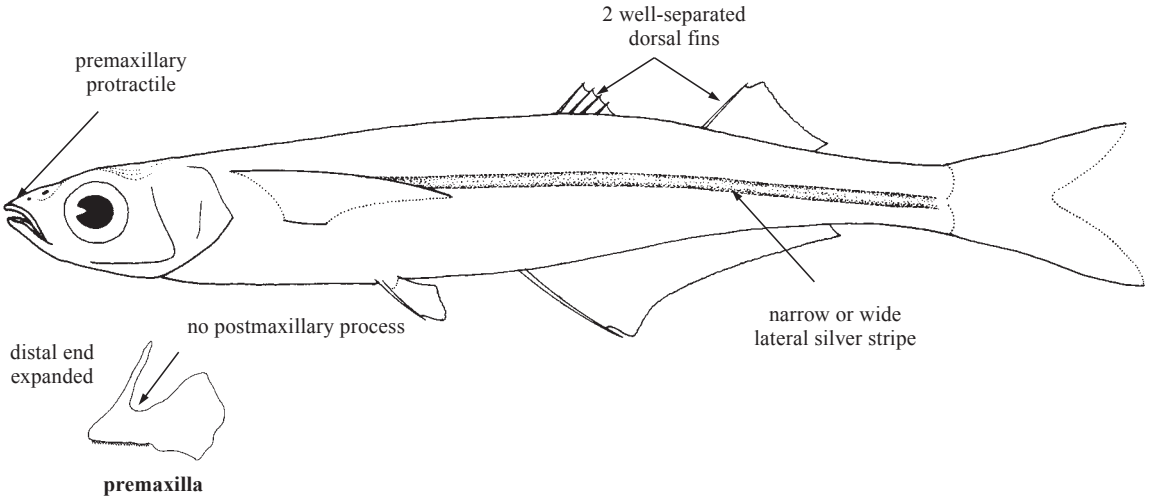


ATHERINOPSIDAE

New World silversides

B. Chernoff, Department of Zoology, Field Museum, Chicago, Illinois, USA

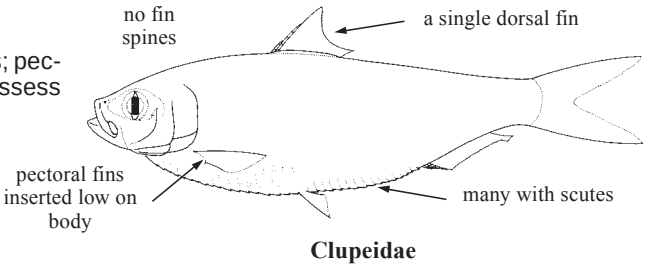
Diagnostic characters: Mostly small fishes less than 150 mm standard length though some species in the eastern Pacific exceed 1 m. Terminal mouth, **premaxillary protractile**, usually highly protractile; **distal end of the premaxilla expanded**, reduced slightly in a few species; **premaxilla lacks postmaxillary process**; small teeth present on both jaws and sometimes on vomer and under the eyes on the mesopterygoid; gill rakers generally large; large eyes; opercular bones without spines. Lateral line sensory system not complete; **mandibular sensory canal connected to preopercular canal**. Two **well-separated dorsal fins**, the first with 2 to 9 spines, the second with a single anterior spine; anal fin with a single anterior spine; pelvic fin inserted high on body, above midlevel of eye; pelvic fin abdominal with 1 spine and 5 soft rays; caudal fin forked. Scales cycloid, moderately imbricated with complete, crenate, or laciniate posterior margins. **Colour:** translucent or green-yellow on dorsal surface with dark middorsal stripe; pale to slightly yellowish ventrally; **narrow or wide lateral silver stripe.**



Habitat, biology, and fisheries: The New World silversides often form large schools but a number of species live in smaller groups. These are generally omnivorous fishes but tend to consume many organisms in the plankton or those close to the surface; a few species are piscivorous. These are marine, estuarine and freshwater forms that mostly live at sea level or low elevation; some members of the family have penetrated the highlands of Mexico, Guatemala, and Chile. Other species have a more pelagic and surf zone existence and can live at the edges of reefs and along rocky coasts. The economic importance of the marine and estuarine atherinopsids of the Western Central Atlantic has dwindled where they are now minimally consumed by people but are still used as bait; however, either purely fresh-water species (e.g., *Chirostoma estor, Atherinella sardina*) or marine members outside the area of coverage (e.g., *Atherinops, Odontesthes*) are commercially important as foodfishes.

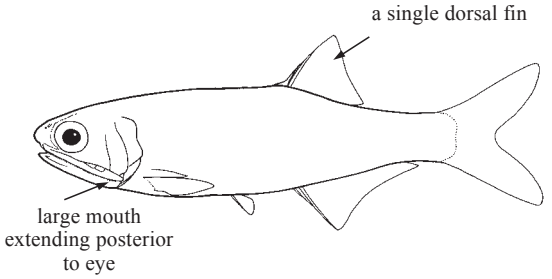
Similar species occurring in the area

Clupeidae: a single dorsal fin; lacking fin spines; pectoral fins inserted low on body; many species possess midventral scutes.

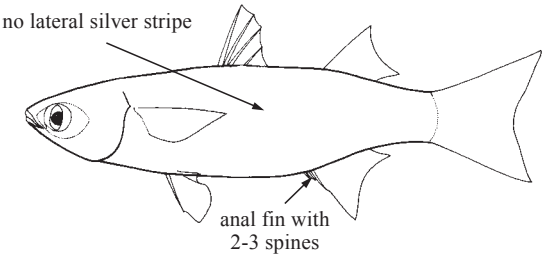


Engraulidae: a single dorsal fin; lacking fin spines; pectoral fins inserted low on body; large mouth extending posterior to eye with a well-rounded, overslung snout.

Mugilidae: anal fin with 2 or 3 spines (only 1 in Atherinopsidae); 24 to 26 vertebrae (more than 30 in Atherinopsidae); lacking a lateral silver stripe; much larger, exceeding 150 mm standard length.



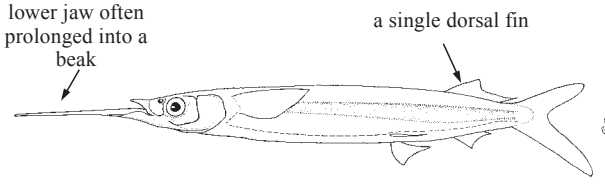
Engraulidae



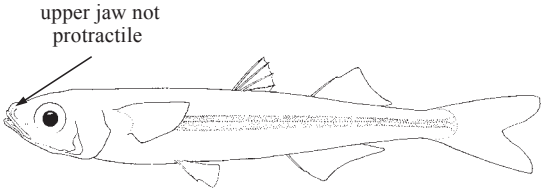
Mugilidae

Hemiramphidae: lower jaw often very proloned into a beak; only a single dorsal fin; lateral line present and runs along lower portion of body, just above pelvic and anal fins.

Atherinidae: upper jaw never protractile with a thin labial ligament (usually highly protractile and ligament fleshy in Atherinopsidae); distal end of premaxilla narrow and pointed (usually expanded in Atherinopsidae); premaxilla with a postmaxillary process (absent in Atherinopsidae); preopercular sensory canal connects to anterior infraorbital canal (connects to mandibular canal in Atherinopsidae).



Hemiramphidae



Atherinidae

Key to the species of Atherinopsidae occurring in the area

1a. Spines of first dorsal fin 6 to 9; soft rays of second dorsal fin 15 to 19, rarely 14; mullet-like in appearance (Fig. 1) . . . . . ***Melanorhinus microps***

1b. Spines of first dorsal fin 2 to 4, rarely 5; soft rays of second dorsal fin 12 or fewer; elongate; not mullet-like in appearance . . . . . → ***2***

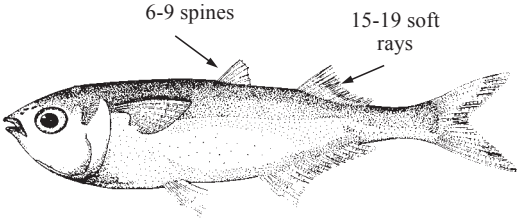


Fig. 1 ***Melanorhinus microps***

2a. Rostral sensory system absent, lacking pits, pores, or tubes; lateral axillary scale of pelvic fin absent or poorly developed, less than or equal to 1/4 length of fin; spinous dorsal fin always anterior to origin of anal fin (Fig. 2a) . . . . . → *3*

2b. Rostral sensory system present with pits, pores, depressions, or tubes; lateral axillary scale of pelvic fin well developed, greater than or equal to 1/3, usually greater than or equal to 1/2 length of fin; origin of spinous dorsal fin anterior or posterior to anal-fin origin (Fig.2b) . . . . → *9*

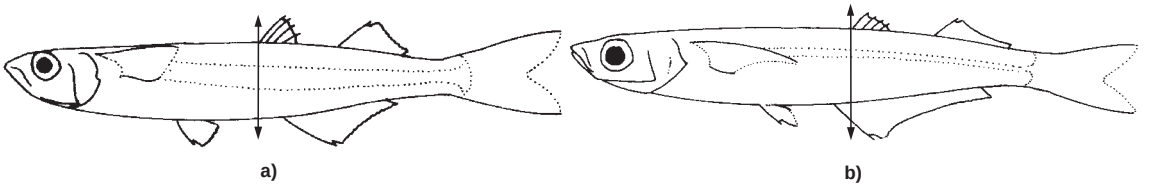


Fig. 2 relative position of dorsal and anal fins

3a. Origin of spinous dorsal fin posterior to vertical through anus; segmented anal-fin soft rays 20 to 27, rarely 19; lateral scales 39 to 47, rarely 38 (Fig. 3) . . . . . ***Menidia menidia***

3b. Origin of spinous dorsal fin anterior to vertical through anus; segmented anal-fin soft rays 8 to 19, rarely 20; lateral scales 28 to 41, rarely 42 or 43 . . . . . → *4*

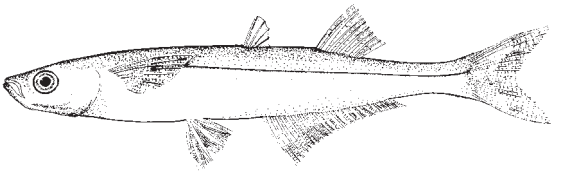


Fig. 3 ***Menidia menidia***

4a. Horizontal distance between spinous dorsal and anal fins 7.0 to 18.0% standard length; posterior extension of swimbladder into urosome short and opaque . . . . . → *5*

4b. Horizontal distance between spinous dorsal and anal fins 1.2 to 8.3% standard length, usually less than 7% standard length; posterior extension of swimbladder into urosome long and transparent or opaque . . . . . → *8*

5a. Spinous dorsal fin originates over or posterior to distal quarter of pelvic fin, bases of posterior dorsal-fin spines behind tips of pelvic fin; segmented anal-fin soft rays 13 to 19; lateral scales 34 to 43 (Fig. 4) . . . . . ***Menidia peninsulae***

5b. Spinous dorsal fin originates over midpoint of pelvic fin, entire base of spinous dorsal fin over pelvic fin; segmented anal-fin soft rays 8 to 15; lateral scales 28 to 34 . . . . . → *6*

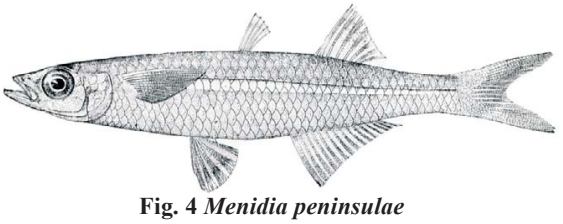


Fig. 4 ***Menidia peninsulae***

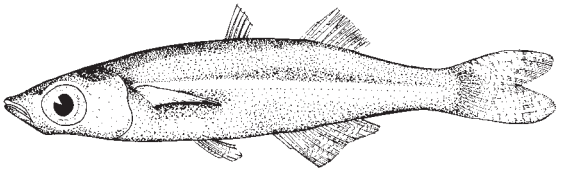


Fig. 5 ***Menidia conchorum***

6a. Scale rows from insertion of pelvic fin to origin of spinous dorsal fin 8; on scale row below lateral stripe, lateralis pits begin on sixth scale behind pectoral-fin base (Fig. 5) . ***Menidia conchorum***

6b. Scale rows from insertion of pelvic fin to origin of spinous dorsal fin 7; lateralis pits begin on third or fourth scale beyond pectoral-fin base on scale row below lateral stripe . . . . . → *7*

7a. Lateral scales 32 to 34; segmented anal-fin soft rays 10 to 14 (Fig . 6) . . . . . ***Menidia* sp.**
7b. Lateral scales 28 to 31; segmented anal-fin soft rays 8 to 12 (Fig. 7) . . . . . ***Menidia colei***

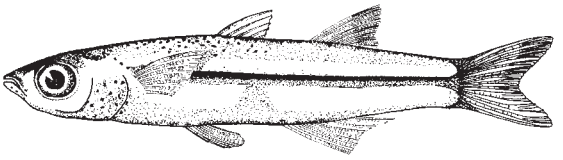


Fig. 6 *Menidia* sp.

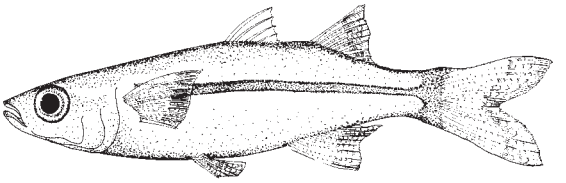


Fig. 7 *Menidia colei*

8a. Second dorsal-fin soft rays usually 9; posterior extension of swimbladder into urosome long and transparent with smoothly rounded tip; males and females (Fig. 8) . . . . ***Menidia beryllina***
8b. Second dorsal-fin soft rays usually 8; posterior extension of swimbladder into urosome long and opaque with slightly blunt tip; females only (Fig. 9) . . . . . ***Menidia clarkhubbsi***

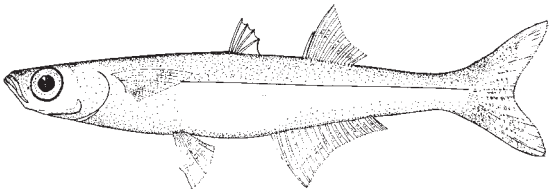


Fig. 8 *Menidia beryllina*

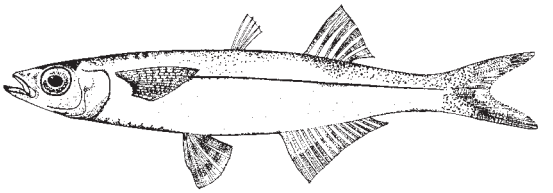


Fig. 9 *Menidia clarkhubbsi*

9a. Rostral sensory system with 4 large quadrangular depressions at anterior margin of frontal bones (Fig. 10a); spinous dorsal fin anterior to origin of anal fin . . . . . → ***10***
9b. Rostral sensory system with pits, tubes, and excavations but lacking quadrangular excavations at anterior margin of frontal bones (Fig. 10b); spinous dorsal fin posterior to origin of anal fin . . . . . → ***13***

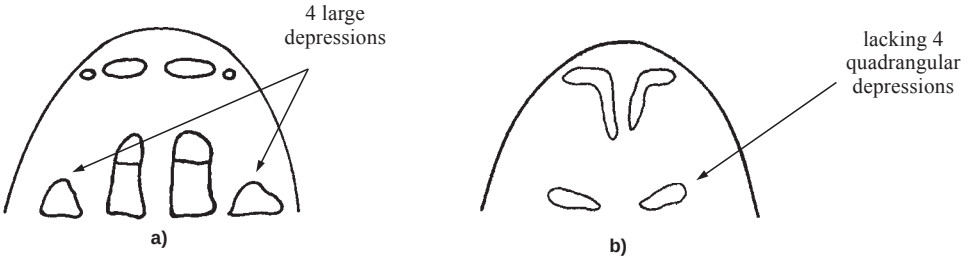


Fig. 10

10a. Anus located closer to origin of anal fin than base of pelvic fin; tips of pelvic fins not reaching anterior margin of vent; posterior margins of scales laciniate; exceeding 60 mm standard length (Fig. 11) . . . . . ***Membras martinicia***

10b. Anus positioned about midway between origin of anal fin and base of pelvic fin; tips of pelvic fins extending to or beyond anterior margin of vent; posterior margins of scales smooth or laciniate . . . . . → ***11***

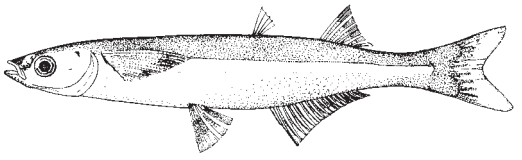


Fig. 11 ***Membras martinicia***

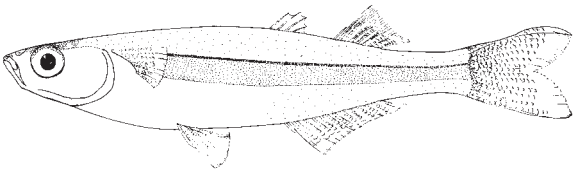


Fig. 12 ***Membras argentea***

11a. Posterior margins of predorsal and lateral scales strongly laciniate (Fig. 12) . . . . ***Membras argentea***

11b. Posterior margins of predorsal and lateral scales smooth or irregular . . . . . → ***12***

12a. Least depth of caudal peduncle greater than 8.5% standard length; body depth greater than 15.7% standard length; total gill rakers on first arch 18 or fewer, usually 15 to 17 (Fig. 13) . . . . . ***Membras analis***

12b. Least depth of caudal peduncle less than 8.5% standard length; body depth less than 15.8% standard length; total gill rakers on first arch 16 or more, usually 18 or 19 (Fig. 14) . . . ***Membras*** **sp.**

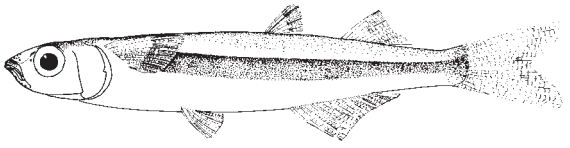


Fig. 13 ***Membras analis***

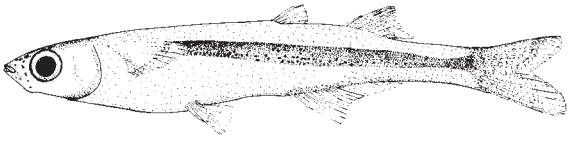


Fig. 14 ***Membras*** **sp.**

13a. Anal-fin sheath extends entire length of anal fin as a single large row of scales; lateral scales 43 to 54; body circumferential scales 25 to 27 (Fig. 15) . . . . . ***Atherinella blackburni***

13b. Anal-fin sheath, if present, not extending beyond midpoint of fin; lateral scales 35 to 44, rarely 45; body circumferential scales 17 to 25 . . . . . → ***14***

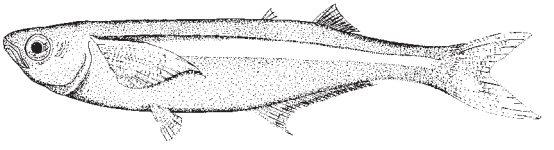


Fig. 15 ***Atherinella blackburni***

14a. Transverse scale rows 6; body circumferential scales 17 to 20 . . . . . → ***15***

14b. Transverse scale rows 7 to 9; body circumferential scales 20 to 25 . . . . . → ***17***

15a. Gill rakers on lower limb of first arch 13 to 16; segmented anal-fin soft rays 17 to 20; anal fin sheath over first several segmented rays or absent . . . . . → ***16***

15b. Gill rakers on lower limb of first arch 18 to 22; segmented anal-fin soft rays 19 to 23; anal fin sheath extending to midpoint of fin (Fig. 16) . . . . . ***Atherinella beani***

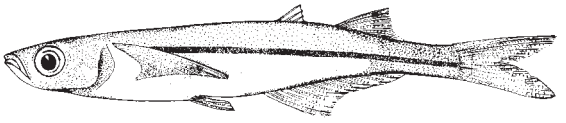


Fig. 16 ***Atherinella beani***

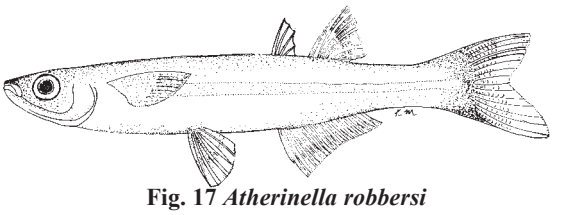


Fig. 17 ***Atherinella robbersi***

16a. Segmented anal-fin soft rays 17 or 18; pectoral-fin rays 13; spinous dorsal fin originates just posterior to vertical through base of anal-fin spine (Fig. 17) . . . . . ***Atherinella robbersi***

16b. Segmented anal-fin soft rays 18 to 20; pectoral-fin rays 14 or 15; spinous dorsal fin originates just posterior to vertical through base of segmented rays 2 to 5 (Fig. 18) . . . . . ***Atherinella* cf. *brasiliensis***

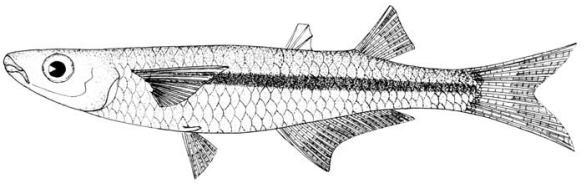


Fig. 18 ***Atherinella* cf. *brasiliensis***

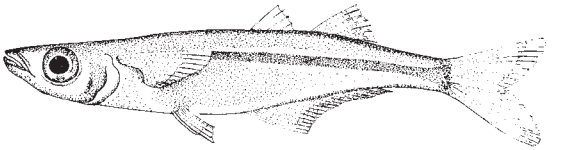


Fig. 19 ***Atherinella schultzi***

17a. Posterior margin of jaw extending beyond vertical through anterior margin of orbit; gill rakers on first arch 12 to 18 (Fig. 19) . . . . . ***Atherinella schultzi***

17b. Posterior margin of jaw curved downwards, not reaching anterior margin of orbit; gill rakers on first arch 20 to 29, rarely 19 . . . . . → ***18***

18a. Lateral scales 35 to 40, rarely 41; body circumferential scales 18 to 22, rarely 23 (Fig. 20) . . . . . ***Atherinella alvarezi***

18b. Lateral scales 40 to 45; body circumferential scales 21 to 25 . . . . . → ***19***

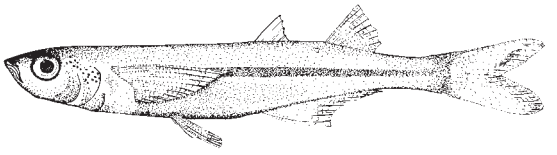


Fig. 20 ***Atherinella alvarezi***

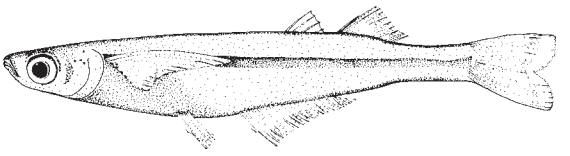


Fig. 21 ***Atherinella milleri***

19a. Anterior rostral sensory system with 4 separate pits; anal-fin soft rays anterior to spinous dorsal-fin origin 6 to 8, rarely 5; anal-fin soft rays anterior to second dorsal-fin origin 16 to 18 (Fig. 21) . . . . . ***Atherinella milleri***

19b. Anterior rostral sensory system with L-shaped furrows, fused together or not; anal-fin soft rays anterior to spinous dorsal-fin origin 3 to 6, rarely 7; anal-fin soft rays anterior to second dorsal-fin origin 12 to 16 . . . . . → ***20***

20a. L-shaped furrows of anterior rostral sensory system not fused posteromedially, each side remaining separate; alveolar arm of premaxilla with dorsal portion elevated, the distal edge almost symmetric; mesopterygoid teeth usually present; anal-fin sheath to anterior third of fin (Fig. 22) . . . . . ***Atherinella chagresi***

20b. L-shaped furrows of anterior rostral sensory system fused posteromedially; alveolar arm of premaxilla with straight dorsal margin, the distal edge anteroventrally extended; mesopterygoid teeth absent; anal-fin sheath rudimentary (Fig. 23) . . . . . ***Atherinella* sp.**

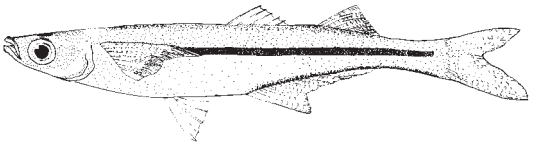


Fig. 22 *Atherinella chagresi*

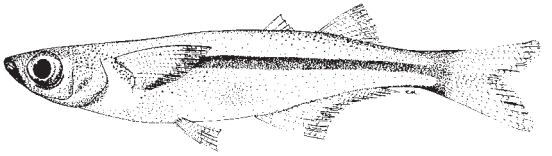


Fig. 23 *Atheinella* sp.

List of species occurring in the area

The symbol is given when species accounts are included.

Atherinella alvarezi (Diaz-Pardo, 1972).
Atherinella beani (Meek and Hildebrand, 1923).
Atherinella blackburni (Schultz, 1949).
Atherinella cf. *brasiliensis* (Quoy and Gaimard, 1825).
Atherinella chagresi (Meek and Hildebrand, 1914).
Atherinella milleri (Bussing, 1979).
Atherinella robbersi (Fowler, 1950).
Atherinella schultzi (Alvarez and Carranza, 1952).
Atherinella sp.

Melanorhinus microps (Poey, 1860).

Membras analis (Schultz, 1948).
Membras argentea (Schultz, 1948).
Membras martinica (Valenciennes in Cuvier and Valenciennes 1835).
Membras sp.

Menidia beryllina (Cope, 1867).
Menidia clarkhubbsi Echelle and Mosier, 1982.
Menidia colei Hubbs, 1936.
Menidia conchorum Hildebrand and Ginsburg, 1927.
Menidia menidia (Linnaeus, 1766).
Menidia peninsulae (Goode and Bean, 1879).
Menidia sp.

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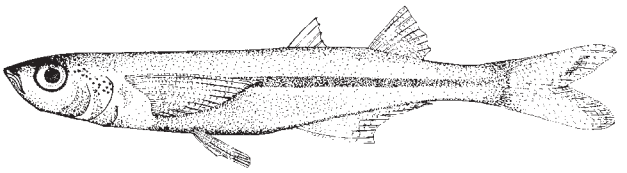
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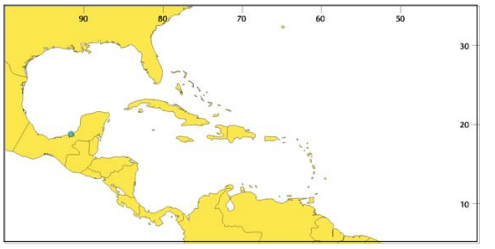
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Atherinella alvarezi (Diaz-Pardo, 1972)

En - Alvarez's silverside.

Maximum length 80 mm standard length; commonly captured at 50 mm standard length. Bright yellow to yellow-green over back and top of head; lower body pale to translucent; dorsum and upper back crosshatched to stippled; lateral dark silver stripe prominent. Primarily a fresh-water species but has been captured in brackish water of coastal estuaries. In Mexico and extreme northeastern Guatemala from the basins of the Rio Jaltepec, Veracruz to the Rio Santa Clara, Campeche; has been captured in the Laguna de Terminos, Campeche, Mexico.

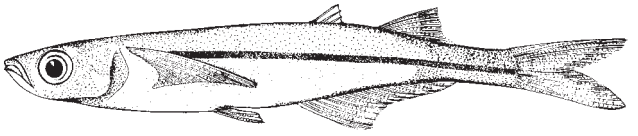


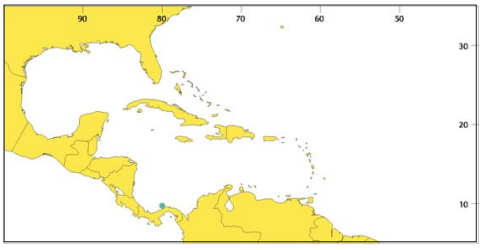


Atherinella beani (Meek and Hildebrand, 1923)

En - Bean's silverside.

Maximum known length 82 mm standard length. Greenish above and pale below; lateral stripe with more black than silver. A costal species known only from 2 collections in the province of Colon, Panama.

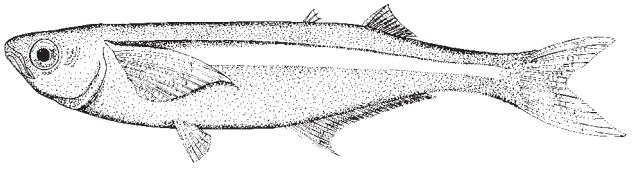


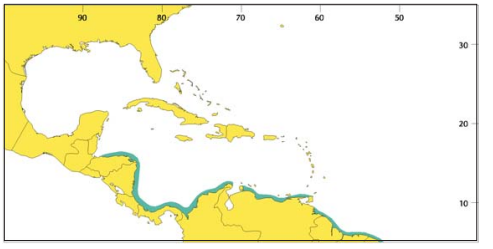


Atherinella blackburni (Schultz, 1949)

En - Beach silverside; **Fr** - Athérine de plage; **Sp** - Tinícalo playón.

Maximum length approximately 90 mm standard length; commonly found at 50 mm standard length. Sea green over dorsum and upper sides; translucent or silvery below; snout darkly pigmented; silvery lateral stripe prominent with distinct black dorsal border; dorsum and upper sides crosshatched. Inhabitant of coastal shores and estuaries. Ranges from Belize to Brazil.

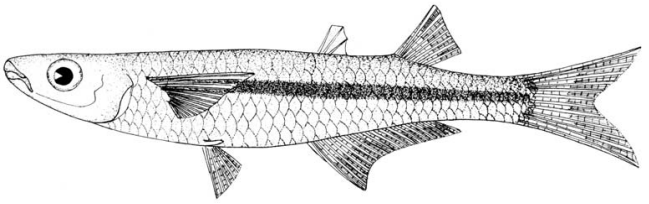


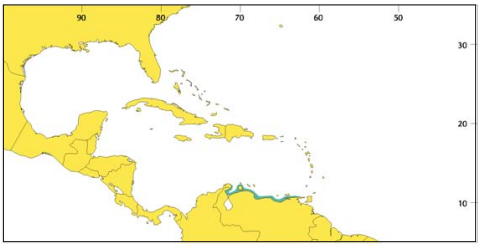


Atherinella* cf. *brasiliensis (Quoy and Gaimard, 1825)

En - Robust silverside.

Maximum length 110 mm standard length; commonly captured greater than 60 mm standard length. Pale yellowish above and below; dorsum crosshatched; silver lateral stripe prominent with dark dorsal margin. Inhabits coastal beaches, estuaries and mangroves. Ranges from the Gulf of Venezuela to Los Roques, Venezuela.

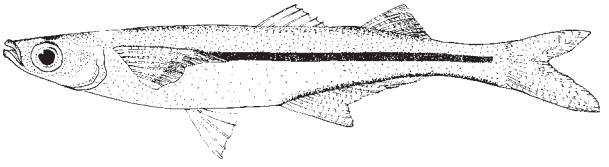


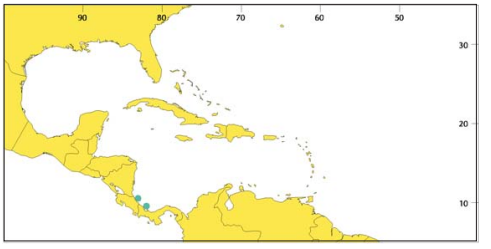


Atherinella chagresi (Meek and Hildebrand, 1914)

En - Chagres silverside.

Maximum length to 95 mm standard length; commonly to 70 mm standard length. Upper body and dorsum greenish; lower body pale; lateral stripe prominent with silver-blue reflections, bordered with black above. Primarily inhabits fresh waters but has also been captured in coastal estuaries. Ranges from the Rio Tortuguero basin of northern Costa Rica to the Rio Cascajal, Colon, Panama; it has been collected in the Tortuguero and Chiriqui estuaries.

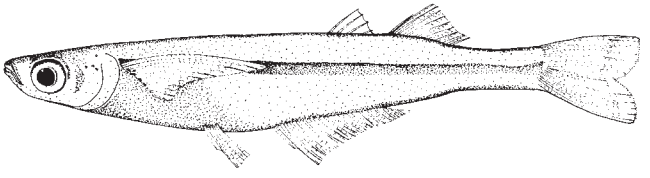


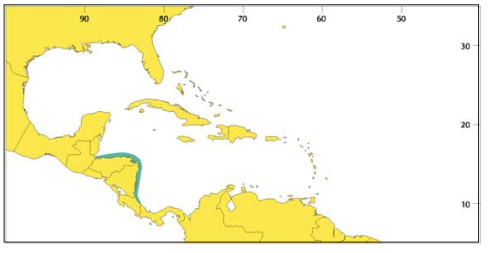


Atherinella milleri (Bussing, 1979)

En - Miller's silverside.

Maximum length exceeds 120 mm standard length; commonly captured at 75 mm standard length. Overall pale coloration with moderate crosshatching over dorsum; 2 or 3 rows of distinctive large pigment spots or freckles extending from dorsal third of opercle to base of pectoral fin; anal-fin base distinctly pigmented; caudal fin with dusky to black margin. Inhabits coastal estuaries, lagoons, and mangroves in brackish water. Ranges from Northern Lagoon, Belize to Westfalia, Costa Rica.

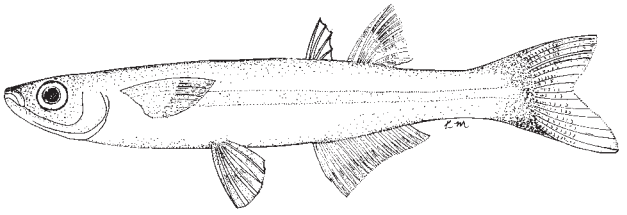


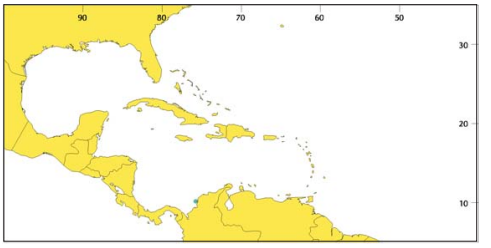


Atherinella robbersi (Fowler, 1950)

En - Totumo silverside.

Maximum length 64 mm standard length. Pale olive brown over dorsum with hints of yellow interdorsally; lighter below; lateral stripe prominent and silvery; caudal fin dusky, may be suffused with some orange-pink. An inhabitant of a coastal marsh and estuary. Known only from Totumo cienega and lagoon, Bolivar, Colombia.

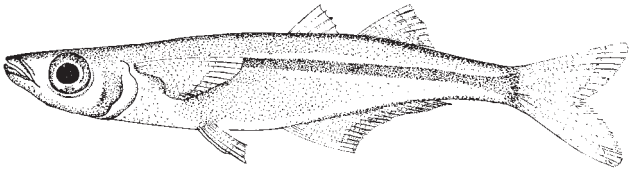


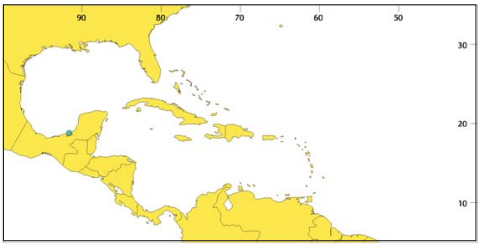


Atherinella schultzi (Alvarez and Carranza, 1952)

En - Long-snout silverside.

Maximum size 79 mm standard length; commonly taken at about 50 mm standard length. Bright yellow dorsally and pale below; melanophores on back often render populations dark; lateral stripe variable in width, generally more black than silver; dorsal and caudal fins can be dusky to dark. Primarily fresh water but has been captured in brackish waters of coastal estuaries. Inland it ranges from the Rio Jaltepec, Veracruz to the Rio Mamental, Campeche, Mexico; is also known from the Laguna de Terminos, Campeche.

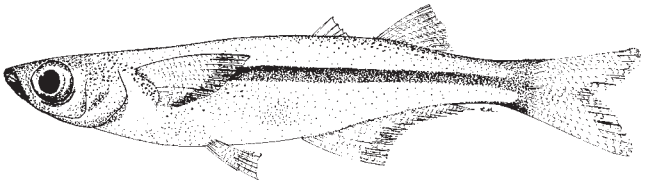


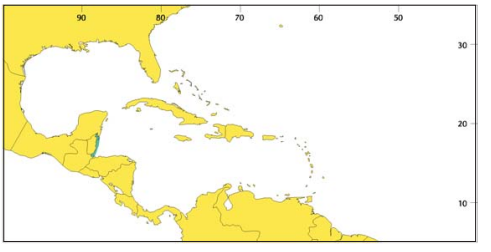


***Atherinella* sp.**

En - Elegant silverside.

Maximum length about 100 mm standard length; commonly greater than 50 mm standard length. Yellow to greenish above and pale to translucent below; lateral stripe prominent and dark, not silvery; dorsum can be completely dusky; fins clear to dusky. Inhabits coastal rivers, estuaries, lakes, and mangroves in brackish and fresh waters. Ranges from the Rio Hondo, Mexico-Belize to the Rio Dulce and Lago Izabal, Guatemala.

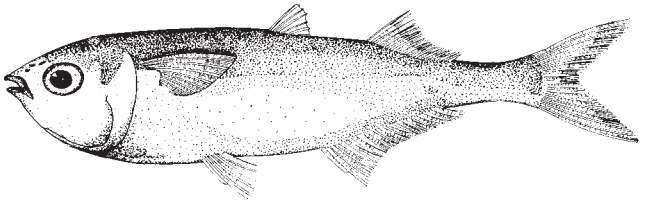


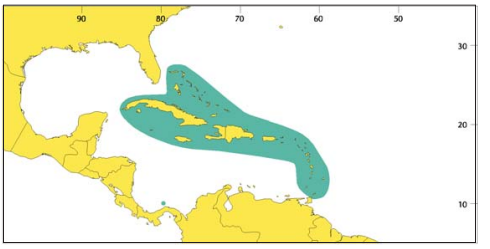


Melanorhinus microps (Poey, 1860)

En - Querimana silverside.

Maximum length 76 mm standard length; commonly found at about 50 mm standard length. Strongly counter-shaded with brownish black above and silvery below; lateral silver stripe not evident; caudal peduncle darkly pigmented along sides extending onto caudal fin and may appear as a dusky vertical band along the base. This species strongly resembles the querimana stage of the mullet, *Mugil*. A pelagic coastal species that is known to enter tide pools and flooded coastal caves. Ranges across the West Indes including Tobago and is known from a single locality in Panama at Porto Bello.



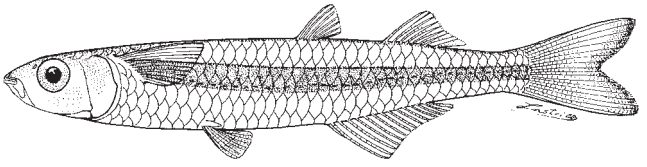


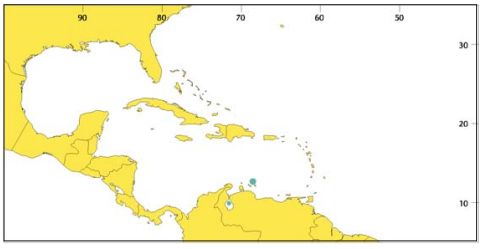
Membras analis (Schultz, 1948)

MMN

En - Backwaters silverside; **Fr** - Athérine lacunaire; **Sp** - Tinícalo lagunar.

Maximum known length 60 mm standard length. Overall pale to translucent colour; some light stippling of pigment above prominent silver stripe. A pelagic species. Known only from Lago Maracaibo, Margarita Island, and Los Roques, Venezuela.

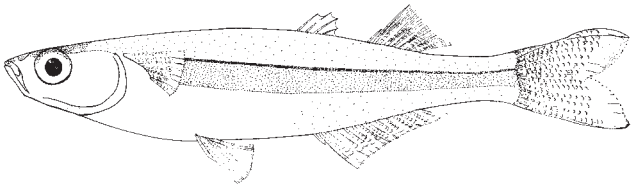


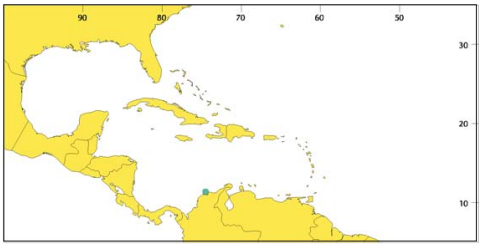


Membras argentea (Schultz, 1948)

En - Plateada silverside.

Maximum known length 43 mm standard length. Pale to silvery overall with prominent lateral silver stripe with black dorsal border. A pelagic coastal species. Known only from the Caribbean Ocean off Sabanilla, Colombia.

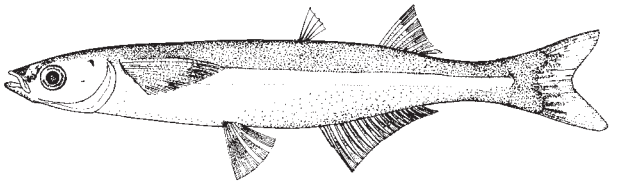


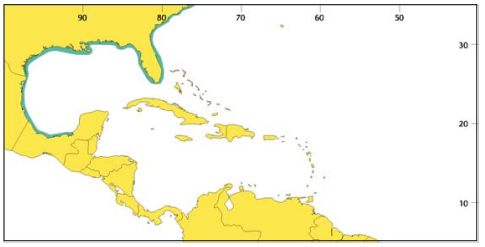


Membras martinica (Valenciennes, 1835)

En - Rough silverside.

Maximum length 125 mm standard length; commonly found exceeding 75 mm standard length. Bright yellow to sea green over back and upper sides; pigment over dorsum varies from peppered with melanophores to strongly crosshatched; lower sides and belly pale to silvery; prominent silver lateral stripe. A common resident of coastal shores and the more saline parts of bays and estuaries. Ranges from Long Island, New York to the Laguna de Terminos, Campeche, Mexico.

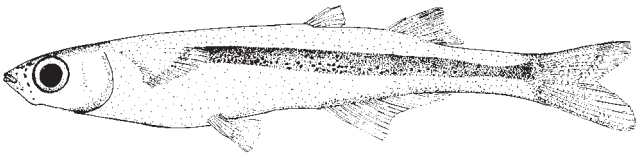


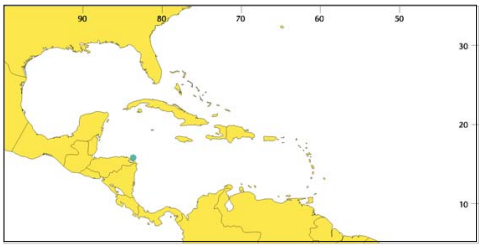


***Membras* sp.**

En - Pygmy silverside.

Maximum length less than 50 mm standard length; commonly to 30 mm standard length. Lightly coloured species, pale to translucent above and below lateral stripe; slight peppering of melanophores over dorsum; prominent silver lateral stripe, occupying almost the entire side of the body posteriorly. Inhabits coastal marsh with mangroves. Known only from Brus Lagoon, Honduras.

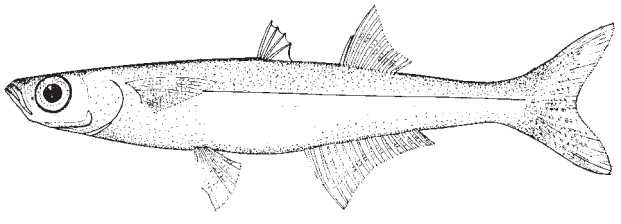


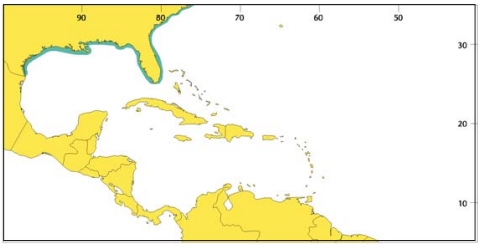


Menidia beryllina (Cope, 1867) MNR

En - Inland silverside.

Maximum length 100 mm standard length; common at 50 to 75 mm standard length. Dorsum can be strongly crosshatched when in clearer waters; yellow to olivaceous above lateral stripe; pale yellow to translucent below; in some populations breeding individuals may develop slightly orange or even slightly reddish hue. Inhabits shallow water habitats of coastal areas, estuaries, inland waterways, and fresh waters. Ranges from just north of Cape Cod in the Gulf of Maine to southern Florida and around the Gulf of Mexico to the Laguna Madre, Tamaualipas, Mexico. In the Mississippi Valley it extends northward to the mouth of the Ohio River.

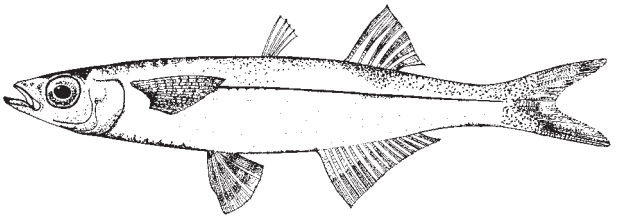


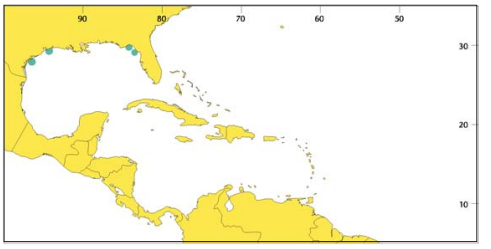


Menidia clarkhubbsi Echelle and Mosier, 1982

En - Texas silverside.

An all-female species that has been produced from hybridization of *Menidia beryllina* and *Menidia peninsulae* and depends upon males of the latter species for sperm. Extremely hard to distinguish other than by genetic techniques. Maximum known length less than or equal to 100 mm standard length. Colour is greenish dorsally and pale ventrally, with prominent lateral silver stripe; dusky pigment over dorsum to lateral stripe. Inhabits near shore environments including coastal ponds. Thought to be restricted to the northern Gulf of Mexico from several locations in northwestern Florida and from near Rockport and Galveston, Texas.

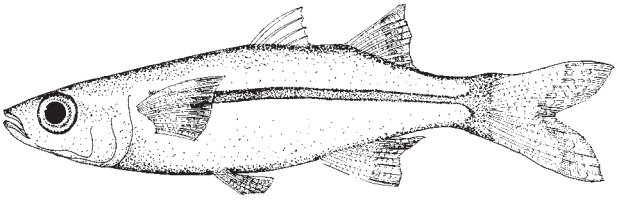


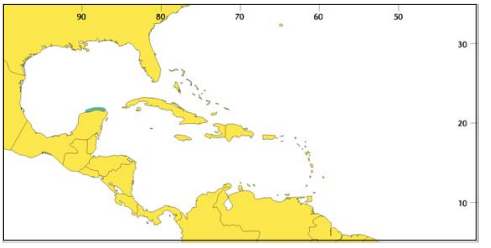


Menidia colei Hubbs, 1936

En - Yucatan silverside.

Maximum length less than 45 mm standard length; commonly to about 30 mm standard length. The overall colour is pale; the silver lateral stripe is prominent and outlined sharply with black above; over the dorsum the scale margins are distinctly stippled. A near shore inhabitant of saline coastal marshes, inlets, and ponds on the northern extremity of the Yucatán Peninsula, Mexico.

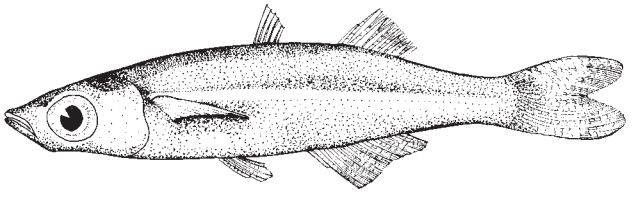


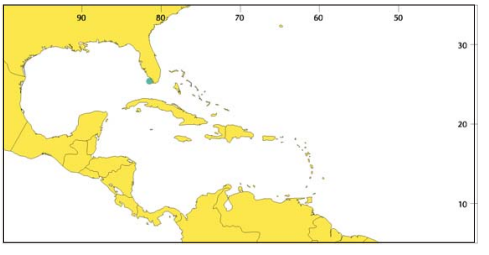


Menidia conchorum Hildebrand and Ginsburg, 1927

En - Key silverside.

Maximum length 50 mm standard length; commonly 30 to 40 mm standard length. Overall pale to translucent; sometimes upper back slightly yellow greenish; small pigment spots lightly flecked on dorsum; lateral silver stripe prominent with some black along upper margin. An inhabitant of quiet waters and coastal ponds. Restricted to Lower Florida Keys.



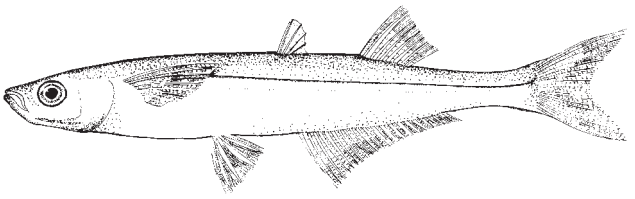


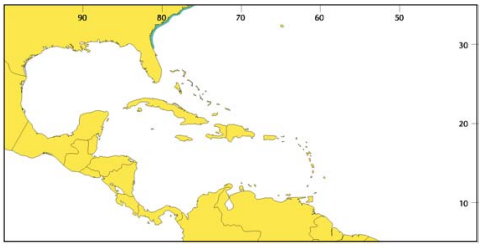
Menidia menidia (Linneaus, 1766)

SSA

En - Atlantic silverside; **Fr** - Capucette; **Sp** - Pejerrey del Atlantico.

Maximum length 150 mm standard length; commonly captured at 80 to 100 mm standard length. Translucent sea green above prominent lateral stripe, pale to translucent below; dorsum and region above lateral stripe can be crosshatched; top of head yellow-green. Near shore inhabitant of sandy beaches, mouths of inlets, and outer reaches of estuaries; extends into upper reaches of estuaries with higher tides. North of Cape Hatteras this species undergoes offshore migrations in winter, having been captured up to 170 km offshore at depths to 126 m. Ranges from the Gulf of St. Lawrence to northeastern Florida.

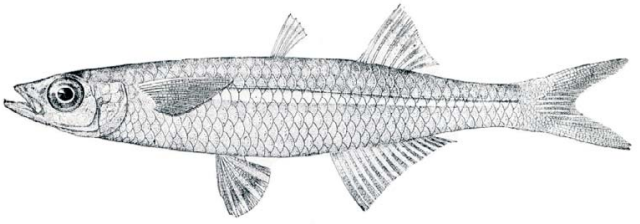


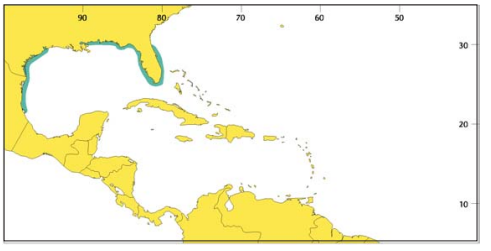


Menidia peninsulae (Goode and Bean, 1879)

En - Tidewater silverside.

Maximum length 150 mm standard length; commonly captured above 80 mm standard length. Bright yellow-green or translucent olivaceous above lateral stripe; lateral stripe prominent silver lined with black above; lower sides and belly pale to translucent; top of head with yellow-green. A common inhabitant of coasts, including tidal creeks, marshes, and estuaries or inlets in brackish or salt water. From northeast Florida to Horn Island, Mississippi, and then disjunctly across the northern Gulf of Mexico from Galveston Bay, Texas, to the Gulf of Tamiahua, Veracruz, Mexico.

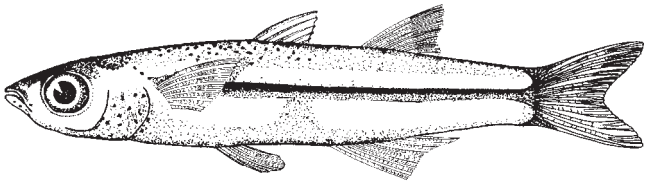


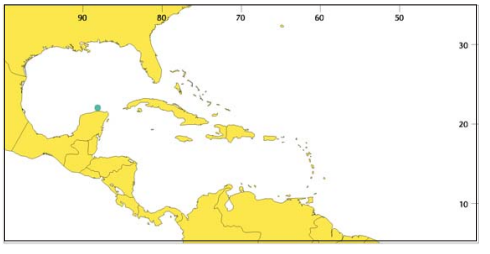


***Menidia* sp.**

En - Least silverside.

Maximum known length less than 40 mm standard length; commonly about 30 mm standard length. Overall lightly coloured, pale to slightly translucent with prominent lateral stripe; faint stippling of pigment on dorsum. An inhabitant of a hypersaline mangrove estuary. Known only from Río Lagartos, Yucatán, Mexico.





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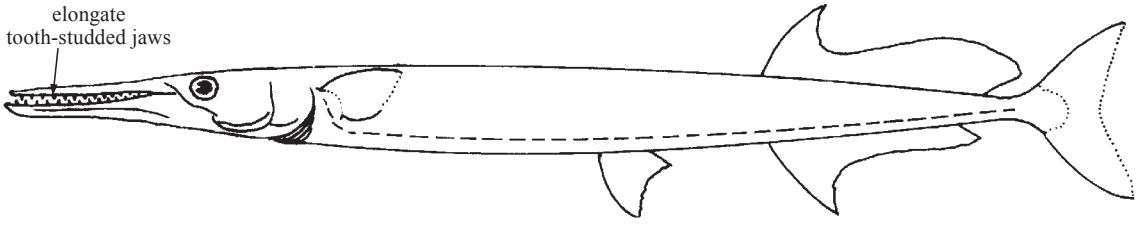
Order BELONIFORMES

BELONIDAE

Needlefishes

by B.B. Collette, National Marine Fisheries, Service, National Museum of Natural History, Washington D.C., USA

Diagnostic characters: Small to medium-sized (up to 2 m) with elongate bodies. Head with **both upper and lower jaws extended into long beaks filled with sharp teeth**; nostrils in a pit anterior to eyes. No spines in fins; dorsal and anal fins posterior in position; pelvic fins located in abdominal position with 6 soft rays; pectoral fins short. Lateral line running down from pectoral-fin origin and then along ventral margin of body. Scales small, cycloid (smooth), easily detached. **Colour:** these fishes live at the surface and are protectively coloured for this mode of life by being green or blue on the back and silvery white on the lower sides and belly. A dusky or dark blue stripe usually present along sides in life; tip of lower jaw frequently red or orange.

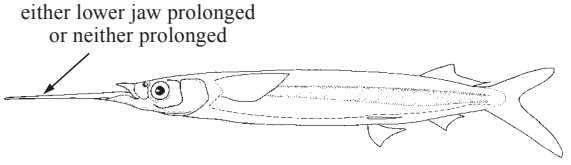


Habitat, biology, and fisheries: Most species are marine, but some occur in fresh waters. Carnivorous, feeding largely on small fishes which they catch sideways in their beaks and then turn and swallow head first. Needlefishes tend to leap and skitter at the surface and some people have been severely injured when accidentally struck by them, particularly at night when needlefishes are attracted to lights. Needlefishes are caught by casting or trolling surface or near-surface lures and with seines. The flesh is excellent and needlefishes are popular foodfishes in some parts of the world although some people have misgivings about eating them due to the green colour of their bones.

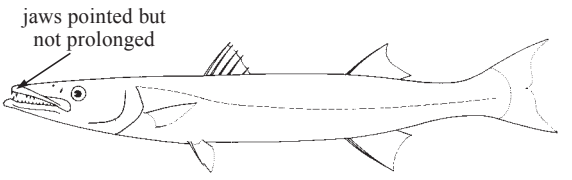
Similar families occurring in the area

Hemiramphidae: either the lower jaw prolonged or neither (*Chriodorus*) of the jaws prolonged.

Sphyraenidae: jaws pointed, but not prolonged into a beak; 2 dorsal fins, the first spiny; pelvic fins in thoracic position.



Hemiramphidae



Sphyraenidae

Key to the species of Belonidae occurring in the area

1a. Body strongly laterally compressed and marked with a series of vertical bars (Fig. 1); anal-fin rays 24 to 28 . . . . . ***Ablennes hians***

1b. Body rounded or squarish in cross-section; no vertical bars present; anal-fin rays 13 to 24 . . . . . → ***2***

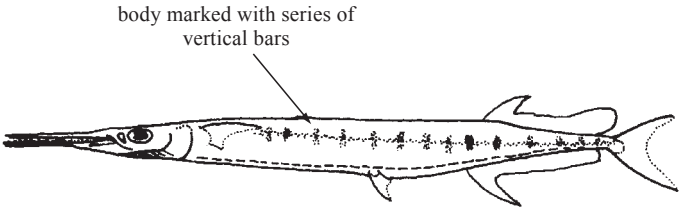


Fig. 1 ***Ablennes hians***

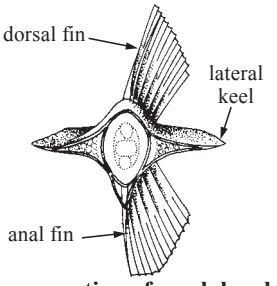


Fig. 2 cross-section of caudal peduncle

2a. Caudal peduncle strongly depressed (flattened dorsoventrally) and with well-developed lateral keels, least depth of caudal peduncle about half the width (Fig. 2); gill rakers present . . . . . ***Platybelone argalus argalus***

2b. Caudal peduncle not strongly depressed, a small lateral keel on caudal peduncle or no keel at all, caudal peduncle deeper than wide; gill rakers absent . . . . . → ***3***

3a. Dorsal-fin rays 12 to 17; no keels on caudal peduncle; caudal fin emarginate, lower lobe not much longer than upper; no expanded black posterior dorsal-fin lobe at any size . . . . . ***(Strongylura)*** → ***4***

3b. Dorsal-fin rays 21 to 26; a weak, darkly pigmented lateral keel on each side of caudal peduncle (Fig. 3); lower lobe of caudal fin much longer than upper lobe; juveniles with an expanded black lobe in the posterior part of the dorsal fin . . . . . ***(Tylosurus)*** → ***6***

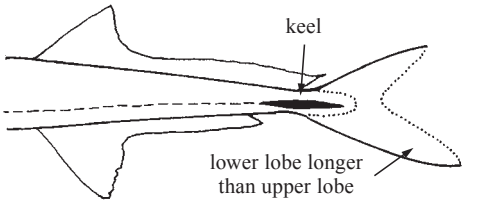


Fig. 3

4a. Maxilla completely covered by preorbital bone; anal-fin rays 12 to 15; predorsal scales 76 to 117; vertebrae 53 to 61 . . . . . ***Strongylura notata***

4b. Maxilla exposed posteriorly; anal-fin rays 16 to 20; predorsal scales 120 to 304; vertebrae 68 to 77 . . . . . → ***5***

5a. Predorsal scales 120 to 185; 2 gonads in both sexes . . . . . ***Strongylura timucu***

5b. Predorsal scales 213 to 304; only right gonad present . . . . . ***Strongylura marina***

6a. Dorsal- and anal-fin lobes relatively low compared to body length (10.1 to 13.3 and 9.7 to 11.7 times in body length, respectively); pectoral and pelvic fins relatively short (8.0 to 12.4 and 10.0 to 14.1 times in body length, respectively); upper and lower jaw teeth straight at all sizes; left gonad absent or greatly reduced in length . . . . . ***Tylosurus acus acus***

6b. Dorsal- and anal-fin lobes relatively high compared to body length (5.4 to 10.6 and 5.5 to 8.0 times in body length, respectively); pectoral and pelvic fins relatively long (6.6 to 8.3 and 7.3 to 10.6 times in body length, respectively); upper and lower jaw teeth point distinctly anterior in juveniles; left gonad distinct although shorter than right . . . . . ***Tylosurus crocodilus crocodilus***

List of species occurring in the area

The symbol is given when species accounts are included.

Ablennes hians (Valenciennes, 1846).

Platybelone argalus argalus (Lesueur, 1821).

Strongylura marina (Walbaum, 1792).
Strongylura notata (Poey, 1860).
Strongylura timucu (Walbaum, 1792).

Tylosurus acus acus (Lacepède, 1803).
Tylosurus crocodilus crocodilus (Péron and Lesueur, 1821).

References

Collette, B.B. 1968. *Strongylura timucu* (Walbaum): a valid species of western Atlantic needlefish. *Copeia,* 1968:189-192

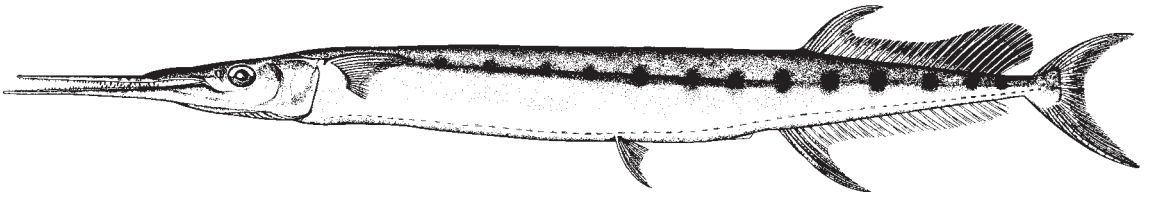
Collette, B.B. 1974. *Strongylura hubbsi*, a new species of freshwater needlefish from the Usumacinta Province of Guatemala and México. *Copeia,* 1974:611-619.

Collette, B.B. and N.V. Parin. 1970. Needlefishes (Belonidae) of the eastern Atlantic Ocean. *Atlantide Rept*., 11:8-60.

Ablennes hians (Valenciennes, 1846) BAF

Frequent synonyms / misidentifcations: None / None.

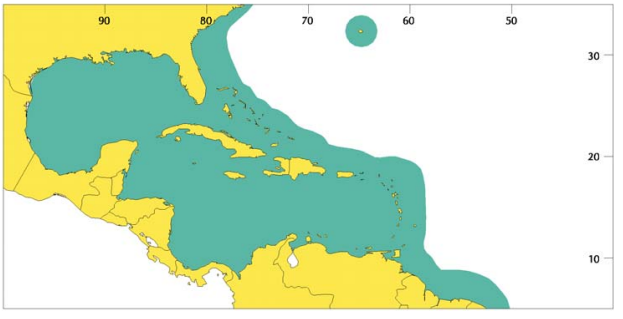
FAO names: En - Flat needlefish; **Fr** - Orphie plate; **Sp** - Agujón sable.



Diagnostic characters: Body elongate and **greatly compressed laterally**. Upper and lower jaws greatly elongate and studded with small sharp teeth. Gill rakers absent. **Anterior parts of dorsal and anal fins with high falcate lobes**, dorsal-fin rays numerous, 23 to 26, usually 24 or 25; **anal-fin rays numerous, 24 to 28**, usually 26 or 27; caudal peduncle without lateral keels; caudal fin deeply forked, lower lobe longer than upper lobe; **pectoral fins falcate**, with 13 to 15 rays. Females lack the right gonad and males either lack it or have it greatly reduced in length. Total number of vertebrae 93 to 97. **Colour:** bluish green above, silvery white below. A broad dark blue stripe along sides and **about 12 to 14 prominent dark vertical bars on body**; tip of lower jaw red. **Juveniles and adults have an elevated black lobe in the posterior part of the dorsal fin.**

Size: Maximum to at least 82.5 cm standard length (without caudal fin) and 63 cm body length (without beak and caudal fin); commonly to 70 cm standard length. The IGFA all-tackle gamefish record is 4.80 kg for a fish caught in Mozambique in 1997.

Habitat, biology, and fisheries: A pelagic species inhabiting offshore surface waters; inshore occurrences seem to be more frequent around islands than along the mainland coast. Carnivorous, feeding mainly on small fishes. Caught mainly by casting or trolling surface or near-surface lures; also with seines and trammel nets (mandingas) often using lights. Marketed fresh or salted. Separate statistics are not collected for this species.

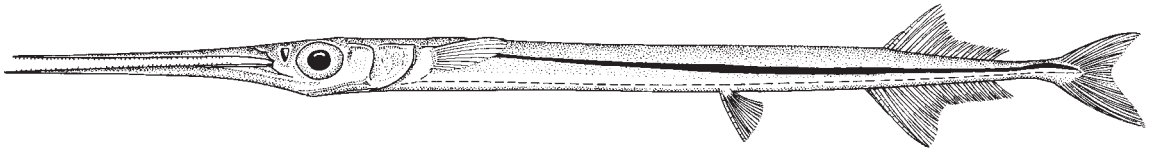


Distribution: Throughout the area, northward extending to Massachusetts and southward at least to Rio de Janeiro; worldwide in tropical and warm-temperate waters.

Platybelone argalus argalus (Lesueur, 1821) PTA

Frequent synonyms / misidentifications: *Belone platyura* Bennett, 1832; *Strongylura ardeola* (Valenciennes, 1846) / None.

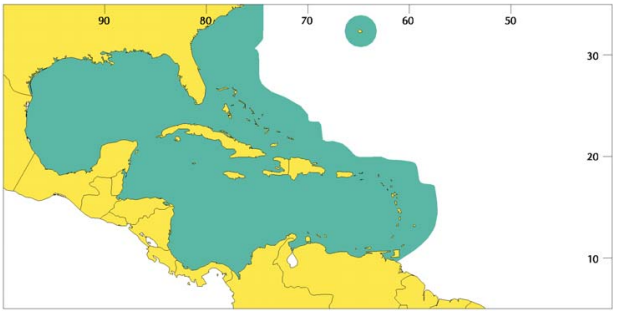
FAO names: En - Keeltail needlefish; **Fr** - Orphie carénée; **Sp** - Agujón de quilla.



Diagnostic characters: Body elongate, rounded in cross-section. Upper and especially lower jaws greatly elongate and studded with fine teeth. **Gill-rakers present.** Anterior parts of dorsal and anal fins not forming prominent lobes; **dorsal-fin rays few, 12 to 15** (usually 13); anal-fin rays 17 to 20 (usually 18); **caudal peduncle greatly depressed, least caudal peduncle depth about half the width, with very large lateral keels**; caudal fin forked, upper and lower lobes of about equal length; pectoral fin not falcate, pectoral-fin rays 10 to 12 (usually 11). Predorsal scales (in front of dorsal fin) comparatively few and large, 107 to 128. Both right and left gonads present, right longer than left. Total vertebrae 70 to 74. **Colour:** bluish green above, silvery below. A dark blue stripe along sides. Fins clear, without pigment. Scales and bones green.

Size: Maximum to at least 38.2 cm standard length (without caudal fin) and 25.6 cm body length (without beak and caudal fin) in the Western Central Atlantic; commonly to 30 cm standard length.

Habitat, biology, and fisheries: An offshore pelagic species frequently found in inshore waters, particularly abundant about the islands of the Bahamas and Antilles. Carnivorous, feeding mainly on small fishes. Caught mainly by casting or trolling surface or near-surface lures; also with seines and trammel nets, often using lights. Separate statistics are not reported for this species.



Distribution: From Virginia south, at Bermuda, throughout the Gulf of Mexico and the Caribbean Sea to Trinidad; a polytypic species (with 7 subspecies) found worldwide in tropical and warm-temperate waters.

Strongylura marina (Walbaum, 1792) NFA

Frequent synonyms / misidentifications: None / None.

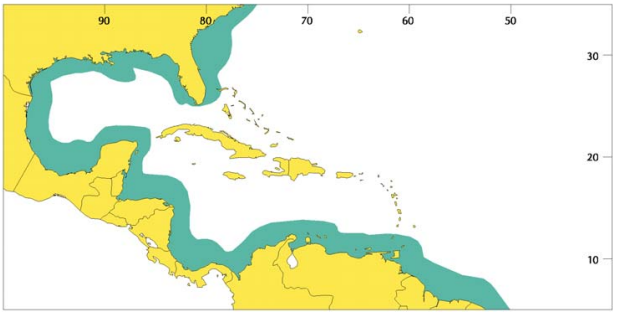
FAO names: En - Atlantic needlefish; **Fr** - Aiguillette verte; **Sp** - Agujón verde.



Diagnostic characters: Body elongate, rounded in cross-section. Upper and lower jaws greatly elongate and studded with sharp teeth; **maxilla exposed posteriorly**. Gill rakers absent. Anterior parts of dorsal and anal fins not forming prominent lobes; dorsal-fin rays 14 to 17; anal-fin rays 16 to 20; pectoral fins not falcate; **caudal peduncle without lateral keels**, deeper than wide; caudal fin emarginate, not deeply forked; pectoral-fin rays 10 to 12 (usually 11). **Predorsal scales numerous and tiny, 213 to 304. Only the right gonad present**. Total number of vertebrae 69 to 77. **Colour:** bluish green above, silvery below. A conspicuous dark blue stripe along sides; **black pigment behind eyes, usually not extending below middle of orbit**, preorbital bone slightly pigmented.

Size: Maximum to 64 cm standard length (without caudal fin) and 42 cm body length (without beak and caudal fin); commonly to 50 cm standard length. The IGFA all-tackle gamefish record is 1.47 kg for a fish caught in New Jersey in 1990.

Habitat, biology, and fisheries: Inhabits coastal areas and mangrove-lined lagoons, where it is moderately common (especially small individuals) and also enters fresh water. Feeds on a wide variety of small fishes and crustaceans. Caught by casting or trolling surface or near-surface lures; also with seines and trammel nets, often using lights and with cast nets in mangrove-lined lagoons (Venezuela). The primary interest in this species is as bait for sport fishes such as marlins. It is sometimes marketed fresh. Separate statistics are not reported for this species.

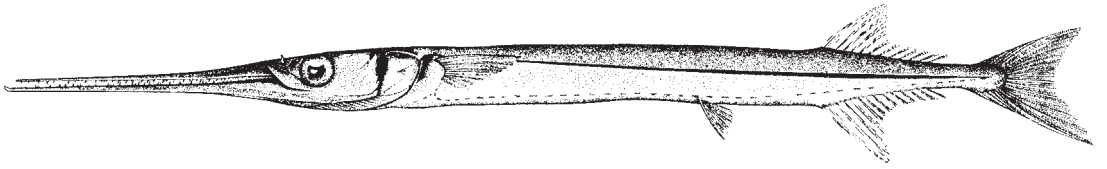


Distribution: Western Atlantic from Massachusetts south around the Florida peninsula, through the Gulf of Mexico, along the coast of Central America, south at least to Rio de Janeiro. Absent from the Bahamas and Antilles.

Strongylura notata (Poey, 1860)

Frequent synonyms / misidentifications: None / None.

FAO names: En - Redfin needlefish; **Sp** - Agujón de aletas rojas.

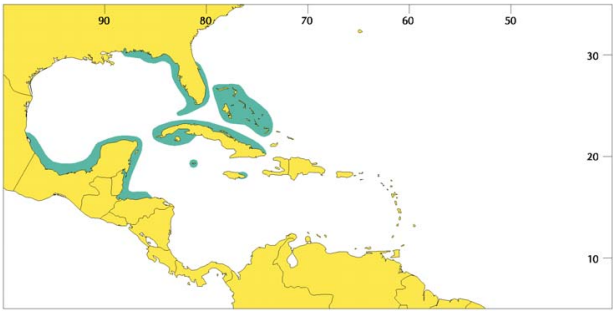


Diagnostic characters: Body elongate, rounded in cross-section. Upper and lower jaws greatly elongate and studded with sharp teeth; **maxilla concealed under preorbital bone when jaws closed**. Gill rakers absent. Anterior parts of dorsal and anal fins not forming prominent lobes; dorsal-fin rays 12 to 15; **anal-fin rays 12 to 15**; caudal peduncle without lateral keels, deeper than wide; caudal fin emarginate, not deeply forked; pectoral fin not falcate; pectoral-fin rays 10 to 12. **Predorsal scales few and large, 76 to 117**. Both right and left gonads present, right longer than left. Total number of vertebrae 53 to 61. **Colour:** bluish green above, silvery below. **Distinct vertical bar at posterior margin of preopercle. Dorsal, anal, and caudal fins red or orange.**

Size: Maximum to 411 mm standard length (without caudal fin) and 245 mm body length (without beak and caudal fin).

Habitat, biology, and fisheries: Inhabits coastal areas and mangrove-lined lagoons, where it is moderately common (especially small individuals). Carnivorous, feeding mainly on small fishes and shrimps. Separate statistics are not reported for this species.

Distribution: Western Atlantic, peninsular Florida, Bahamas, West Indies, and Central America from Belize to Honduras.



Remarks: Two subspecies are recognized: *Strongylura notata notata* (Poey, 1860) from Cuba, Jamaica, Mexico, Belize, and Honduras and *Strongylura notata forsythia* Breder, 1932 from the Bahamas, Florida Keys, and southern Florida. *S. n. forsythia* differs from *S. n. notata* primarily in having more predorsal scales (usually more than 90) and more vertebrae (usually more than 57).

Strongylura timucu (Walbaum, 1792) SGR

Frequent synonyms/ misidentifications: None / *Strongylura marina* (Walbaum, 1792).

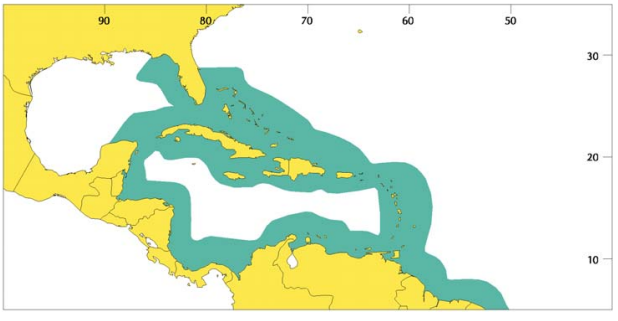
FAO names: En - Timucu; **Fr** - Aiguillette timucu; **Sp** - Agujón timucu.



Diagnostic characters: Body elongate, rounded in cross-section. Upper and lower jaws greatly elongate and studded with sharp teeth; **maxilla exposed**. Gill rakers absent. Anterior parts of dorsal and anal fins not forming prominent lobes; dorsal-fin rays 14 to 17 (usually 16); anal-fin rays 16 to 20 (usually 17 or 18); pectoral fin not falcate; pectoral-fin rays 10 or 11. Caudal peduncle without lateral keels, deeper than wide; caudal fin emarginate, not deeply forked. **Predorsal scales relatively few and large, 120 to 185. Both right and left gonads present, right longer than left**. Total number of vertebrae 68 to 75. **Colour:** bluish green above, silvery below. A broad lateral dusky band on sides. **Black pigment behind eyes usually extending to ventral margin of orbit, preorbital bone densely pigmented.**

Size: Maximum to 42 cm standard length (without caudal fin) and 31 cm body length (without beak and caudal fin); commonly to 30 cm standard length.

Habitat, biology, and fisheries: Inhabits coastal areas and mangrove-lined lagoons, where it is moderately common (especially small individuals). Carnivorous, feeding mainly on small fishes. Caught with trammel nets (mandingas), often using lights and with cast nets (especially in mangrove-lined lagoons in Venezuela and Colombia). Separate statistics are not reported for this species.



Distribution: Western Atlantic from Jupiter Inlet on the east coast of Florida and Pensacola on the west coast south through the Florida Keys, the Bahamas, and Antilles; along the coasts of Central America and South America from Yucatán at least to Rio de Janeiro. Particularly common in the Bahamas and Antilles; absent from the northeastern Gulf of Mexico.

Tylosurus acus acus (Lacepède, 1803) AND

Frequent synonyms / misidentifications: *Tylosurus imperialis* (Rafinesque, 1810) / None.

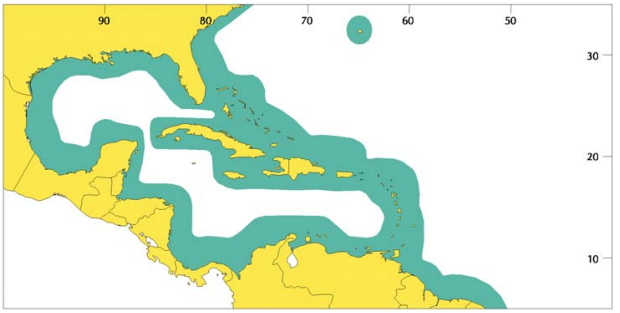
FAO names: **En** - Agujon needlefish; **Fr** - Aiguille voyeuse; **Sp** - Marao ojón.



Diagnostic characters: Body elongate, rounded in cross-section. Upper and lower jaws greatly elongate and studded with sharp teeth; **teeth straight at all sizes**. Gill rakers absent. Anterior part of dorsal fin with a low lobe, contained 10.5 to 13.3 times in body length; dorsal-fin rays numerous, 22 to 26 (usually 24); anal-fin lobe low, contained 9.7 to 11.7 times in body length; **anal-fin rays numerous, 20 to 24 (usually 21 or 22); a small black lateral keel on caudal peduncle**, caudal peduncle deeper than wide; caudal fin deeply forked, lower lobe much longer than upper; pectoral and pelvic fins relatively short, 8.0 to 12.4 and 10.0 to 14.1 times in body length, respectively; pectoral-fin rays 13 or 14. **Predorsal scales tiny and very numerous, 320 to 390**. Left gonad absent or greatly reduced in length in both sexes. Total number of vertebrae 90 to 95. **Colour:** dark bluish above, silvery white below. A dark blue stripe along sides. **Juveniles have an elevated black lobe in the posterior part of the dorsal fin which is lost with growth.**

Size: Maximum to 128.5 cm standard length (without caudal fin) and 95 cm body length (without beak and caudal fin); commonly to 90 cm standard length. The IGFA all-tackle gamefish record is 3.71 kg for a fish caught in North Carolina in 1986.

Habitat, biology, and fisheries: A pelagic species inhabiting more offshore waters than *Tylosurus crocodilus*, but also found in coastal waters. Carnivorous, feeding mainly on small fishes. Caught by casting or trolling surface or near-surface lures; also with seines and trammel nets, often using lights. Marketed mostly fresh and salted. The flesh is of good quality. Separate statistics are not collected for this species.

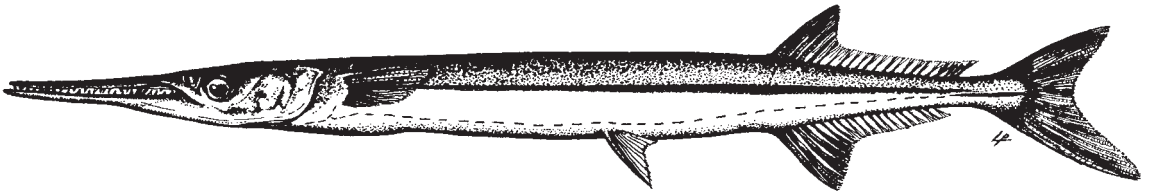


Distribution: Throughout the area, northward extending to Massachusetts and Bermuda and southward at least to Rio de Janeiro; a polytypic species (with 4 subspecies) found worldwide in tropical and warm-temperate waters. Replaced in the eastern tropical Pacific by *Tylosurus pacificus*.

Tylosurus crocodilus crocodilus (Péron and Lesueur, 1821) BTS

Frequent synonyms / misidentifications: *Tylosurus raphidoma* (Ranzani, 1842) / None.

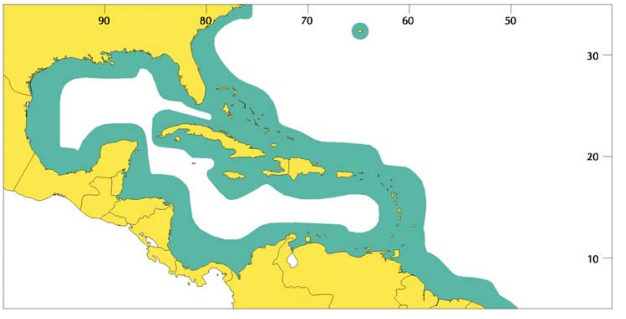
FAO names: En - Hound needlefish (AFS: Houndfish); **Fr** - Aiguille crocodile; **Sp** - Marao lisero.



Diagnostic characters: Body elongate, rounded in cross-section. Upper and lower jaws greatly elongate and studded with sharp teeth, **teeth in both jaws point anteriorly in juveniles**. Gill rakers absent. Anterior part of dorsal and anal fins with relatively high lobes, contained 5.4 to 10.6 and 5.5 to 8.0 times in body length, respectively; dorsal-fin rays 21 to 23 (usually 22 or 23); **anal-fin rays 18 to 22 (usually 20 or 21); a small black lateral keel on caudal peduncle**, caudal peduncle deeper than wide; caudal fin deeply forked, lower lobe much longer than upper; pectoral and pelvic fins relatively long, contained 6.6 to 8.3 and 7.3 to 10.6 times in body length, respectively; pectoral-fin rays 13 to 15 (usually 14 or 15). **Predorsal scales tiny and very numerous, 240 to 290**. Both right and left gonads present, right longer than left. Total number of vertebrae 80 to 84. **Colour:** dark bluish green above, silvery white below. A dark blue stripe along sides. **Juveniles have an elevated black lobe in the posterior part of the dorsal fin which is lost with growth.**

Size: Maximum to at least 101.3 cm standard length (without caudal fin) and 71.5 cm body length (without beak and caudal fin) in the Western Central Atlantic; commonly to 90 cm standard length. The IGFA all-tackle gamefish record is 3.4 kg for a fish caught in Florida in 1999.

Habitat, biology, and fisheries: A pelagic species inhabiting more coastal waters than *Tylosurus acus*, but also found in offshore waters. Carnivorous, feeding mainly on small fishes. Injuries and a few fatalities from houndfish colliding with people, particularly when attracted to lights at night. Caught by casting or trolling surface or near-surface lures; also with seines and trammel nets. Marketed mostly fresh and salted. It is considered a high quality food fish in Venezuela. Separate statistics are not reported for this species.



Distribution: Throughout the area, northward extending to North Carolina and Bermuda and southward at least as far as Salvador, Brazil; worldwide in tropical and warm-temperate waters. Replaced in the tropical eastern Pacific by *Tylosurus crocodilus fodiator*.

SCOMBERESOCIDAE

Sauries

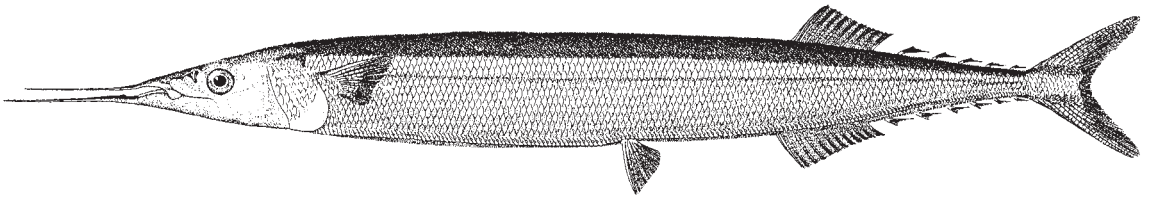
by B.B. Collette, National Marine Fisheries Service, National Museum of Natural History, Washington D.C., USA

A single species occurring in the area.

Scomberesox saurus saurus (Walbaum, 1792) SAU

Frequent synonyms / misidentifications: None / None.

FAO names: En - Atlantic saury; **Fr** - Balaou atlantique; **Sp** - Paparada del Atlántico.



Diagnostic characters: Upper and lower jaws prolonged. Five or 6 small separate finlets, dorsally between dorsal and caudal fins, ventrally between anal and caudal fins. Body about 9 times as long as deep, laterally flattened, tapering toward head and tail, with slender caudal peduncle. Lower jaw projecting a little beyond upper; teeth pointed but small. All fins small. Dorsal fin originates slightly behind origin of anal fin; these fins similar in outline, originating posteriorly. Pelvic fins situated about midway along body. Caudal fin deeply forked and symmetrical, similar to a mackerel tail. Trunk covered with small scales. Patch of scales on each gill cover. Dorsal-fin soft rays 9 to 12 plus 5 or 6 finlets; anal-fin soft rays 12 or 13 plus 5 to 7 finlets; pectoral-fin soft rays 12 to 15; predorsal scales 73 to 81; gill rakers on first arch 34 to 45; precaudal vertebrae 39 to 43, caudal vertebrae 24 to 28, total 64 to 70. **Colour:** olive green above with a silver band on each side at the level of the eye and about as broad as the latter. There is a dark green spot above the base of each pectoral fin; dorsal fin greenish; lower parts are silvery with golden gloss. Young fry, which live in the surface waters of the open Atlantic, have dark blue backs and silvery sides.

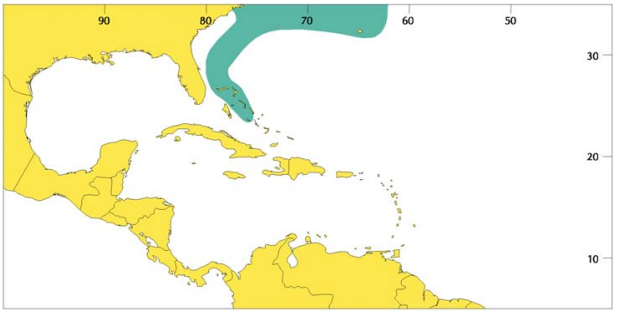
Size: Maximum size 762 mm standard length.

Similar families occurring in the area

Scomberesocidae resembles needlefish in the slender form and in the fact that both upper and lower jaws are prolonged, but differs in having a series of 5 or 6 small separate finlets, both dorsally between dorsal and caudal fins, and ventrally between anal and caudal fins.

Habitat, biology, and fisheries: Sauries spend most of their life in warm homogeneous surface layers of the open sea, far from shallow continental shelf waters. They live close to the surface; so close that in English waters, where they are plentiful in summer, few are caught in nets as deep as 2 m. Atlantic saury are one of the most abundant epipelagic planktivores inhabiting the open part of the Atlantic Ocean, feeding mainly on siphonophores, copepods, euphausiids, and amphipods. Larvae of polychaetes, decapods, isopods, ostracods, cirripeds, siphonophores, fish eggs and larvae, protozoans, and algae are also present in the diet. In winter, most sauries caught in the southern part of the area (34°N) feed on larvae of decapods, hyperiid amphipods, molluscs, and foraminiferans. Atlantic saury serve as food for many inhabitants of the sea, such as squids, swordfish, marlins, sharks, tunas, dolphins, whales, and birds. The great abundance of sauries and their wide distribution make them an important link in the epipelagic food chain of the ocean by transferring energy from lower to higher trophic levels. Valuable foodfishes in some parts of the world; Atlantic saury are important in the Mediterranean. At present, there is no fishery in the northwest Atlantic, but an experimental fishery was conducted by Russian vessels during 1969 to 1974. Caught in nets suspended from booms along the side of the vessels; the fish are attracted by bright lights at night.

Distribution: Antitropical in temperate parts of the Atlantic, Pacific, and Indian oceans. Two subspecies recognized with the nominal subspecies broadly distributed in the northern Atlantic Ocean (mostly north of 30°N) and throughout the Mediterranean Sea. In the northwest Atlantic, found from Cape Hatteras to Newfoundland. The area to the west of the Gulf Stream core is the main habitat of Atlantic saury in the open sea of the northwest Atlantic, although they have been taken east of the Gulf Stream. Generally, the area of distribution extends from coastal waters eastward to 40°W and from 32°N northward to 50°N. There are scattered records at the southern limit of the range, from Bermuda, northern Florida, the Bahamas, and Cuba.



References

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Hubbs, C. L. and R.L. Wisner. 1980. Revision of the sauries (Pisces, Scomberesocidae) with descriptions of two new genera and one new species. *US Fish. Bull.*, 77:521-566.

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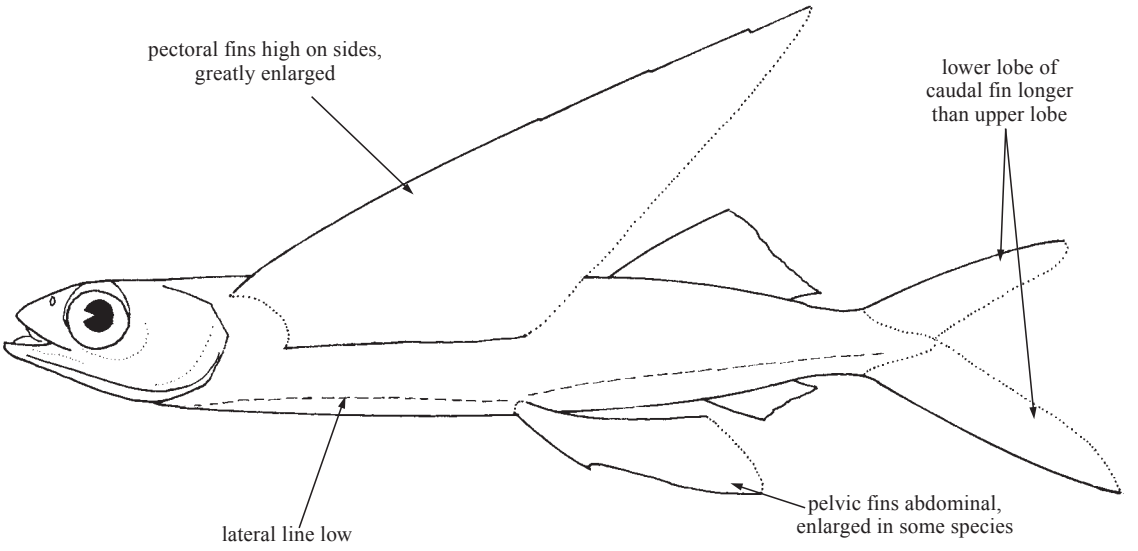
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EXOCOETIDAE

Flyingfishes

by N.V. Parin, Shirshov Institute of Oceanology, Russia (after Gibbs, 1978)

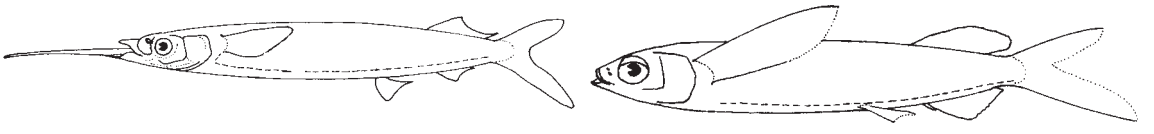
Diagnostic characters: Small to medium-sized (to 45 cm total length) with elongate, broadly cylindrical (round or elliptical in cross-section) bodies, flattend ventrally in some species. Head short; snout usually blunt (produced in *Fodiator* only), shorter than eye in all western Atlantic species. Mouth small; jaw teeth absent or very small. Gill rakers well developed. Upper pharyngeal bones of third gill arches close together, but not fused into a single plate. **No spines in fins**. Dorsal and anal fins set equally far back on body; their bases short and opposed. Caudal fin deeply forked; its lower lobe longer than the upper. **Pectoral fins high on sides, strikingly long, always extending beyond dorsal-fin origin**. Pelvic fins abdominal in position, and greatly enlarged in many, but not all, species. **Lateral line low on body**. Scales large, cycloid (smooth to touch), easily shed. Swimbladder large, extending posteriorly beyond body cavity. Young stages (to about 10 cm) quite different in appearance from adults, with pectoral fins shorter; dorsal fin often higher than in adults; single or paired chin barbels conspicuous in many species. **Colour:** dark above, pale below. Dark colours usually iridescent blue or green in life; dorsal fin in some species with black pigment; pectoral fins in some species with pale crossband and outer margin. Colour patterns of young stages variable, and spots and bars often developed.



Habitat, biology, and fisheries: Inhabit surface waters of open ocean as well as neritic and inshore areas. Well known for their habit of leaping out of the water and gliding over long distances. Schooling, do not undertake extensive migrations. Feed on zooplankton, larger species also feed on small fishes. Attracted by light at night. Very abundant in most tropical seas. Usually appreciated as food and some species are highly prized; however, few commercial fisheries have developed. Target fishery operates from Barbados, Tobago, etc., using mainly drift gill nets in localities of unusually heavy spawning concentrations, the catch from this fishery is mostly fresh-frozen. In other regions within the area, especially around the Antilles, flyingfishes are consumed fresh or used as bait. FAO statistics report landings ranging from 1 623 to 2 835 t from 1995 to 1999.

Similar families occurring in the area

Hemiramphidae: body more elongated, except *Oxyporhamphus*; pectoral fins short to medium length, never reaching dorsal-fin origin; lower jaw much longer than upper jaw, except in adult *Chriodorus* and *Oxporhamphus*; upper pharyngeals of third gill arch usually fused, forming a single plate; swimbladder not extending posteriorly beyond body cavity.



Hemiramphus
typical

Hemiramphidae

Oxyporhamphus
without prolonged lower jaw

Key to the species of Exocoetidae in the area

1a. Pectoral fins moderately long, not reaching beyond posterior part of anal-fin base; pectoral branch of lateral line present (Fig.1). . . . . → ***2***

1b. Pectoral fins very long, reaching beyond anal-fin base to or almost to caudal-fin base; pectoral branch of lateral line absent . . . . . → ***3***

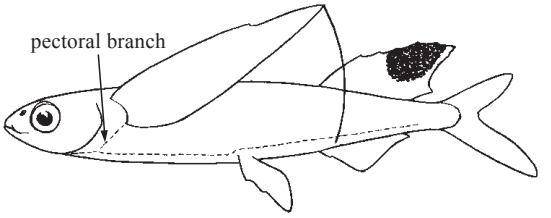


Fig. 1 ***Parexocoetus***

2a. Snout long and pointed, much longer than eye diameter; upper jaw not protrusible; juveniles not barbelled, with lower jaw greatly elongated (recorded only twice from the area, off Suriname and in the Carribean Sea but both records seem to be erroneous . . . . . ***Fodiator acutus***

2b. Snout short and blunt, shorter than eye diameter; upper jaw protrusible (Fig. 2); juveniles with paired chin barbels (easily lost) and lower jaw not elongated . . . . . ***Parexocoetus hillianus***

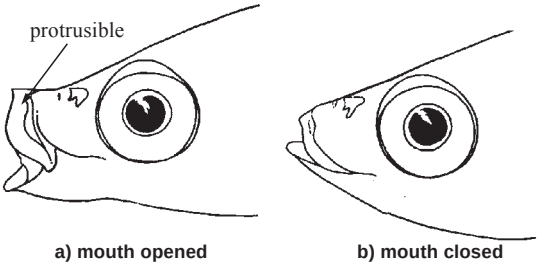


Fig. 2 ***Parexocoetus***

3a. Pelvic fins short, not reaching anal-fin origin (barely reaching in juveniles), inserted nearer to pectoral-fin insertion than anal-fin origin (Fig. 3); juveniles not barbelled . . . . . → ***4***

3b. Pelvic fins long, reaching well beyond anal-fin origin, inserted nearer to anal-fin origin than pectoral-fin insertion (Fig.4); juveniles barbelled or not barbelled . . . . . → ***5***

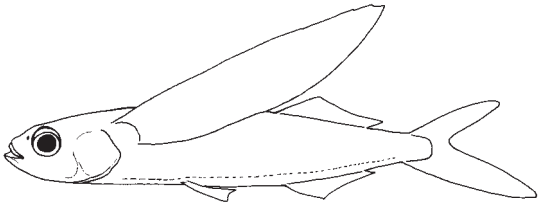


Fig. 3 ***Exocoetus***

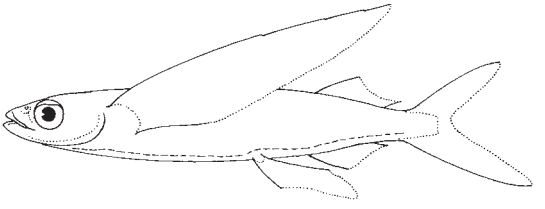


Fig. 4 ***Hirundichthys***

4a. Gill rakers on first gill arch 22 to 29 (usually 25 to 27); 7 to 8 (usually 7.5) scales in transverse row between dorsal-fin origin and lateral line; juveniles hump-backed . . . . . ***Exocoetus obtusirostris***

4b. Gill rakers on the first gill arch 29 to 37 (usually 32 to 34); 6 or 7 (usually 6.5) scales in transverse row between dorsal-fin origin and lateral line; juveniles elongated . . . . . ***Exocoetus volitans***

5a. Origin of anal fin 3 soft rays or more behind origin of dorsal fin (Fig. 5); dorsal fin 2 to 5 soft rays more than anal fin; juveniles barbelled or not barbelled . . . . . → ***6***

5b. Origin of anal fin slightly before, under or, rarely, not more than 2 soft rays behind origin of dorsal fin (Fig. 6); dorsal fin usually with less or equal number of rays than anal fin; juveniles not barbelled . . . . . → ***13***

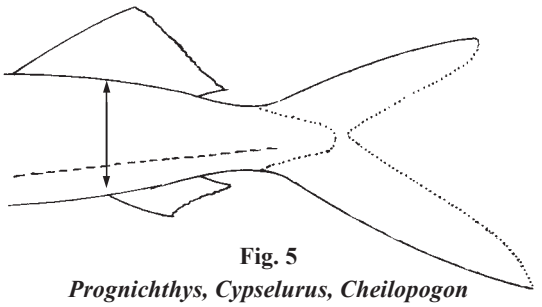


Fig. 5
Prognichthys, Cypselurus, Cheilopogon

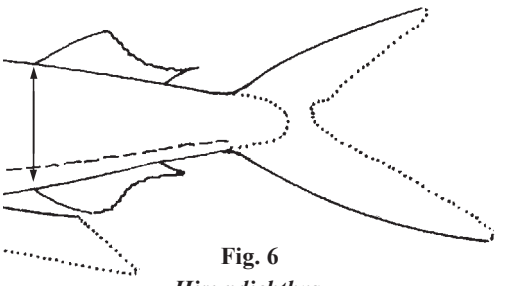


Fig. 6
Hirundichthys

6a. First 2 pectoral-fin rays unbranched (Fig. 7); juveniles not barbelled . . . . . → ***7***

6b. Only the first pectoral-fin ray unbranched (Fig. 8); juveniles barbelled . . . . . → ***8***

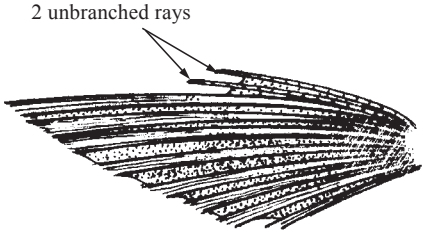


Fig. 7
Prognichthys

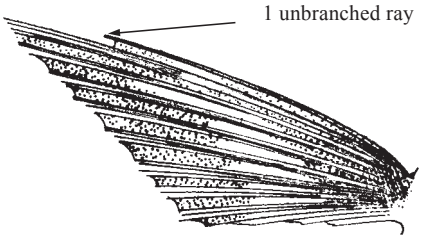


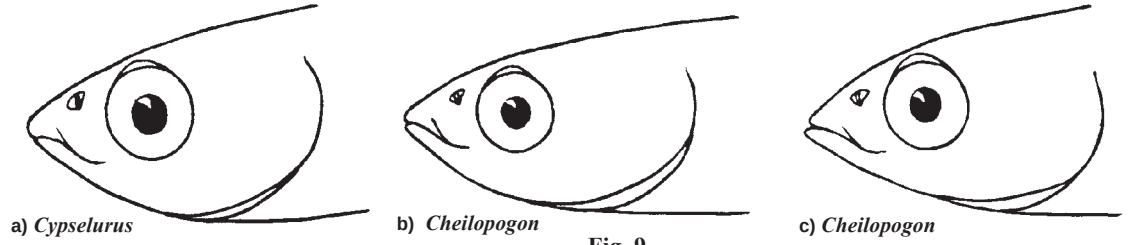
Fig. 8
Cypselurus, Cheilopogon

7a. Pectoral fins chiefly pale with central part greyish; eye diameter 1.2 to 1.5 in postorbital part of head; anal-fin soft rays 9 to 11 (usually 10); juveniles with pectoral fins pale with 2 large black blotches, 1 at base and the other in outer portion . . . . . ***Prognichthys glaphyrae***

7b. Pectoral fins chiefly blackish with central part greyish; eye diameter 1.4 to 1.8 in postorbital part of head; anal-fin soft rays 8 to 10 (usually 9); juveniles with pectoral fins almost uniformly pigmented . . . . . ***Prognichthys occidentalis***

8a. Pelvic fins inserted about midway between posterior head margin and origin of lower caudal-fin lobe; lower jaw slightly shorter than upper jaw and included beneath the latter when mouth closed (Fig. 9a), pectoral fins lightly and almost uniformly pigmented; juveniles with a single chin barbel . . . . . ***Cypselurus comatus***

8b. Pelvic fins inserted much nearer to posterior head margin than origin of lower caudal-fin lobe (except in *Ch. cyanopterus*); both jaws of equal length, or lower jaw a little longer than upper jaw (Fig. 9b, c); pectoral fins more densely pigmented, usually (except in *Ch. cyanopterus*) with paler transverse strip or basal triangle; juveniles with paired chin barbels . . . . → ***9***

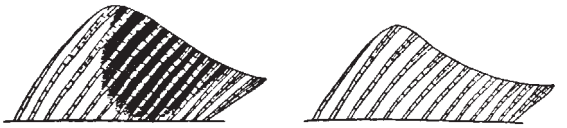


a) ***Cypselurus*** b) ***Cheilopogon*** c) ***Cheilopogon***

Fig. 9

9a. Dorsal fin moderately high (longest soft ray usually less than 10 times in standard length), bearing a prominent black spot (Fig. 10a); palatine teeth present; jaw teeth noticeable (conspicuous to the touch). . . . . → ***10***

9b. Dorsal fin moderately low (longest soft ray usually more than 10 times in standard length), without black spot (Fig. 10b); palatine teeth absent; jaw teeth minute (not conspiciuous to the touch) . . . . . → ***11***



a) ***Ch. exsiliens*** ***Ch. cyanopterus*** b) ***Ch. furcatus*** ***Ch. melanurus*** ***Ch. heterurus***

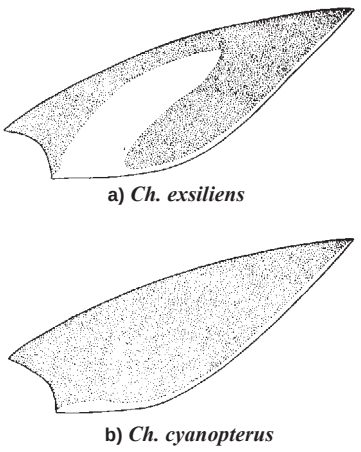
Fig. 10 dorsal fin

10a. Predorsal scales 24 to 29; pectoral fins black with a definite pale crossband (Fig. 12a); lower caudal-fin lobe obviously darker than upper lobe; juveniles with moderately long flat barbels, their length more than 2.5 times in standard length . . . . . ***Cheilopogon exsiliens***

10b. Predorsal scales 33 to 41; pectoral fins uniformly bluish black except for outer margin and lowermost soft rays (Fig. 12b); both caudal-fin lobes equally pigmented; juveniles with very long barbels with fleshy axis, their length less than 1.7 times in standard length . . . . . ***Cheilopogon cyanopterus***

11a. Pectoral fin usually blackish, with definite pale crossband and broad outer margin; juveniles with moderately long barbels, their length less than 2.7 times in standard length . . . . . ***Cheilopogon furcatus***

11b. Pectoral fins greyish, with indefinite pale triangular crossband and narrow outer margin; juveniles with short barbels, their length more than 7 times in standard length . . . . . → ***12***



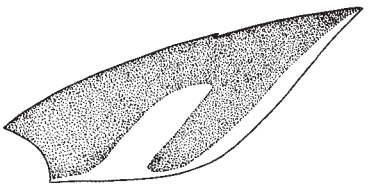
a) ***Ch. exsiliens*** b) ***Ch. cyanopterus***

Fig. 12 pectoral fin

12a. Head length 3.9 to 4.6, usually less than 4.3 in standard length; predorsal scales 25 to 33, usually 27 to 30; vertebrae 45 to 47, usually 46 . . . . . ***Cheilopogon melanurus***

12b. Head length 4.3 to 4.9, usually more than 4.5 in standard length; predorsal scales 29 to 38, usually 30 to 35; vertebrae 47 to 50, usually 48 . . . . . ***Cheilopogon heterurus***

13a. First 2 pectoral-fin soft rays unbranched; pectoral fin uniformly black without pale crossband; head length 4.5 to 5.0 in standard length; pectoral-fin length 1.25 to 1.35 in standard length . . . . . ***Hirundichthys rondeletii***



13b. Only the first pectoral-fin ray unbranched; pectoral fins grey, with pale triangular crossband; head length 3.9 to 4.4; pectoral-fin length 1.35 to 1.6 in standard length . . . . → ***14***

14a. Palatine teeth present; pectoral fins with broad pale outer margin (Fig. 13) . ***Hirundichthys speculiger***

14b. No palatine teeth; pectoral teeth with narrow pale outer margin . . . . . ***Hirundichthys affinis***

List of species occurring in the area

Note: Species accounts are included for all species excepting *Fodiator acutus* which occurrence in the area is highly doubtful.

The symbol is given when species accounts are included.

Cheilopogon cyanopterus (Valenciennes, 1847).
Cheilopogon exsiliens (Linnaeus, 1771).
Cheilopogon furcatus (Mitchill, 1815).
Cheilopogon heterurus (Rafinesque, 1810).
Cheilopogon melanurus (Valenciennes, 1847).

Cypselurus comatus (Mitchill, 1815).

Exocoetus obtusirostris Günther, 1866.
Exocoetus volitans Linnaeus, 1758.

Fodiator acutus (Valenciennes, 1847). 15 cm sl. E Atlantic.

Hirundichthys affinis (Günther, 1866).
Hirundichthys rondeletii (Valenciennes, 1847).
Hirundichthys speculiger (Valenciennes, 1847).

Parexocoetus hillianus (Gosse, 1851).

Prognichthys glaphyrae Parin, 1999.
Prognichthys occidentalis Parin, 1999.

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Bruun, A.F. 1935. Flying-fishes (Exocoetidae) of the Atlantic. *Dana Rep.*, (6):1-106.

Parin, N.V. 1999. Flying fishes of the genus *Prognichthys* in the Atlantic Ocean. *Voprosy Ikchtiologii,* 39(3):293-305. [*Journ. Ichthyol*., 39(4)281-293].

Parin, N.V. and T.N.Belyanina. 2000. Comparative description of two closely related Atlantic flying fishes, *Cheilopogon heterurus* and *Ch. melanurus* (Exocoetidae). *Voprosy Ikhtiologii*, 40(2):149-165.[*Journ. Ichthyol.*, 40(3):213-229].

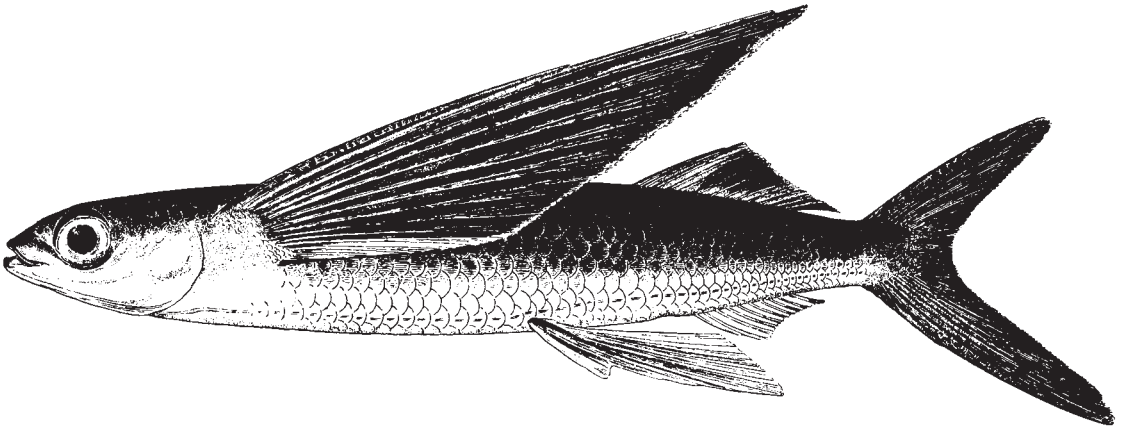
Parin N.V. and I.B. Shakhovskoy. 2000. A review of the flying fish genus *Exocoetus* (Exocoetidae) with descriptions of the two new species from the southern Pacific Ocean. Journ. Ichthyol., 40 (suppl. 1):31-63.

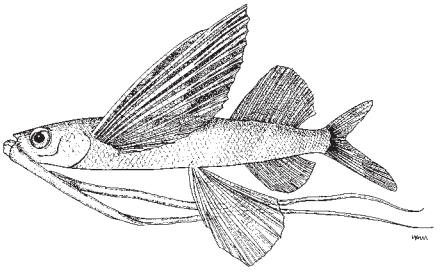
Staiger, J.C. 1965. Atlantic flyingfishes of the genus *Cypselurus*, with descriptions of the juveniles. *Bull. Mar. Sci.,*15(3):672-725.

Cheilopogon cyanopterus (Valenciennes, 1847)

Frequent synonyms / misidentifications: *Cypselurus cyanopterus* / None.

FAO names: En - Marginated flyingfish; **Fr** - Exocet codene; **Sp** - Volador bordiblanco.





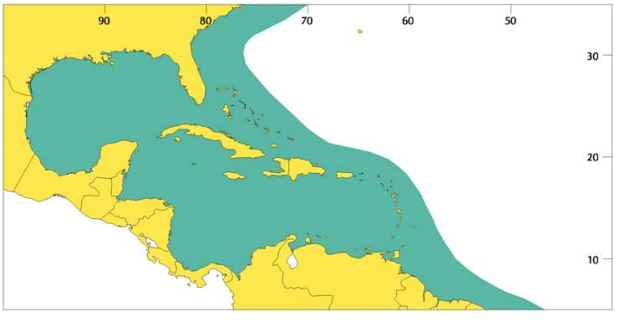
juvenile

Diagnostic characters: Body elongate, nearly rectangular in cross-section, almost flat ventrally. Depth 5.4 to 5.7 in standard length. Eye 3.3 to 3.6 in head length. Head length 5.4 to 5.7 in standard length. Jaws subequal. Jaw teeth conspicious, mostly conical and slightly curved. **Palatine teeth present**. Gill rakers on first arch 21 to 28. **Dorsal fin** moderately high, **with 12 to 14 soft rays. Anal fin with 9 to 11 soft rays, originating under fifth to seventh dorsal fin ray. Pectoral fins** 1.4 to 1.5 in standard length, **with** 13 to 15 soft rays, **first ray unbranched. Pelvic fins** 3.3 to 3.8 in standard length, **inserted nearer to posterior margin of opercle than origin of caudal-fin base. Juveniles with** enlarged dorsal fin (its height 3.9 to 5.1 in standard length at 30 to 150 mm standard length) and **very long paired chin barbels** exceeding standard length at 20 to 80 mm standard length (barbels lost at 190 to 200 mm standard length). Predorsal scales 33 to 41. Scales in transverse row 7.5 to 9. Vertebrae 43 to 46. **Colour:** body dark above, pale below. Dorsal fin greyish with a large black blotch in central part; anal fin transparent; caudal fin dark grey to almost black; pectoral fins bluish black except outer margin and lowermost soft rays; pelvic fins unpigmented. Juveniles with black dorsal fin, other fins strongly but partially pigmented; stems of barbels light, their lateral folds black.

Size: Maximum 33 cm standard length (about 41 cm total length).

Habitat, biology, and fisheries: Predominantly neritic species. Feeds on zooplankton and small fishes. Mature at about 27 cm standard length. Eggs demersal. Not important to fisheries.

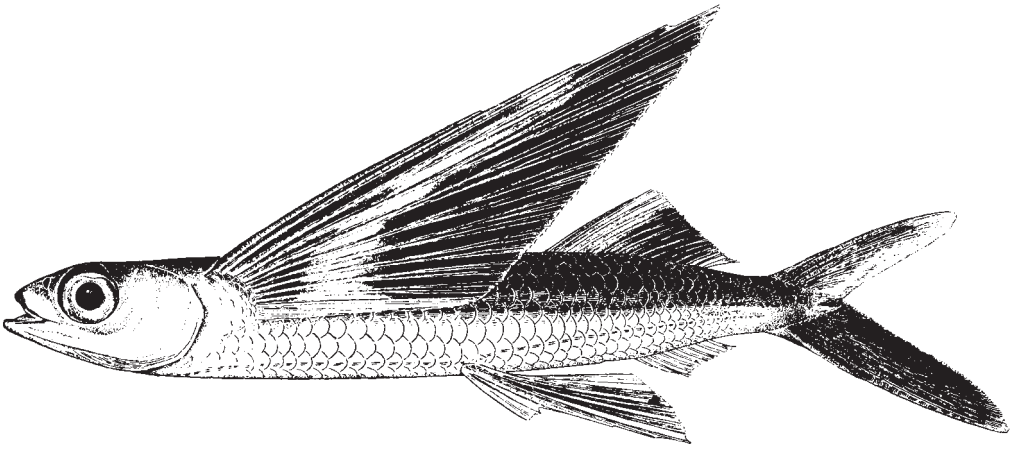
Distribution: Tropical Atlantic and Indo-West Pacific. In the western Atlantic from 40 N (juveniles in the Gulf Stream) to 20 S including both the Gulf of Mexico and the Caribbean Sea.

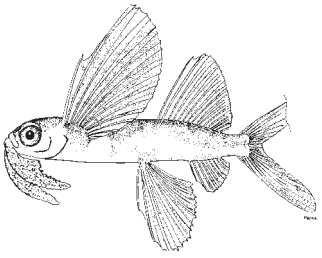


Cheilopogon exsiliens (Linnaeus, 1771)

Frequent synonyms / misidentifications: *Cypselurus exsiliens* / None.

FAO names: En - Bandwing flyingfish; **Fr** - Exocet rayé; **Sp** - Volador bandiblanco.





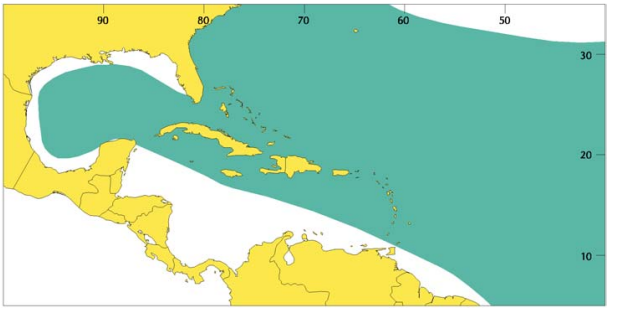
juvenile

Diagnostic characters: Body elongate, nearly rectangular in cross-section, almost flat ventrally. Depth 5.6 to 6.6 in standard length. Head length 3.8 to 4.2 in standard length. Eye 3.1 to 3.5 in head length. Jaws subequal. Jaw teeth conspicuous, unicuspid. **Palatine teeth present**. Gill rakers on first arch 23 to 28. **Dorsal fin moderately high, with 13 to 15 soft rays. Anal fin with 9 to 11 soft rays, originating under sixth to ninth dorsal fin ray. Pectoral fin** 1.3 to 1.5 in standard length, **with** 14 to 15 soft rays, **first ray unbranched. Pelvic fins** 2.8 to 3.8 in standard length, **inserted nearer to posterior margin of opercle than origin of caudal-fin base. Juveniles with** enlarged dorsal fin (its height 2.9 to 4.5 times in standard length at 30 to 100 mm standard length), and with **paired flap-like chin barbels**, their length 2.9 to 4.5 in standard length at 30 to 100 mm standard length (barbels lost at 105 to 115 mm standard length). **Predorsal scales 24 to 29**. Scales in transverse row 6 to 7.5. Vertebrae 43 to 45. **Colour:** body dark above, pale below. Dorsal fin greyish, with a large black blotch in central part; anal fin transparent; caudal fin with lower lobe almost entirely black and upper lobe almost entirely unpigmented, pectoral fins bluish black with pale oblique band crossing the fin; pelvic fins greyish, often with remains of black pigment in distal half. Juveniles with faint transverse bars on body; dorsal and paired fins partially pigmented; caudal fin clean, barbels grey with dark margins.

Size: Maximum 24 cm standard length (about 30 cm total length).

Habitat, biology, and fisheries: Oceanic species. Feeds on zooplankton. Eggs pelagic. Of no importance to fisheries.

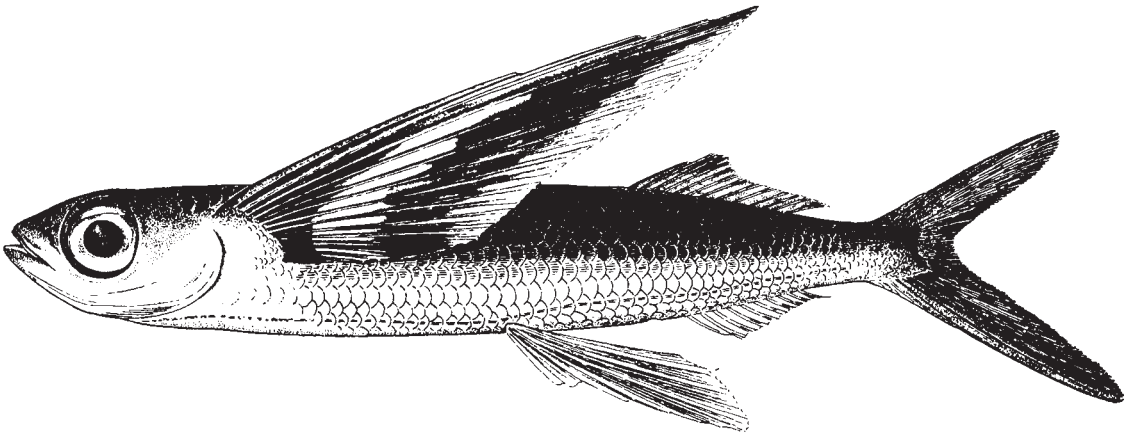
Distribution: In the western North Atlantic to about 40 N in the Gulf Stream, including the Gulf of Mexico, apparently absent or rare in the Caribbean Sea. Also found in the eastern North Atlantic off Europe and North Africa, and in the southern Atlantic between 10 and 25 S.

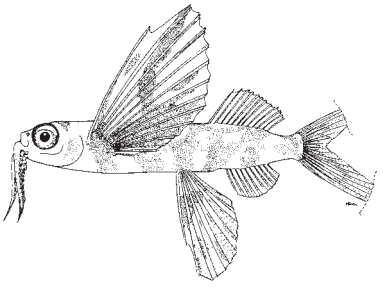


Cheilopogon furcatus (Mitchill, 1815) ECF

Frequent synonyms / misidentifications: *Cypselurus furcatus* / None.

FAO names: En - Spotfin flyingfish; **Fr** - Exocet tacheté; **Sp** - Volador manchado.





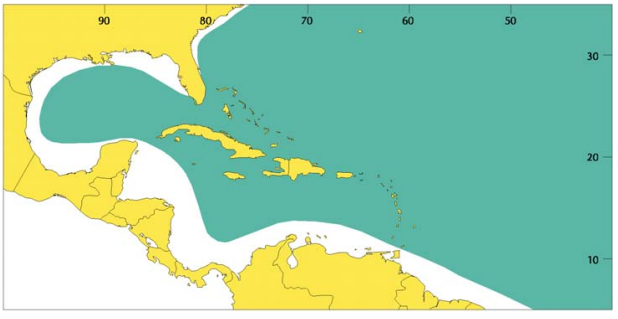
juvenile

Diagnostic characters: Body elongate, nearly rectangular in cross-section, almost flat ventrally. Depth 4.8 to 6.1 in standard length. Head length 2.8 to 3.1 in standard length. Eye 2.8 to 3.1 in head length. Lower jaw slightly projected before the upper when mouth closed. Jaw teeth diminutive, mostly conical. **Palatine teeth absent**. Gill rakers on first arch 18 to 25. **Dorsal fin low, with 12 to 14 soft rays. Anal fin with 8 to 11 soft rays, originating under fifth to seventh dorsal-fin ray. Pectoral fins** 1.3 to 1.5 in standard length, **with** 14 to 17 soft rays, **first ray unbranched. Pelvic fins** 2.7 to 3.3 in standard length, **inserted nearer to posterior margin of opercle than orign of caudal-fin base. Juveniles with paired chin barbels** consisting of firm pointed stem and skin fold along the outer margin, barbel length 1.2 to 3.1 times in standard length at 50 to 150 mm standard length, (barbels disappear at 112 to 175 mm standard length). Scales in transverse row 7 to 9. **Predorsal scales 26 to 33**, usually 27 to 30. Vertebrae 43 to 46. **Colour:** body dark above; pale below. Dorsal and caudal fins greyish; anal fin transparent; pectoral fins almost black to grey (deep blue in life) with unpigmented oblique crossband reaching or nearly reaching upper margin of the fin and very broad unpigmented margin along rear edge of the fin. Juveniles 50 to 100 mm standard length with 6 transverse vertical bars on body; dorsal and anal fins with black spots; pectoral fins with dark lower part and 2 oblique dark bands; pelvic fins also with dark spots and bands.

Size: Maximum to 27 cm standard length (about 33 cm total length).

Habitat, biology, and fisheries: True oceanic species not connected with inshore waters during any period of life. Feeds on zooplankton. Matures at 19 cm standard length. Eggs demersal, laid on drifting algae or other floating objects. Of no importance to fisheries.

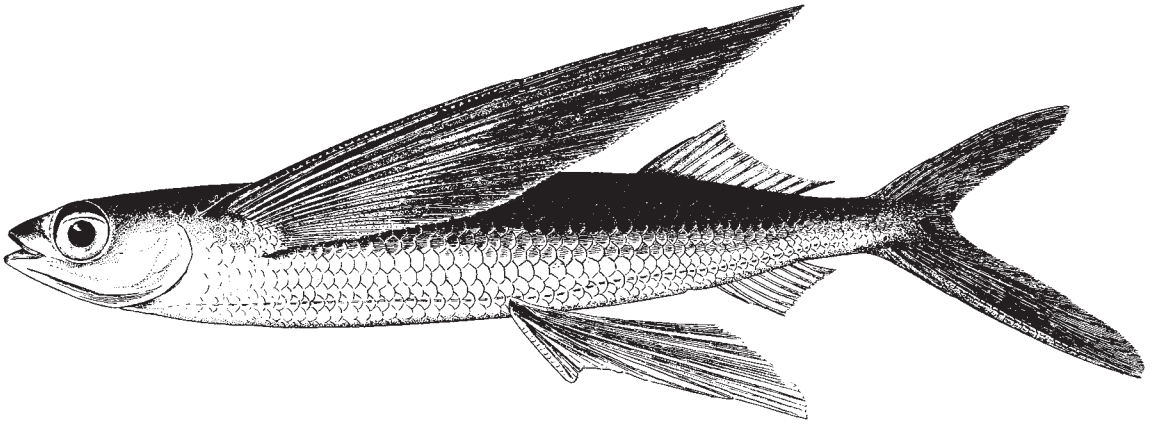
Distribution: Worldwide in the tropical oceans. In the western Atlantic from 44 N in the Gulf Stream to 18 S.

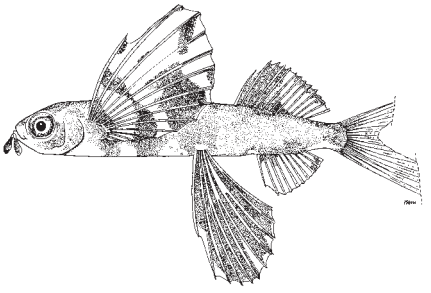


Cheilopogon heterurus (Rafinesque, 1810) ECE

Frequent synonyms / misidentifications: None / None.

FAO names: En - Mediterranean flyingfish (AFS: Blotchwing flyingfish); **Fr** - Exocet méditerranéen; **Sp** - Volador mediterraneo.





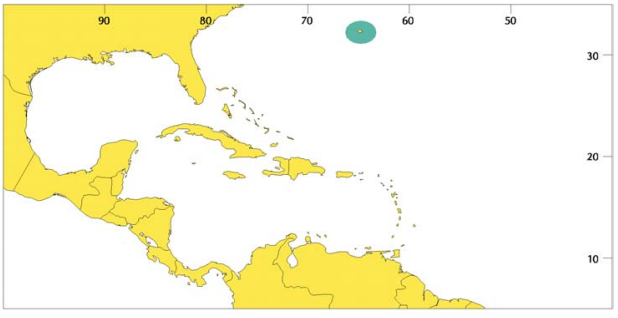
juvenile

Diagnostic characters: Body elongate, nearly rectangular in cross-section, almost flat ventrally. Depth 5.3 to 6.6 in standard length. Head length 4.3 to 4.9 in standard length. Lower jaw slightly projecting beyond the upper with mouth closed. Jaw teeth diminutive, mostly conical. **Palatine teeth absent**. Gill rakers on first arch 19 to 26. **Dorsal fin low, with 12 to 15 soft rays. Anal fin with 8 to 10 soft rays, originating under fifth to seventh dorsal fin ray. Pectoral fins 1.3 to 1.5 in standard length, with** 16 to 18 soft rays, **first ray unbranched. Pelvic fins** 2.7 to 3.3 in standard length, **inserted nearer to posterior margin of opercle than origin of caudal-fin base. Juveniles with paired chin barbels** consisting of firm pointed stem and skin fold along the outer margin, barbel length more than 8, usually 10 to 25 times in standard length (barbels lost at about 80 to 90 mm standard length). Scales in transverse row 7 to 9. Predorsal scales 29 to 38. Vertebrae 46 to 50, usually 47 to 49. **Colour:** body dark above, pale below. Dorsal and caudal fins greyish; anal fin transparent; pectoral fins light to dark greyish, with indefinite pale triangular crossband and narrow outer margin, pelvic fins unpigmented. Juveniles less than 100 to 150 mm standard length with 3 transverse vertical bands on anterior part of body; dorsal and anal fins with dark markings; pectoral fins pale with dark blotches and curved bands; pelvic fins also with dark blotches and bands.

Size: Maximum to 35 cm standard length (about 45 cm total length).

Habitat, biology, and fisheries: neritic species, rarely found offshore. Feeds on zooplankton. Mature at 280 to 300 mm standard length. Spawns near shore. Eggs demersal. Not known to be a commercial fish.

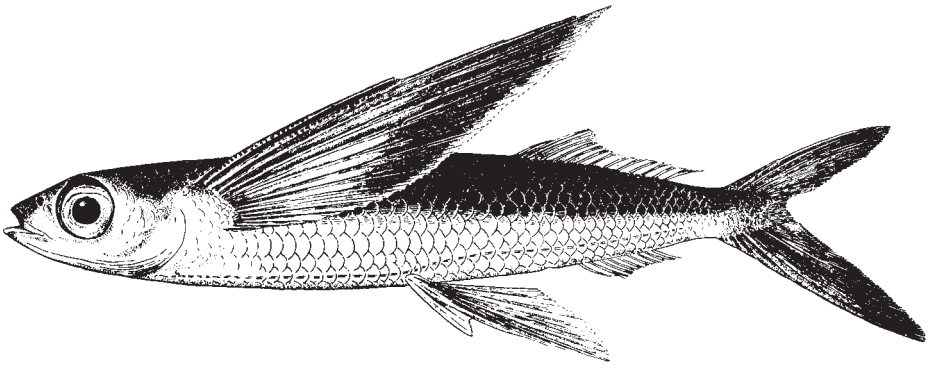
Distribution: In the western Atlantic known only from off Bermuda. Disjunct population occurs in the western Mediterranean Sea, along the shores of southwestern Europe (occasional specimens as far north as Denmark and southern Norway) and northwestern Africa, and off the Azores.

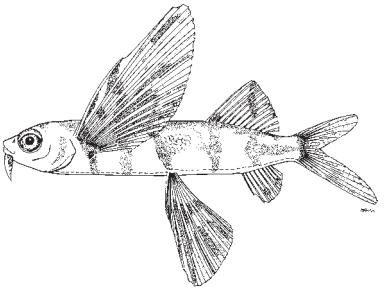


Cheilopogon melanurus (Valenciennes, 1847)

Frequent synonyms / misidentifications: *Cypselurus melanurus*; *Cypselurus lutkeni* (Jordan and Evermann, 1896) / *Cypselurus heterurus* (Rafinesque, 1810).

FAO names: En - Atlantic flyingfish; **Fr** - Exocet atlantique; **Sp** - Volador atlántico.





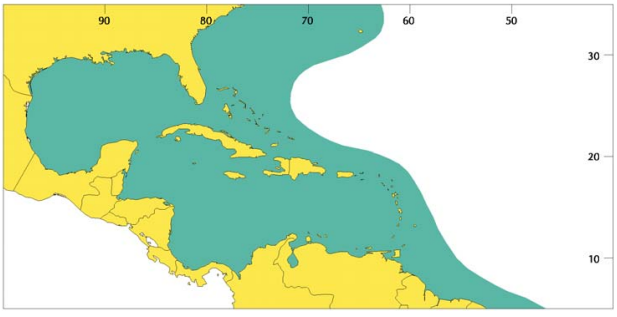
juvenile

Diagnostic characters: Body elongate, nearly rectangular in cross-section, almost flat ventrally. Depth 4.9 to 6.2 in standard length. Head length 3.9 to 4.6 in standard length. Lower jaw slightly projecting beyond the upper with mouth closed. Jaw teeth diminutive, mostly conical. **Palatine teeth absent**. Gill rakers on first arch 17 to 24. **Dorsal fin low, with 11 to 14 soft rays. Anal fin with 7 to 11 soft rays, originated under fifth to seventh dorsal-fin ray. Pectoral fins 1.4 to 1.6 in standard length, with** 14 to 18 soft rays, **first ray unbranched. Pelvic fins** 2.5 to 3.3 in standard length, **inserted nearer to posterior margin of opercle than origin of caudal-fin base. Juveniles with paired chin barbels** consisting of firm pointed stem and skin fold along the outer margin; barbel length more than 7, usually 8 to 20 times in standard length (barbels lost at 80 to 100 mm standard length). Scales in transverse row 6 to 8. **Predorsal scales 25 to 33, usually 27 to 30**. Vertebrae 45 to 47, usually 46. **Colour:** body dark above, pale below. Dorsal and caudal fins greyish; anal fin transparent; pectoral fins greyish, with indefinite pale triangular crossband and narrow outer margin; pelvic fins unpigmented. Juveniles less than 100 to 120 mm standard length with 6 transverse vertical bands on body; dorsal and anal fins with dark markings; pectoral fins pale, with dark blotches and curved bands; pelvic fins also with dark blotches and bands.

Size: Maximum to 26.5 cm standard length (about 33 cm total length).

Habitat, biology, and fisheries: Neritic species. Feeds on zooplankton. Eggs dimersal. Of no importance to fisheries.

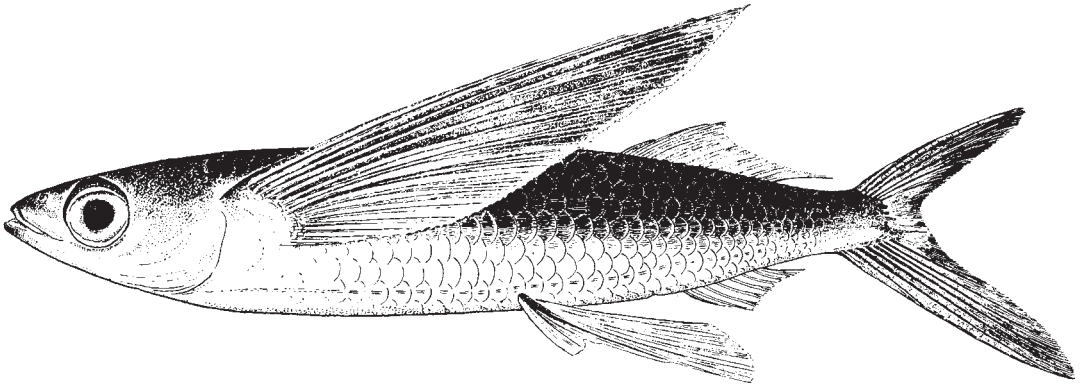
Distribution: In the western Atlantic mostly along coasts from about 40 N to Trinidad, including the Gulf of Mexico and the Caribbean Sea, found offshore only in the area between the Gulf Stream and Bermuda. Also known from the coast of Brazil from the Equator to about 30 S.

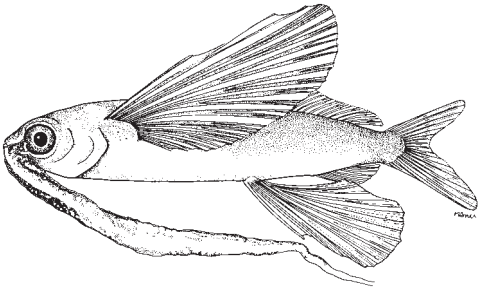


Cypselurus comatus (Mitchill, 1815)

Frequent synonyms / misidentifications: None / None.

FAO names: En - Clearwing flyingfish; **Fr** - Exocet holandais; **Sp** - Volador holandés.





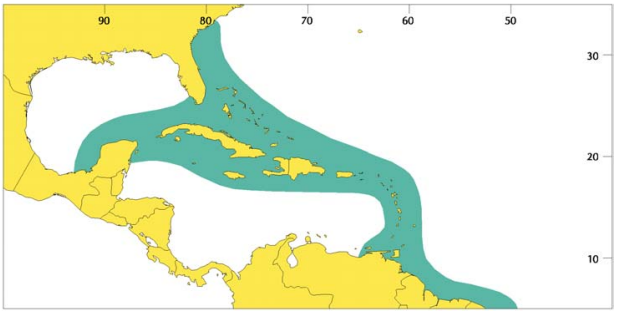
juvenile

Diagnostic characters: Body elongate, nearly rectangular in cross-section, almost flat ventrally. Depth 5.0 to 6.0 in standard length. Head length 3.8 to 4.1 in standard length. Eye 2.8 to 3.1 in head length. Lower jaw a little shorter than the upper and included beneath upper jaw with mouth closed. Jaw teeth noticeable, partly tricuspid. **Palatine teeth usually present**. Gill rakers on first arch 19 to 24. **Dorsal fin low, with 11 to 14 soft rays. Anal fin with 8 or 9 soft rays, originating under fourth to sixth dorsal-fin ray. Pectoral fin 1.5 to 1.6 in standard length, with** 13 to 15 soft rays, **first ray unbranched. Pelvic fins** 3.3 to 3.7 in standard length, **inserted middle of distance between hind margin of opercle to origin of caudal-fin base. Juveniles with a single chin barbel**, its length 0.9 to 2.3 times in standard length at 50 to 80 mm standard length, barbel disappearing at 150 to 160 mm standard length. Scales in transverse row 7 to 8.5. Predorsal scales 23 to 30. Vertebrae 40 to 43. **Colour:** body dark above, pale below. Dorsal and caudal fins greyish; anal fin transparent; pectoral fins uniformly light greyish to grey; pelvic fins greyish basally, transparent elsewhere, rarely with a black spot. In juveniles body uniformly blackish; pelvic fins heavily pigmented; stem of barbel light; its lateral folds blackish.

Size: Maximum to 24 cm standard length in the Gulf of Mexico, to 21 cm standard length (about 26 cm total length) elsewhere.

Habitat, biology, and fisheries: Neritic species. Feeds on zooplankton. Smallest ripe female is 18 cm standard length. Eggs demersal. Breeding season in West Indies from February to April. Of no importance to fisheries.

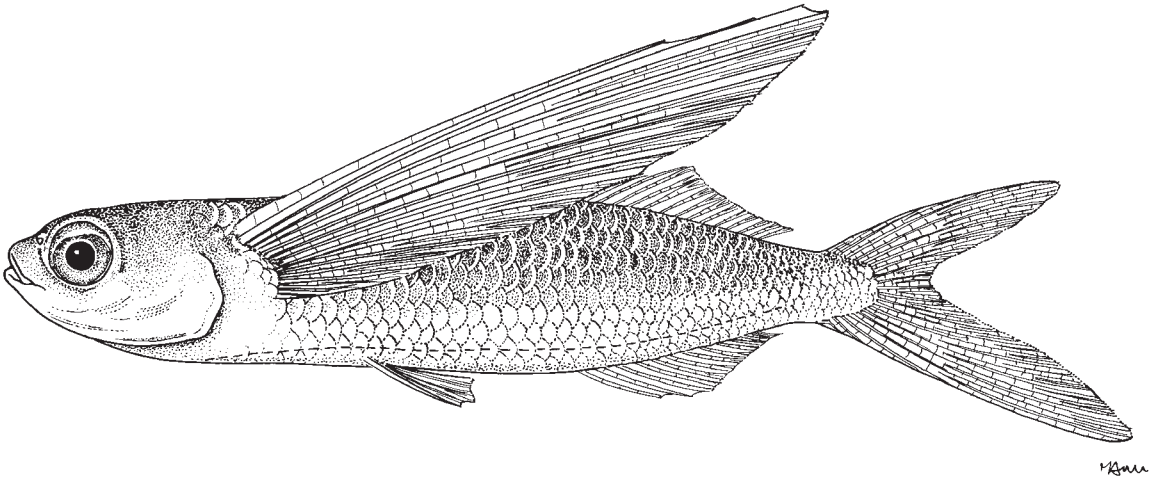
Distribution: Endemic to the tropical western Atlantic. Abundant off Florida, the Bahamas, Antilles, and in the Caribbean Sea; very rare (known from a single record) in the Gulf of Mexico. Also recorded from off Brazil between 1 and 20 S.

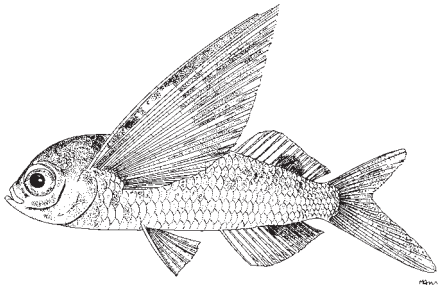


Exocoetus obtusirostris Gònther, 1866

Frequent synonyms / misidentifications: None / None.

FAO names: En - Oceanic two-wing flyingfish; **Fr** - Exocet bouledogue; **Sp** - Volador ñato.





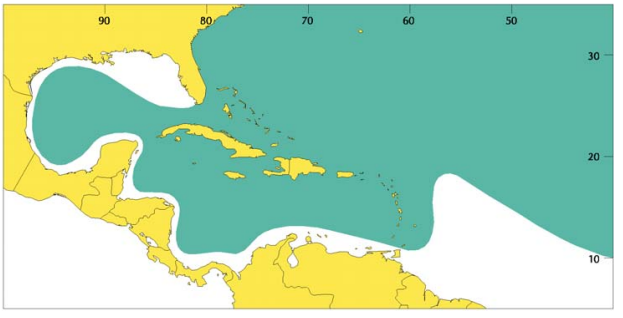
juvenile

Diagnostic characters: Body elongate, roundish in cross-section, slightly flattened ventrally. **Depth 4.6 to 5.4 in standard length**. Head length 3.6 to 4.1 in standard length. Eye 3.2 to 3.6 in head length. Jaws subequal, without teeth. **Gill rakers on first arch 22 to 29**. Dorsal fin low, with 12 to 14 soft rays. Anal fin with 12 to 14 soft rays, originating just before dorsal-fin origin. **Pectoral fins 1.3 to 1.4 in standard length**, with 15 to 17 soft rays. **Pelvic fins 6.5 to 7.5 in standard length, inserted much nearer to posterior margin of opercle than caudal-fin base**. Juveniles not barbelled, hump-backed, upper profile of head steeply sloping, body depth 3.4 to 3.7 in standard length at less than 40 mm standard length. Predorsal scales 18 to 23. **Scales in transverse row 7 to 8, usually 7.5**. Vertebrae 42 to 45. **Colour:** body dark above, pale below. Dorsal and caudal fins greyish; anal and pelvic fins transparant; pectoral fins brownish grey with a broad pale margin. In juveniles body evenly pigmented, dorsal and anal fins blackish posteriorly; pectoral fins usually transparent; pelvic fins mostly blackish.

Size: Maximum to 19.5 cm standard length (about 24.5 cm total length).

Habitat, biology, and fisheries: Oceanic species. Feeds on small zooplankton, predominently copepods. Consumed by predatory fishes (dolphin fish, tunas, snake-mackerels, etc.), squids, seabirds, and dolphin fish. Longevity about 1 year. Spawning intermittant, each batch consist of 420 to 890 eggs. Eggs pelagic. No importance to fisheries.

Distribution: Tropical Atlantic Ocean. In the western Atlantic between 40 N and 40 S, including the Gulf of Mexico and the Caribbean Sea.

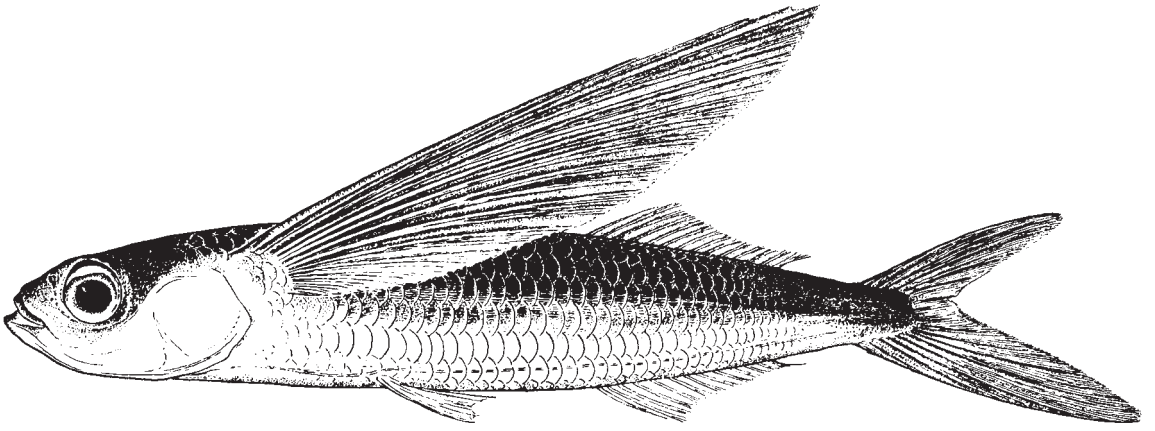


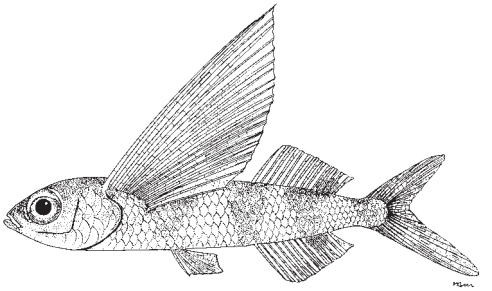
Exocoetus volitans Linnaeus, 1758

EXV

Frequent synonyms / misidentifications: None / None.

FAO names: En - Tropical two-wing flyingfish; **Fr** - Exocet volant; **Sp** - Volador.





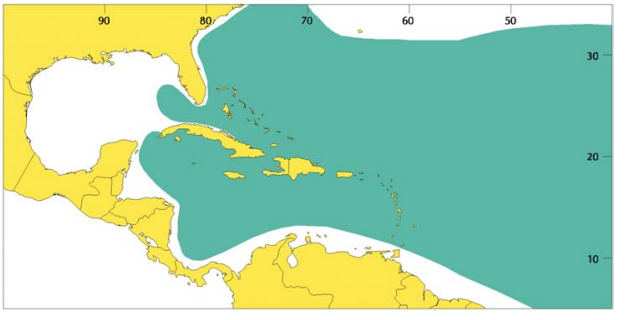
juvenile

Diagnostic characters: Body elongate, roundish in cross-section, slightly flattened ventrally. Depth 5.6 to 6.0 in standard length. Head length 3.6 to 3.9 in standard length. Eye 3.5 to 3.9 in head length. Jaws subequal, without teeth. **Gill rakers on first arch 29 to 37, usually 32 to 34**. Dorsal fin low, with 13 to 15 soft rays. Anal fin with 12 to 14 soft rays, originating under first to third dorsal-fin ray. **Pectoral fins 1.3 to 1.4 in standard length**, with 14 to 16 soft rays. **Pelvic fins 6.5 to 7.6 in standard length, inserted much nearer to posterior margin of opercle than caudal-fin base**. Juveniles not barbelled, fusiform, upper profile of head gently sloping, body depth 4.8 to 5.3 in standard length at less than 40 mm standard length. **Scales in transverse row 6 to 7, usually 6.5**. Predorsal scales 16 to 21. Vertebrae 43 to 45. **Colour:** body dark above, pale below. Dorsal and caudal fins greyish; anal and pelvic fins transparent; pectoral fins grey with a narrow colourless margin. In juveniles body pale with vertical dark bars; dorsal and anal fins blackish posteriorly; pectoral and pelvic fins transparent.

Size: Maximum to 19 cm standard length (about 24 cm total length).

Habitat, biology, and fisheries: Most abundant oceanic flyingfish. Feeds mainly on copepods. All specimens below 140 mm standard length are immature and all above 170 mm standard length are ripe. Maximum age 1+ year. Spawning intermittant, each portion numbering 330 to 420 eggs. Eggs pelagic. Of no importance to fisheries.

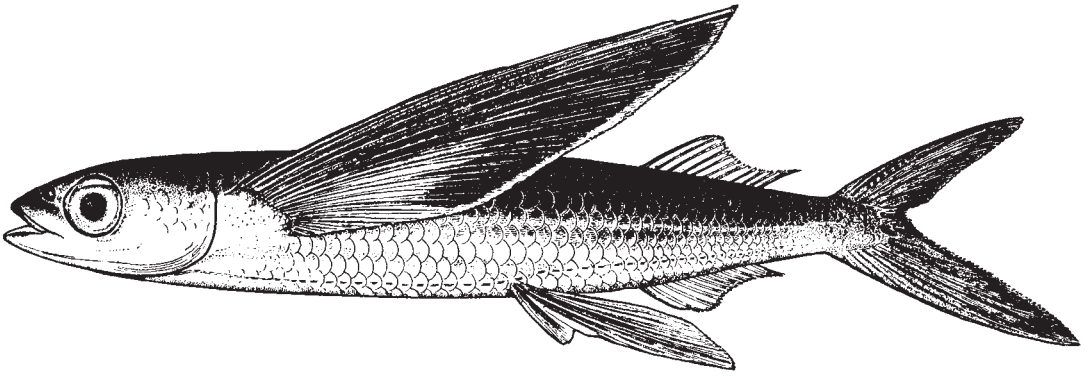
Distribution: Worldwide in offshore tropical waters. In the western Atlantic common between 30 to 35 N and 25 to 30 S but rare in the Gulf of Mexico.

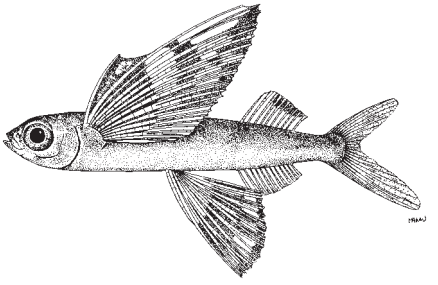


Hirundichthys affinis (Gònther, 1866) FFV

Frequent synonyms / misidentifications: None / None.

FAO names: En - Fourwing flyingfish; **Fr** - Exocet hirondelle; **Sp** - Volador golondrina.



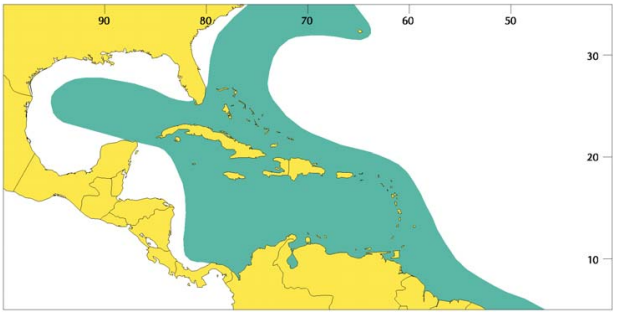


juvenile

Diagnostic characters: Body elongate, nearly rectangular in cross-section, almost flat ventrally. Depth 5.5 to 5.7 in standard length. Head length 4.0 to 4.3 in standard length. Eye 3.3 to 3.6 in head length. Jaws subequal. Jaw teeth conspicious, conical. **Palatine teeth absent**. Gill rakers on first arch 24 to 30. Dorsal fin very low, with 10 to 12 soft rays. **Anal fin** with 11 to 13 soft rays, **originating slightly before or 1 or 2 rays behind dorsal-fin origin. Pectoral fin 1.4 to 1.6 in standard length, with** 16 to 18 soft rays, **first ray unbranched. Pelvic fins** 3.5 to 3.9 in standard length, **inserted slightly nearer to posterior margin of opercle than origin of caudal-fin base**. Juveniles not barbelled. Scales in transverse row 5 to 7. Predorsal scales 26 to 33. Vertebrae 45 to 47. **Colour:** body dark above, pale below. Dorsal and caudal fins greyish; anal fin transparent; pectoral fins dark grey with unpigmented triangular crossband and narrow outer margin; pelvic fins light. Juveniles with pectoral and pelvic fins mottled with dark spots and bands.

Size: Maximum to 23 cm standard length (about 29 cm total length).

Habitat, biology, and fisheries: Neritic species. Feeds on zooplankton. Consumed by dolphinfish (*Coryphaena*) and other predatory fishes. Matures at about 19 cm. Maximum age 1.5 years. Spawning intermittant, total fecundity ranging between 4 100 and 9 200 eggs. Eggs demersal, laid on floating objects. Target species of artisanal fisheries on Barbados, Martinique, Domenica, Santa Lucia and Tobago as well as northeastern Brazil. Taken with gill nets, scooping by handhold dipnets and baited hooks near land. Fishery season from January to May in the eastern Caribbean, May to August off northeastern Brazil.



Distribution: In the western Atlantic abundant in the Caribbean Sea and adjacent areas (including the Gulf of Mexico), juveniles in the Gulf Stream northwards to 30 N. Also known from off Brazil and in the tropical eastern Atlantic.

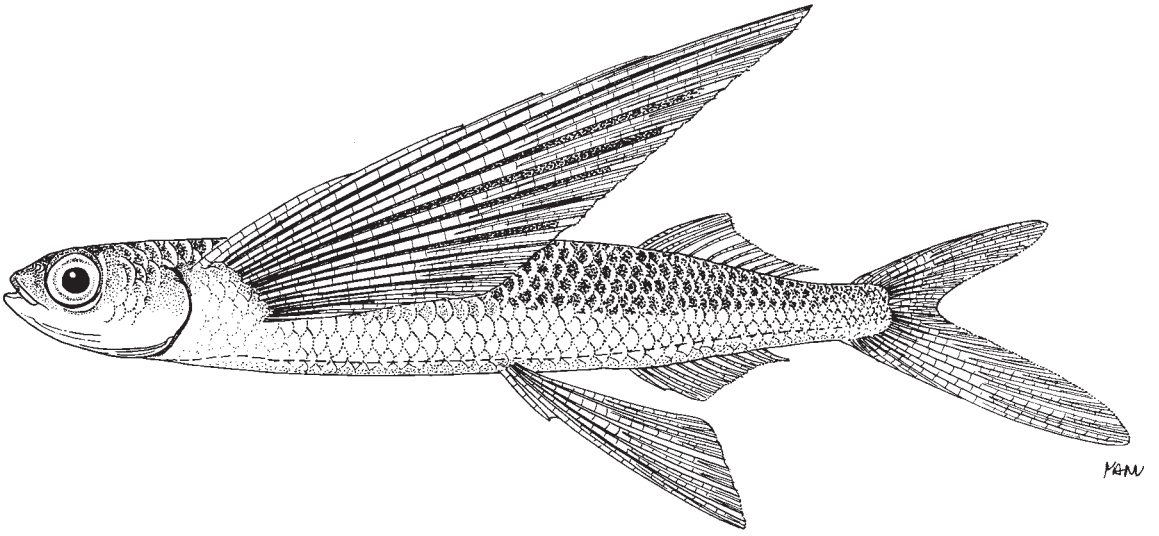
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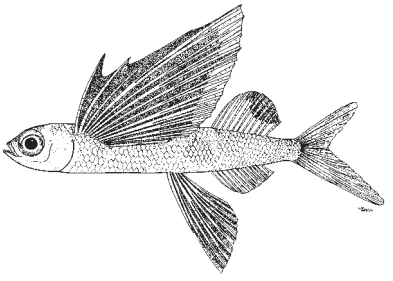
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Hirundichthys rondeletii (Valenciennes, 1846) HDR

Frequent synonyms / misidentifications: None / None.

FAO names: En - Blackwing flyingfish; **Fr** - Exocet aile noire; **Sp** - Volador aleta negra.





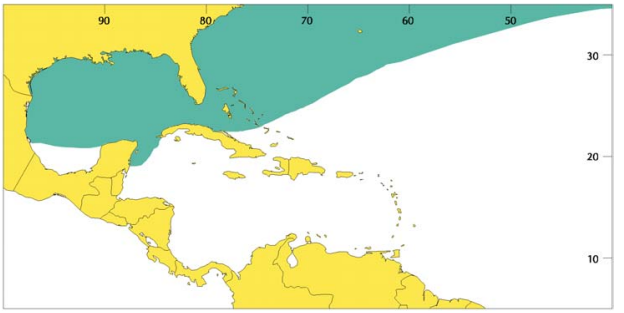
juvenile

Diagnostic characters: Body elongate, nearly rectangular in cross-section, almost flat ventrally. Depth 5.7 to 6.5 in standard length. Head length 4.5 to 5.0 in standard length. Eye 3.1 to 3.3 in head length. Jaws subequal. Jaw teeth conspicious, conical. **Palatine teeth absent**. Gill rakers on first arch 21 to 29. Dorsal fin low, with 10 to 12 soft rays. **Anal fin** with 11 to 13 soft rays, **originating slightly before, or 1 or 2 rays behind dorsal-fin origin. Pectoral fins 1.3 to 1.4 in standard length, with** 17 to 19 soft rays, **first 2 rays unbranched. Pelvic fins 2.8 to 3.4 in standard length, inserted slightly nearer to posterior margin of opercle than origin of caudal-fin base**. Juveniles not barbelled. Predorsal scales 26 to 31. Scales in transverse row 6 to 7.5. Vertebrae 44 to 47. **Colour:** body dark above, pale below. Dorsal and caudal fins greyish; anal fin transparent; pectoral fins black without unpigmented crossband and with a narrow light outer margin; pelvic fins usually with black spot. Juveniles less than 50 mm standard length with a few dark transverse vertical bands on body; dorsal, pectoral, and pelvic fins mottled with dark spots and bands.

Size: Maximum to 24 cm standard length (about 30 cm total length).

Habitat, biology, and fisheries: Feeds on zooplankton. Eggs demersal. Of no importance to fisheries.

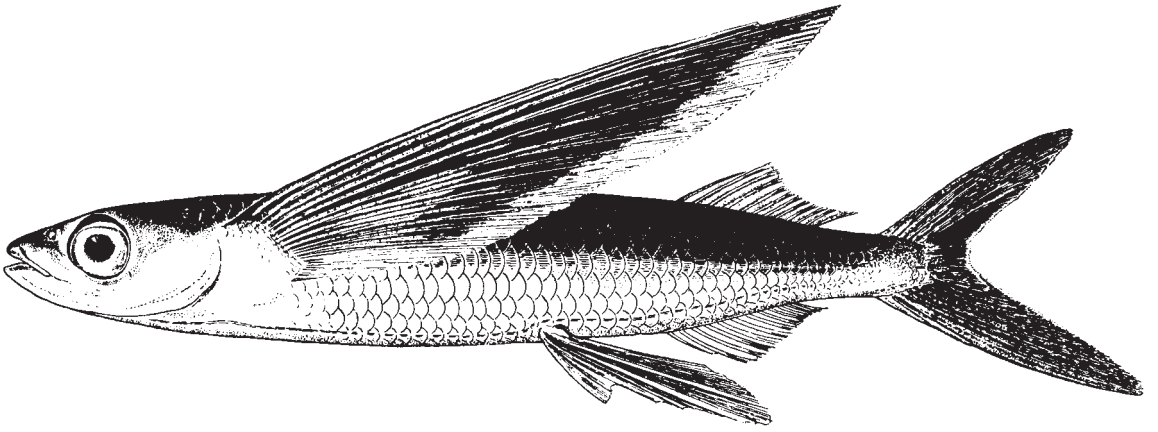
Distribution: The Gulf of Mexico and the Atlantic north of about 30 N. Also in the subtropical waters of the North Pacific and the Southern Hemispere.

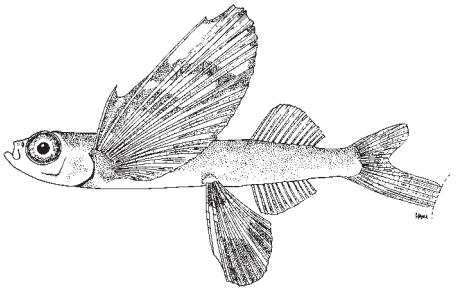


Hirundichthys speculiger (Valenciennes, 1846)

Frequent synonyms / misidentifications: None / None.

FAO names: En - Mirrorwing flyingfish; **Fr** - Exocet miroir; **Sp** - Volador espejo.





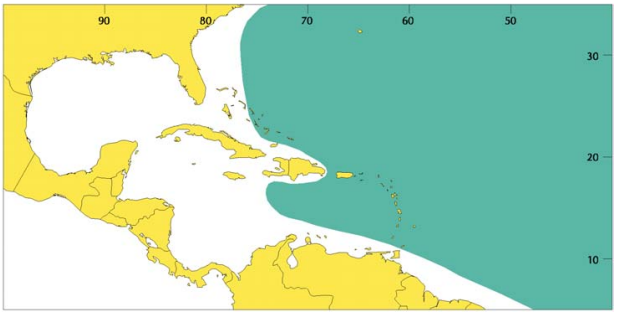
juvenile

Diagnostic characters: Body elongate, nearly rectangular in cross-section, almost flat ventrally. Depth 5.8 to 6.7 in standard length. Head length 3.9 to 4.2 in standard length. Eye 2.9 to 3.3 in head length. Jaws subequal. Jaw teeth conspicious, conical. **Palatine teeth present**. Gill rakers on first arch 21 to 29. Dorsal fin low, with 10 to 13 soft rays. **Anal fin** with 11 to 13 soft rays, **originating slightly before, or 1 to 2 rays behind dorsal-fin origin. Pectoral fins 1.4 to 1.5 in standard length, with** 17 to 20 soft rays, **first ray unbranched. Pelvic fins 3.5 to 3.8 in standard length, inserted slighty nearer to posterior margin of opercle than origin of caudal-fin base**. Juveniles not barbelled. Scales in transverse row 5 to 7. Predorsal scales 28 to 33. Vertebrae 45 to 47. **Colour:** body dark above, pale below. Dorsal and caudal fins greyish; anal fin transparent; pectoral fins dark grey with unpigmented triangular crossband and broad outer margin; pelvic fins light. Juveniles with pectoral and pelvic fins mottled with dark spots and bands.

Size: Maximum to 25 cm standard length (about 31 cm total length).

Habitat, biology, and fisheries: Oceanic species. Feeds on zooplankton. Eggs demersal, laid on floating objects. Of no importance to fisheries.

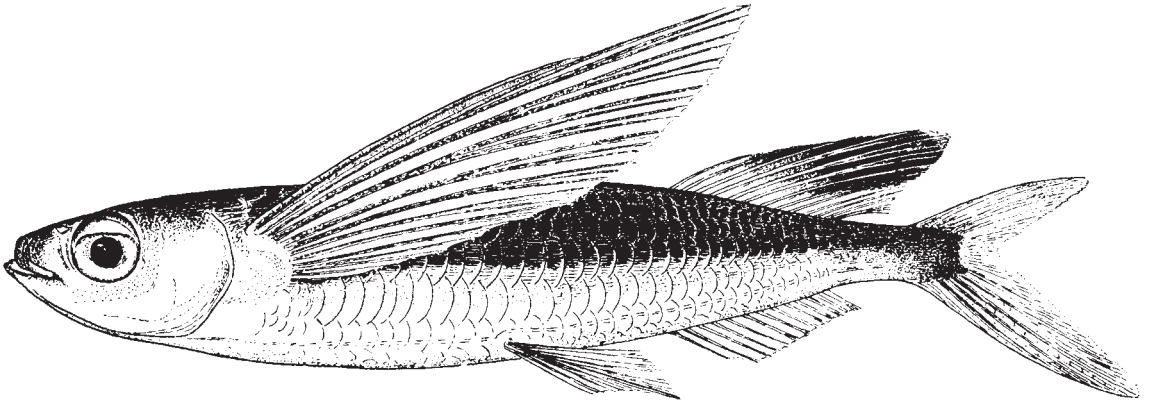
Distribution: In the western Atlantic between 40 N and 39 S, absent in the Gulf of Mexico and the western Caribbean Sea. Known also from the tropical eastern Atlantic, Indian, and Pacific Oceans.

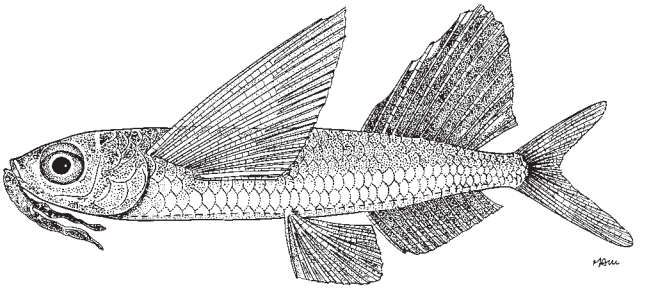


Parexocoetus hillianus (Gosse, 1851)

Frequent synonyms / misidentifications: *Parexocoetus brachypterus hillianus* (Gosse, 1851), *Parexocoetus brachypterus littoralis* (Breder,1938) / *Parexocoetus brachypterus* (Richardson, 1846).

FAO names: En - Sailfin flyingfish; **Fr** - Exocet voilier; **Sp** - Volador aletón.





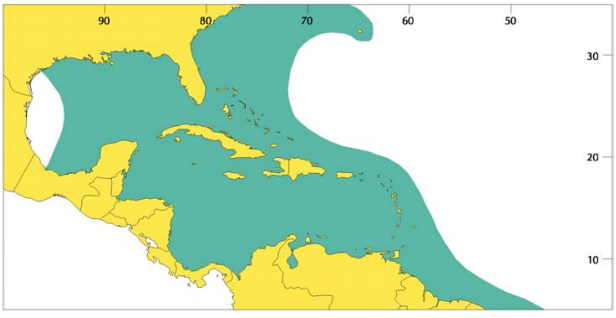
juvenile

Diagnostic characters: Body elongate, elliptic in cross-section, somewhat compressed. Depth 4.3 to 6.0 in standard length. Head length 3.9 to 4.9 in standard length. Eye 2.9 to 3.5 in head length. Snout blunt, shorter than eye. Jaws subequal, with small, conical teeth. Gill rakers on first arch 26 to 33. **Dorsal fin very high** (2.4 to 3.1 in standard length), with 9 to 14 soft rays. Anal fin with 10 to 14 soft rays, originating before second ray of dorsal fin. **Pectoral fins 1.7 to 2.1 in standard length**, extending to or beyond middle of dorsal-fin base with 11 to 13 soft rays, first ray unbranched. **Pelvic fins 4.5 to 5.5 in standard length**, inserted nearer posterior margin of opercle than caudal-fin base, barely or not reaching anal-fin origin. Juveniles similar to adults in general appearance, with paired, short chin barbels at less than 105 mm standard length (easily lost). Scales in transverse row 4.5 to 5.5. Predorsal scales 16 to 24. Pectoral branch of lateral line present. Vertebrae 36 to 40. **Colour:** body dark (iridescent bluish green in life) above, pale below. Dorsal fin with a large black blotch distally. All other fins transparent. In juveniles dorsal, pelvic, and anal fins bearing black pigment.

Size: Maximum to 12.5 cm standard length (about 15.5 cm total length).

Habitat, biology, and fisheries: Inhabits inshore and neritic waters, carried out to open sea with currents. Feeds on crustacean plankton. Eaten by many predatory fishes and sea birds. Eggs demersal. Reach full size in 1 year. Very abundant but not known to be commercial species.

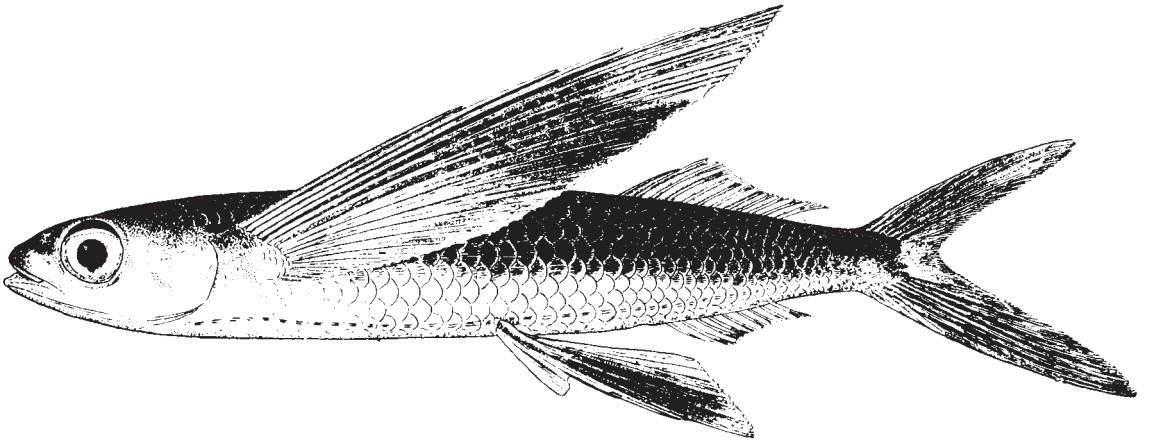
Distribution: From 40 N to northern Brazil. Very common in the Caribbean Sea and Lesser Antilles area, less common in the Gulf of Mexico, the Gulf Stream and the western Sargasso Sea. Also occurs in the tropical eastern Atlantic.

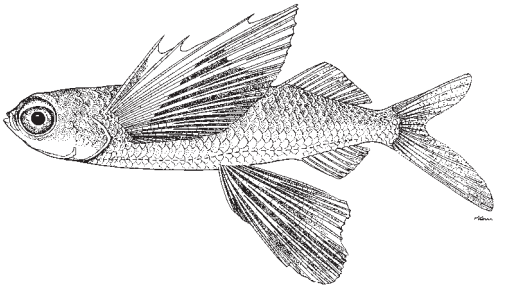


Prognichthys glaphyrae Parin, 1999

Frequent synonyms / misidentifications: None / *Prognichthys gibbifrons* (Valenciennes, 1846).

FAO names: En - Oceanic bluntnose flyingfish.





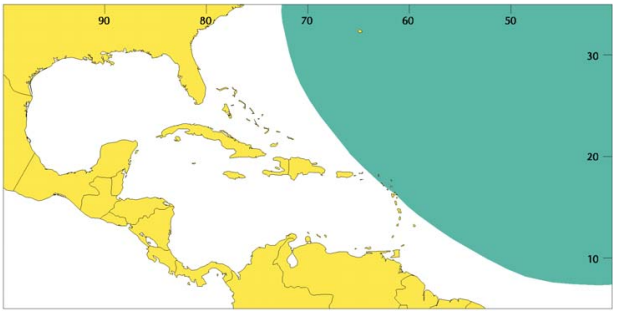
juvenile

Diagnostic characters: Body elongate, nearly rectangular in cross-section, almost flat ventrally. Depth 5.1 to 6.2 in standard length. Head length 3.6 to 4.0 in standard length. **Eye 2.8 to 3.2 in head length and 1.2 to 1.5 in postobital part of head**. Lower jaw a little shorter than the upper and included beneath upper jaw when mouth closed. Jaw teeth small, mostly conical. No palatine teeth. Gill rakers on first arch 21 to 28. **Dorsal fin low**, with 11 to 13 soft rays. **Anal fin with 8 to 11, usually 10 soft rays, originating under third to fifth dorsal fin ray. Pectoral fins 1.4 to 1.5 in standard length, with** 16 to 19 soft rays, **first 2 rays unbranched. Pelvic fins 2.8 to 3.3 in standard length**, inserted nearer to posterior margin of opercle than caudal-fin base. Juveniles not barbelled, characteristically robust and blunt-snouted at less than 60 mm standard length, with pectoral and pelvic fins of comparable length. Scales in transverse row 7 or 8. Predorsal scales 20 to 25. Vertebrae 42 to 44. **Colour:** body dark above, pale below (dark colour iridescent blue, pale colour silvery in life). Dorsal and caudal fins greyish; anal fin transparent; pectoral fins greyish in central part but their pointed tips for about 1/4 of fin length, posterior margin and lower portion transparent; pelvic fins mostly greyish, especially in the middle (probably both pectoral and pelvic fins greenish in life). Juveniles less than 30 mm standard length with body and paired fins heavily pigmented; in juveniles 30 to 130 mm standard length pectoral fins very contrastingly pigmented: mostly pale with a black areas at the base and posteriorly.

Size: Maximum to 20 cm standard length (about 25 cm total length).

Habitat, biology, and fisheries: Oceanic species. Feeds on zooplankton. Eggs pelagic. Of no importance in fisheries.

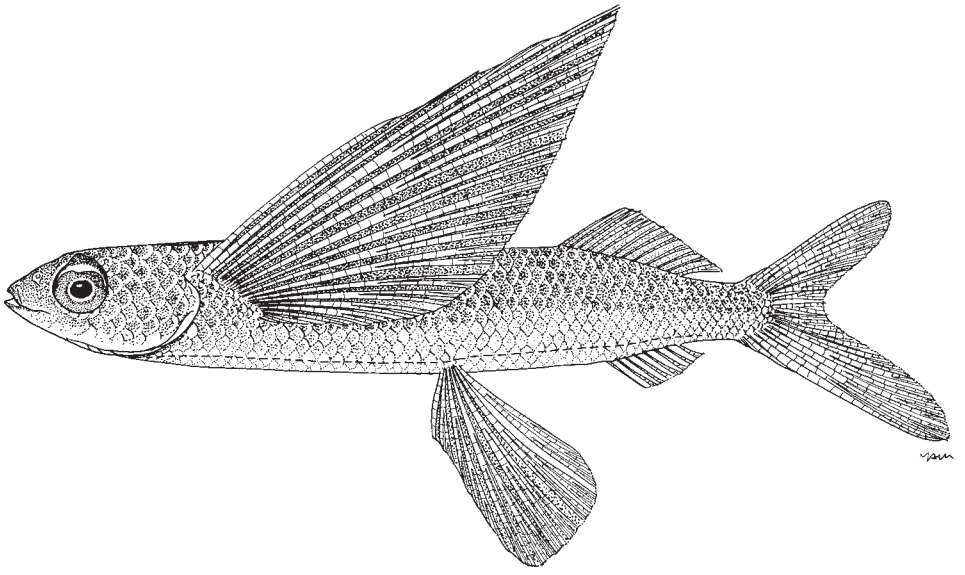
Distribution: Distributional range limited to the Atlantic Ocean. In the western Atlantic recorded between 30 to 32 N and 20 S but not known from coastal waters of America or from the Caribbean Sea, the Gulf of Mexico, or the Gulf Stream.

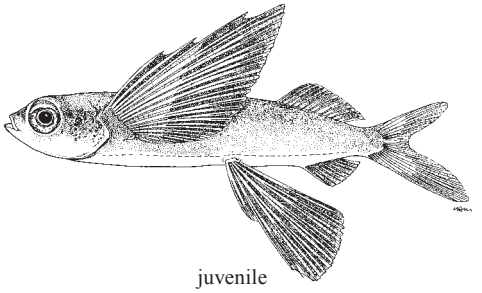


Prognichthys occidentalis Parin, 1999

Frequent synonyms / misidentifications: None / *Prognichthys gibbifrons* (Valenciennes, 1846).

FAO names: En - Western bluntnose flyingfish.





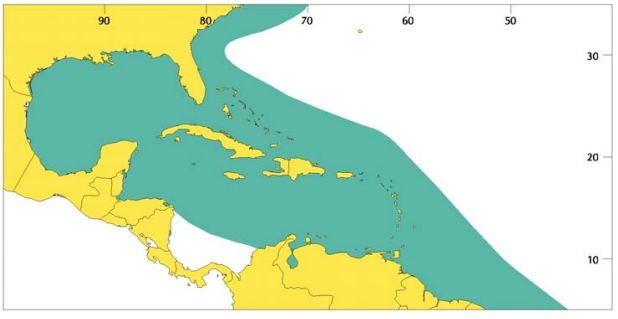
juvenile

Diagnostic characters: Body elongate, nearly rectangular in cross-section, almost flat ventrally. Depth 5.5 to 6.7 in standard length. Head length 3.7 to 7.1 in standard length. **Eye 3.0 to 3.6 in head length and 1.4 to 1.7 in postorbital part of head**. Lower jaw a little shorter than the upper and included beneath upper jaw when mouth closed. Jaw teeth small, mostly conical. No palatine teeth. Gill rakers on first arch 20 to 26. Dorsal fin low, with 10 to 13 soft rays. **Anal fin with 8 to 10, usually 9 soft rays, originating under fourth to fifth dorsal-fin ray. Pectoral fins 1.4 to 1.6 in standard length, with** 15 to 19 soft rays, **2 upper rays unbranched. Pelvic fins 2.8 to 3.4 in standard length**, inserted nearer to posterior margin of opercle than caudal-fin base. Juveniles not barbelled, characteristically robust and blunt-snouted, at less than 60 mm with pectoral and pelvic fins of comparable length. Vertebrae 42 to 44. Predorsal scales 20 to 25. Scales in transverse row 6.5 to 8. **Colour:** body dark above, pale below. Dorsal and caudal fins greyish; anal fin transparent; pectoral fins browish with pale distal tip and lowermost portion. Juveniles less than 30 mm standard length with body and paired fins heavily pigmented; in larger juveniles pectoral fins blackish, sometimes with lighter crossband in central part.

Size: Maximum to 18 cm standard length (about 23 cm total length).

Habitat, biology, and fisheries: Neritic species avoiding open sea. Feeds on zooplankton. Of no importance to fisheries.

Distribution: Distributed along the American coasts from 40 N to 40 S including the Caribbean Sea, the Gulf of Mexico, and near the Bahamas. Northernmost and southernmost records resulted from passive transport of juveniles with the Gulf Stream and the Brazil Current.

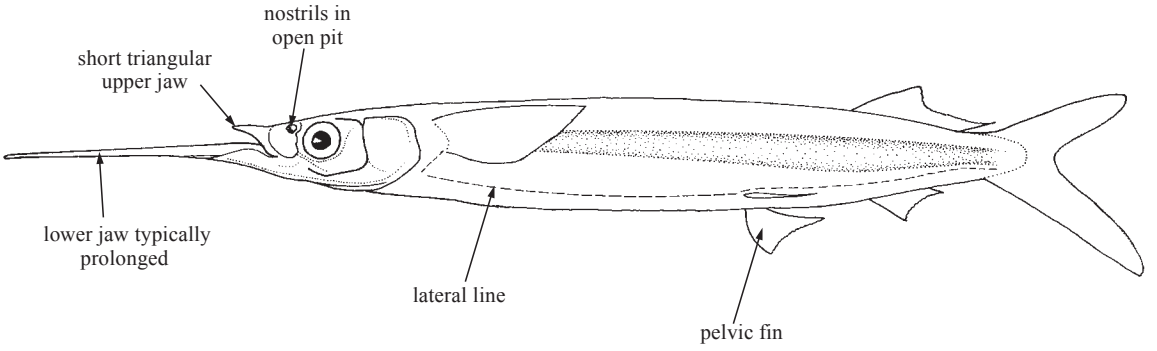


HEMIRAMPHIDAE

Halfbeaks

by B.B. Collette, National Marine Fisheries Service, National Musuem of Natural History, Washington D.C., USA

Diagnostic characters: Elongate fishes with a **prolonged lower jaw** (except in *Chriodorus atherinoides* and *Oxyporhamphus micropterus*) and a short triangular upper jaw. Nostrils in a pit anterior to eyes. No spines in fins; dorsal and anal fins posterior in position; pectoral fins usually short; pelvic fins in abdominal position, with 6 soft rays. Scales moderately large, cycloid (smooth), easily detached. Lateral line running down from pectoral-fin origin and then backward along ventral margin of body. **Colour:** these fishes live at the surface and are protectively coloured for this mode of life being green or blue on the back and silvery white on the sides and ventrally; tip of the lower jaw bright red or orange in life in most species.

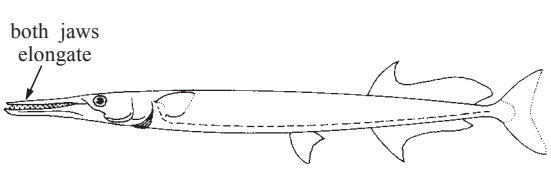


Habitat, biology, and fisheries: Most species are marine, but some inhabit fresh water; omnivorous, feeding on floating sea grasses, crustaceans, and small fishes. They are prone to leap and skitter at the surface and 1 offshore species, *Euleptorhamphus velox* can leap out of the water and glide like a flyingfish. The flesh is excellent and halfbeaks are utilized as food in many parts of the world. In the Gulf of Mexico and Caribbean Sea, they are more important as baitfish for billfishes, dolphins, kingfish, wahoo, and king mackerel than as food fish. They are caught with seines or dipnetted under lights at night.

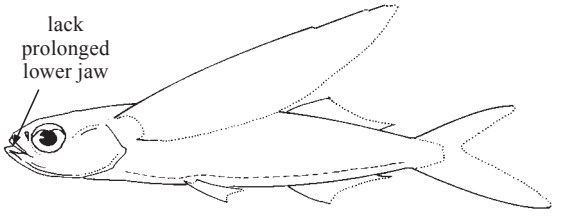
Similar families occurring in the area

Belonidae (needlefishes): both upper and lower jaws elongate and armed with needle-sharp teeth.

Exocoetidae (flyingfishes): lack the prolonged lower jaw characteristic of most halfbeaks; pectoral fins or both pectoral and pelvic fins enlarged and used for aerial gliding.



Belonidae



Exocoetidae

Key to the species of Hemiramphidae occurring in the area

1a. Lower jaw not noticeably elongate (Fig. 1) . . . . . → *2*

1b. Lower jaw distinctly elongate (Fig. 2); total gill rakers on first arch 25 to 46; pectoral-fin soft rays usually 7 to 12 . . . . . → *3*

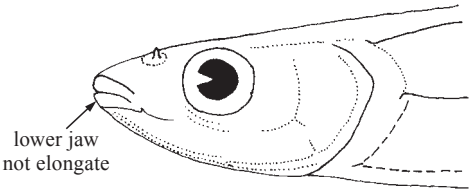


Fig. 1 lateral view of head

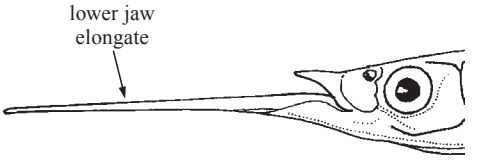


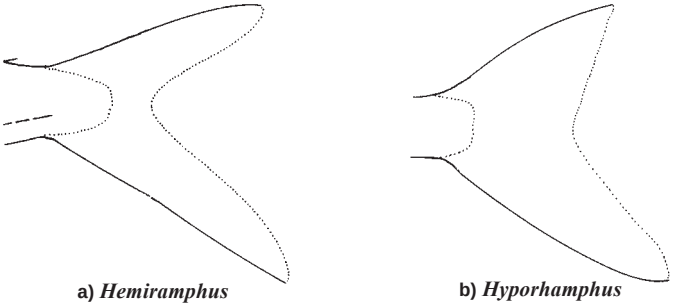
Fig. 2 lateral view of head

2a. Total gill rakers on first arch 19 to 23; pectoral fins short; pectoral-fin soft rays usually 13 or 14 . . . . . ***Chriodorus atherinoides***

2b. Total gill rakers on first arch 30 to 35; pectoral fins long; pectoral-fin soft rays 11 to 13 . . . . . ***Oxyporhamphus micropterus similis***

3a. Dorsal-fin soft rays 21 to 25; anal-fin soft rays 19 to 24; pectoral fins very long; pectoral-fin soft rays usually 7 to 9 . . . . . ***Euleptorhamphus velox***

3b. Dorsal-fin soft rays 12 to 17; anal-fin soft rays 10 to 18; pectoral fins short to moderate; pectoral-fin soft rays 9 to 12 . . . . . → *4*

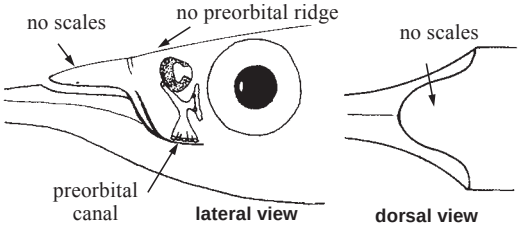


a) ***Hemiramphus*** b) ***Hyporhamphus***

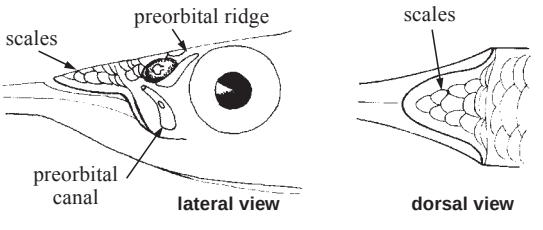
Fig. 3 caudal fin

4a. Caudal fin deeply forked (Fig. 3a); scales absent on snout; preorbital ridge absent (Fig. 4a); anal-fin soft rays usually 10 to 13 . . . . . ***(Hemiramphus)*** → *5*

4b. Caudal fin emarginate or only slightly forked (Fig. 3b); scales present on snout; preorbital ridge well developed (Fig. 4b); anal-fin soft rays usually 14 to 17 . . . . . ***(Hyporhamphus)*** → *7*



a) ***Hemiramphus***



b) ***Hyporhamphus***

Fig. 4 detail of head

5a. Pectoral fins moderate, reaching beyond anterior margin of nasal pit when folded forward; anal-fin soft rays 10 to 13, usually 11 or 12; upper caudal-fin lobe blue in life . . ***Hemiramphus balao***

5b. Pectoral fins short, not reaching nasal pit when folded forward; anal-fin soft rays 12 to 14, usually 13; upper caudal-fin lobe reddish orange in life . . . . . ***→ 6***

6a. Gill rakers on first arch 37 to 45. . . . . ***Hemiramphus bermudensis***

6b. Gill rakers on first arch 28 to 36 . . . . . ***Hemiramphus brasiliensis***

7a. Scales absent from dorsal and anal fins or only a few present on anterior parts of the fins . . . . . ***Hyporhamphus roberti***

7b. Scales cover dorsal and anal fins of adults . . . . . ***→ 8***

8a. Total gill rakers on first arch 26 to 35, usually 28 to 32; on second arch 19 to 28, usually 25 or fewer; ratio of preorbital length to orbit diameter usually less than 0.70 . . . . . ***Hyporhamphus unifasciatus***

8b. Total gill rakers on first arch 31 to 40, usually 33 to 39; on second arch 20 to 30, usually 25 or more; ratio of preorbital length to orbit diameter usually greater than 0.70 . . ***Hyporhamphus meeki***

List of species occurring in the area

The symbol is given when species accounts are included.

Chriodorus atherinoides Goode and Bean, 1882.

Euleptorhamphus velox Poey, 1868.

Hemiramphus balao Lesueur, 1821.
Hemiramphus bermudensis Collette, 1962.
Hemiramphus brasiliensis (Linnaeus, 1758).

Hyporhamphus meeki Banford and Collette, 1993.
Hyporhamphus roberti (Valenciennes, 1847).
Hyporhamphus unifasciatus (Ranzani, 1841).

Oxyporhamphus micropterus similis Bruun, 1935.

References

Banford, H.M. and B.B. Collette. 1993. *Hyporhamphus meeki*, a new species of halfbeak (Teleostei: Hemiramphidae) from the Atlantic and Gulf coasts of the United States. *Proc. Biol. Soc. Washington,* 106:369-384.

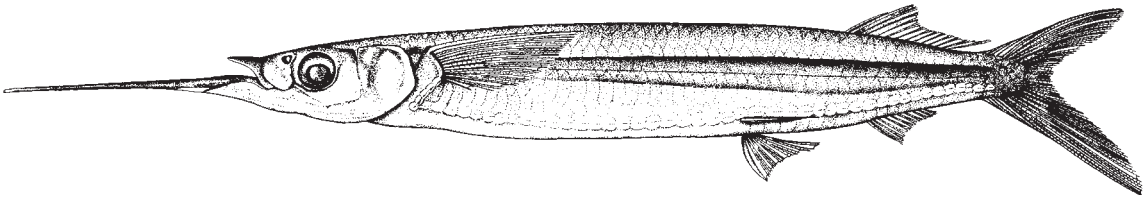
Berkeley, S.A. and E.D. Houde. 1978. Biology of two exploited species of halfbeaks, *Hemiramphus brasiliensis* and *H. balao* from southeast Florida. *Bull. Mar. Sci. Gulf. Carib.,* 28:624-644.

Collette, B.B. 1962. *Hemiramphus bermudensis*, a new halfbeak from Bermuda, with a survey of endemism in Bermudian shore fishes. *Bull. Mar. Sci. Gulf. Carib.*, 12:432-449.

McBride, R., L. Foushee, and B. Mahmoudi. 1996. Florida's halfbeak, *Hemiramphus* spp., bait fishery. *Mar. Fish. Rev.*, 58(1-2):29-38.

Hemiramphus balao Lesueur, 1821 BHA

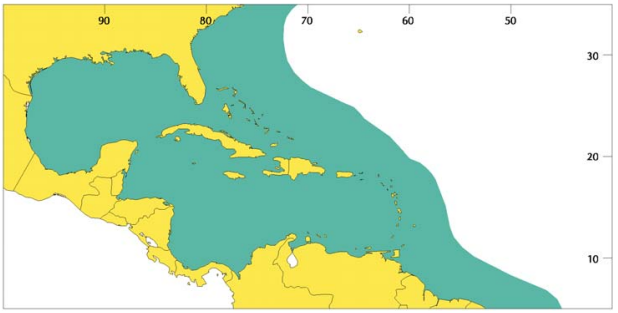
Frequent synonyms / misidentifications: None / *Hemiramphus brasiliensis* (Linnaeus, 1758).
FAO names: En - Balao halfbeak (AFS: Balao); **Fr** - Démi-bec balaou; **Sp** - Agujeta balajú.



Diagnostic characters: An elongate fish with a greatly prolonged beak-like lower jaw. Upper jaw short, triangular; snout scaleless; preorbital ridge (bony ridge under nostril) absent. Total number of gill rakers on first arch 31 to 39 (average 34.5 to 37.2), 7 to 10 on upper and 22 to 29 on lower limb of arch. Dorsal-fin rays 11 to 15, usually 13 or 14; **anal-fin soft rays 10 to 13, usually 11 or 12**; caudal fin deeply forked, lower lobe much longer than upper; **pectoral fins long, reaching beyond anterior margin of nasal pit when folded forward**, and with 10 to 12, usually 11, soft rays. **Colour:** dark bluish above, silvery white below; beak dark with fleshy red tip; **upper and lower lobes of caudal fin bluish violet.**

Size: Maximum to at least 40 cm total length; about 28 cm standard length (from jaw to base of caudal fin); commonly to 35 cm total length.

Habitat, biology, and fisheries: An inshore, surface-dwelling fish forming sizeable schools. Feeds on planktonic organisms, such as copepods, decapods, siponophores, and polychaetes. Matures in the first year. Although a good foodfish (used as such especially in the West Indies), this species is most important as bait for offshore gamefishes such as sailfishes and marlins. An important bait fishery exists in Dade and Munroe counties, southern Florida; local food and bait fisheries in Venezuela and Colombia. Separate statistics are not reported for this species. Usually taken along with *Hemiramphus brasiliensis*, the estimated combined catch of the 2 species in the Florida fishery 300 t/year (worth about US$800 000 retail). The Florida fishery is conducted mostly from small boats powered by a single gasoline engine with modified lampara nets. In Venezuela it is taken mainly with 'mandinga' nets, often using lights.

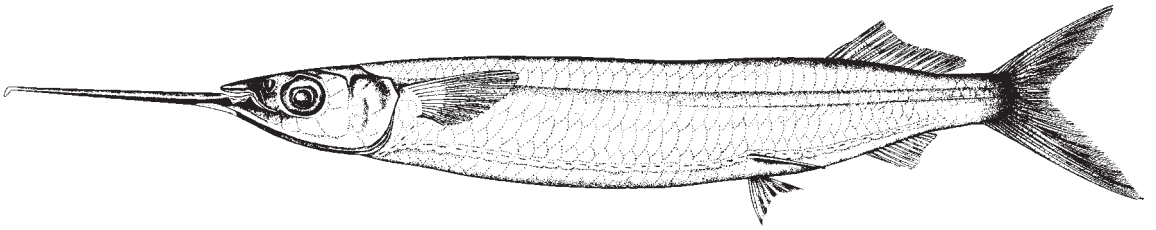


Distribution: East coast of Florida and throughout the Gulf of Mexico and the Caribbean Sea; extending north to New York and south to Santos (Brazil); also found in the eastern tropical Atlantic from the Canary Islands south to Luanda, Angola.

Hemiramphus bermudensis Collette, 1962

Frequent synonyms / misidentifications: None / None.

FAO Names: En - Bermuda halfbeak; **Fr** - Démi-bec bermudien; **Sp** - Agujeta bermuda.

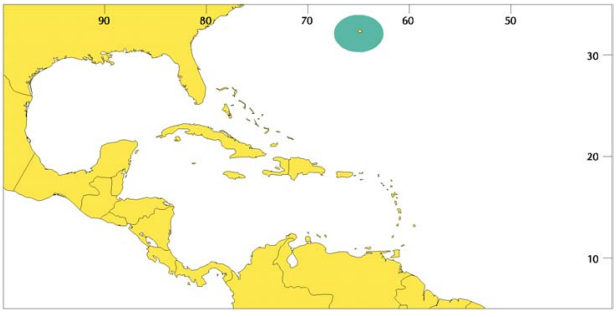


Diagnostic characters: An elongate fish with a greatly prolonged beak-like lower jaw. Upper jaw short, triangular; snout scaleless; preorbital ridge (bony ridge under nostril) absent. **Total number of gill rakers on first arch 37 to 45 (average 40)**, 9 to 13 on upper and 26 to 33 on lower limb of arch. Dorsal-fin soft rays 13 to 15, usually 14; **anal-fin soft rays 12 to 14, usually 13**; caudal fin deeply forked, lower lobe much longer than upper; **pectoral fins short, not reaching to nasal pit when folded forward** and with 10 to 12 (usually 11) soft rays. **Colour:** dark bluish above, silvery white below; beak black with bright red fleshy tip; **upper caudal-fin lobe reddish orange in adults.**

Size: Maximum to about 44 cm total length, about 31 cm standard length (from tip of upper jaw to base of caudal fin); commonly to 35 cm total length.

Habitat, biology, and fisheries: An inshore pelagic species, forming sizeable schools. Taken in coastal waters around Bermuda, but apparently no special fishery. Separate statistics are not reported for this species. Caught mainly with seines and dipnets. Although a foodfish, it is mainly used as bait.

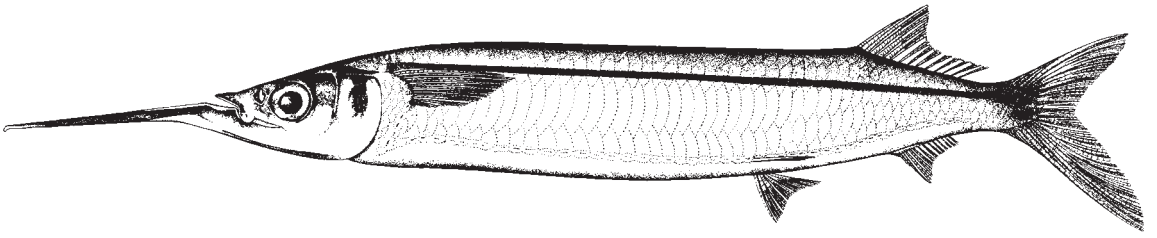
Distribution: Restricted to the waters around Bermuda where it replaces the wide-ranging *Hemiramphus brasiliensis*.



Hemiramphus brasiliensis (Linnaeus, 1758) BAL

Frequent synonyms / misidentifications: None / None.

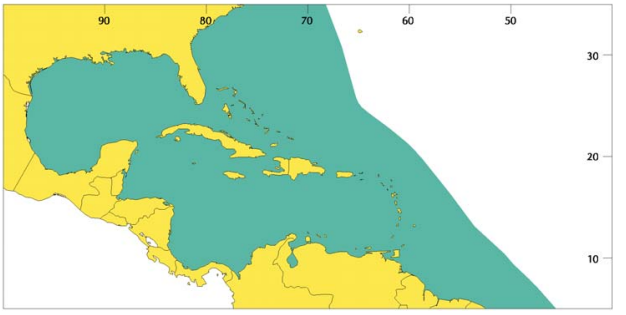
FAO Names: En - Ballyhoo halfbeak (AFS: Ballyhoo); **Fr** - Démi-bec brésilien; **Sp** - Agujeta brasileña.



Diagnostic characters: An elongate fish with a greatly prolonged beak-like lower jaw. Upper jaw short, scaleless; preorbital ridge (bony ridge under nostril) absent. **Total number of gill rakers on first arch 28 to 36** (average 31.2), 7 to 10 on upper and 20 to 26 on lower limb of arch. Dorsal-fin soft rays 12 to 15, usually 13 or 14; **anal-fin soft rays 12 to 14, usually 13**; caudal fin deeply forked, lower lobe much longer than upper; **pectoral fins short, not reaching to nasal pit when folded forward**, with 10 to 12 (usually 11) soft rays. **Colour**: dark bluish green above, silvery white below; beak black with fleshy red tip; **entire upper lobe of caudal fin yellowish orange**, lower lobe dusky.

Size: Maximum to at least 40.5 cm total length, 35 cm standard length (from tip of upper jaw to base of caudal fin); commonly to 35 cm total length.

Habitat, biology, and fisheries: An inshore, surface-dwelling fish forming sizeable schools. Feeds largely on sea grasses and also on planktonic crustaceans and siphonophores. Mature in their first year and few exceed 2 years of age. Although a good foodfish (used as such especially in the West Indies), is most important as bait for offshore gamefishes such as sailfish and marlins. An important bait fishery exists in Dade and Munroe counties, southern Florida; local food and bait fisheries in Venezuela and Colombia. Separate statistics are not reported for this species. Usually taken along with *Hemiramphus balao*, the estimated combined catch of the 2 species in the Florida fishery 300 t/year (worth about US$800 000 retail). The Florida fishery is conducted mostly from small boats powered by a single gasoline engine with modified lampara nets. In Venezuela it is taken mainly with 'mandinga' nets, often using lights.

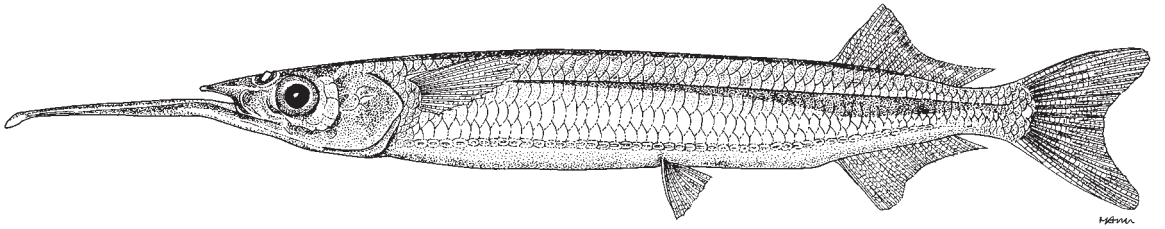


Distribution: East coast of Florida and throughout the Gulf of Mexico and the Caribbean Sea; northward extending to Woods Hole, Massachusetts and southward to Rio de Janeiro, Brazil. Also found in the eastern Atlantic from the Canary Islands and Dakar south to Luanda, Angola. Replaced at Bermuda by *Hemiramphus bermudensis*.

Hyporhamphus meeki Banford and Collette, 1993

Frequent synonyms / misidentifications: None / *Hyporhamphus unifasciatus* (Ranzani, 1842).

FAO names: En - Meek's halfbeak (AFS: False silverstripe halfbeak); **Fr** - Démi-bec Meek; **Sp** - Agujeta Meek.

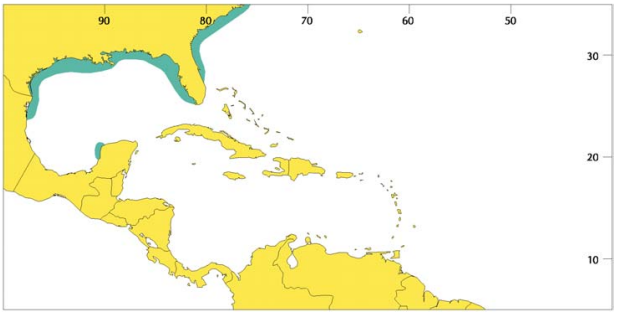


Diagnostic characters: An elongate fish with a greatly prolonged beak-like lower jaw. Upper jaw short, scaly; **preorbital ridge (bony ridge under nostril) present; ratio of preorbital length to orbit diameter usually greater than 0.70**. Total number of gill rakers on first arch 31 to 40 (average 34.6), 8 to 12 on upper and 20 to 29 on lower limb of first arch. Dorsal-fin soft rays 12 to 17, usually 14 or 15; **anal-fin soft rays 14 to 18, usually 15 to 17; caudal fin emarginate to slightly forked. Bases of dorsal and anal fins covered with scales**. Pectoral fins short, not reaching to nasal pit when folded forward and with 10 to 13 (usually 11 or 12) soft rays. **Colour:** greenish above, silvery white below; 3 distinct narrow black lines along back from head to dorsal fin; fleshy tip of beak red; caudal fin pale, dark-edged.

Size: Maximum to about 18 cm standard length (from tip of snout to base of caudal fin), 22 cm total length; commonly to 15 cm standard length, 18 cm total length.

Habitat, biology, and fisheries: An inshore surface schooling species, frequently entering estuaries. Omnivorous, feeding mostly on floating sea grasses and also on algae and small animal organisms.

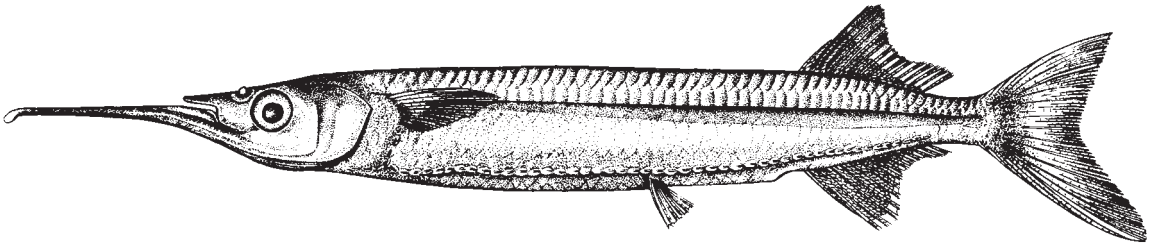
Distribution: From Cape Cod, Massachusetts to peninsular Florida, throughout the northern Gulf of Mexico to Yucatán. Replaced by *Hyporhamphus unifasciatus* in Bermuda, the southern tip of Florida, the West Indies, and Central and South America from Yucatán to Uruguay.



Hyporhamphus unifasciatus (Ranzani, 1841)

Frequent synonyms / misidentifications: None / None.

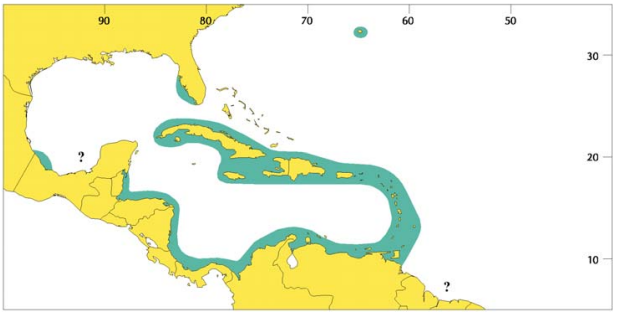
FAO names: En - Common halfbeak (AFS: Atlantic silverstripe halfbeak); **Fr** - Démi-bec blanc; **Sp** - Agujeta blanca.



Diagnostic characters: An elongate fish with a greatly prolonged beak-like lower jaw. Upper jaw short, scaly; **preorbital ridge (bony ridge under nostril) present; ratio of preorbital length to orbit diameter usually less than 0.70**. Total number of gill rakers on first arch 26 to 35 (average 30.6), 7 to 11 on upper and 11 to 25 on lower limb of first arch. Dorsal-fin soft rays 13 to 16, usually 15; **anal-fin soft rays 15 to 18, usually 16 or 17**; pectoral fins short, not reaching to nasal pit when folded forward and with 10 to 12 (usually 11) soft rays; **caudal fin emarginate to slightly forked. Bases of dorsal and anal fins covered with scales. Colour:** greenish above, silvery white below; 3 distinct narrow black lines from along head to dorsal fin; fleshy tip of beak red; caudal fin pale, dark-edged.

Size: Maximum to about 27 cm total length, about 24 cm standard length (from tip of snout to base of caudal fin); commonly to 20 cm standard length.

Habitat, biology, and fisheries: An inshore surface schooling species, frequently entering estuaries. Omnivorous, feeding mostly on floating sea grasses and also on algae and small animal organisms. Caught in inshore waters throughout its range; a special bait fishery is reported from Venezuela. Separate statistics are not reported for this species. Caught with 'mandinga' nets in Venezuela, often using lights. Considered edible but little appreciated (Colombia).

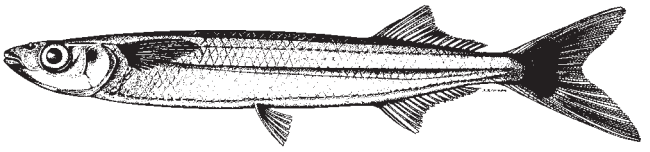


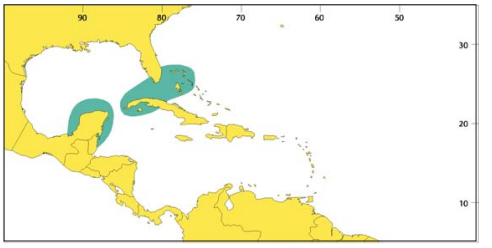
Distribution: From Bermuda and southern peninsular Florida, southward through the Caribbean and the West Indies to Uruguay. Confined to the western Atlantic Ocean, all literature records outside this range refer to other superficially similar species of *Hyporhamphus*, including *Hyporhamphus naos*, from the eastern Pacific, California to Panama and the Galapagos Islands.

Chriodorus atherinoides Goode and Bean, 1882 HCE

En - Hardhead halfbeak.

Maximum size 164 mm standard length. Abundant in clear waters around Key West and in brackish lakes in the Bahamas. Feeds on green algae and adherent organisms such as diatoms. Of no present fisheries importance but was considered an excellent panfish in the 1880s. Southern Florida, Florida Keys, Cuba, Campeche and Yucatán, Mexico, and Belize.



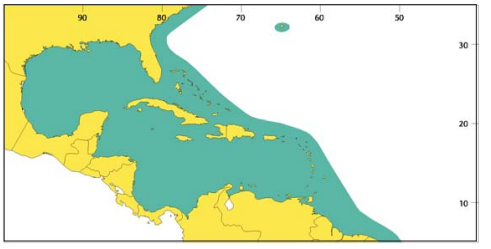


Euleptorhamphus velox Poey, 1868

En - Flying halfbeak; **Fr** - Démi-bec volant; **Sp** - Agujeta voludora.

Maximum size 281 mm standard length. An offshore species. Eaten by oceanic fishes and birds. Of no fisheries interest. Western Atlantic from Massachusetts throughout the Gulf of Mexico and Caribbean Sea south to Recife, Brazil. Also found in the Gulf of Guinea in the eastern Atlantic.

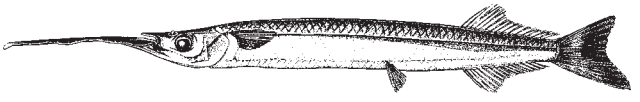


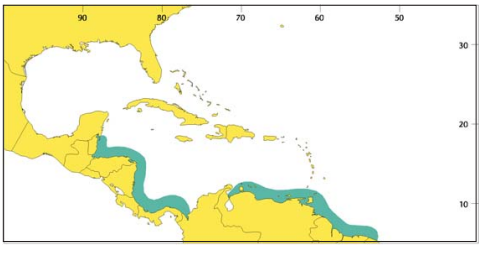


Hyporhamphus roberti (Valenciennes, 1847)

En - Slender halfbeak; **Fr** - Démi-bec allongé; **Sp** - Agujeta larga.

Maximum size 186 mm standard length. Found in estuaries and river mouths of coastal Central and South America. Of no fisheries importance. Two subspecies are recognized: *Hyporhamphus roberti roberti* (Valenciennes, 1847) from south of Rio de Janeiro, Brazil north to Lake Maracaibo, Venezuela and *Hyporhamphus roberti hildebrandi* Jordan and Evermann, 1927 from the Gulf of Uraba, Colombia north to Guatemala.

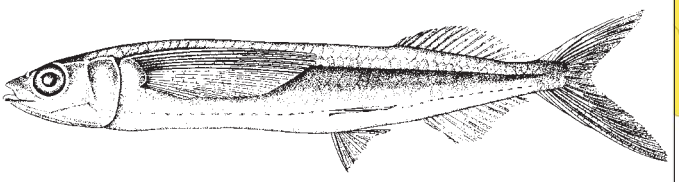


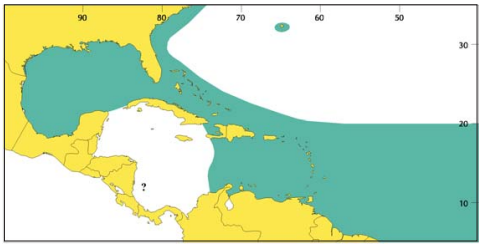


Oxyporhamphus micropterus similis Bruun, 1935

En - Atlantic smallwing flyingfish (AFS: Smallwing flyingfish).

Maximum size 185 mm standard length. A small offshore species of no fisheries interest. Widespread in tropical and subtropical waters of the Atlantic, in the western Atlantic north to 40°N, in the Gulf of Mexico and Caribbean Sea south at least to the equator. In the eastern Atlantic from 20°N south to 20°S. Considered to be Exocoetidae by some authors.





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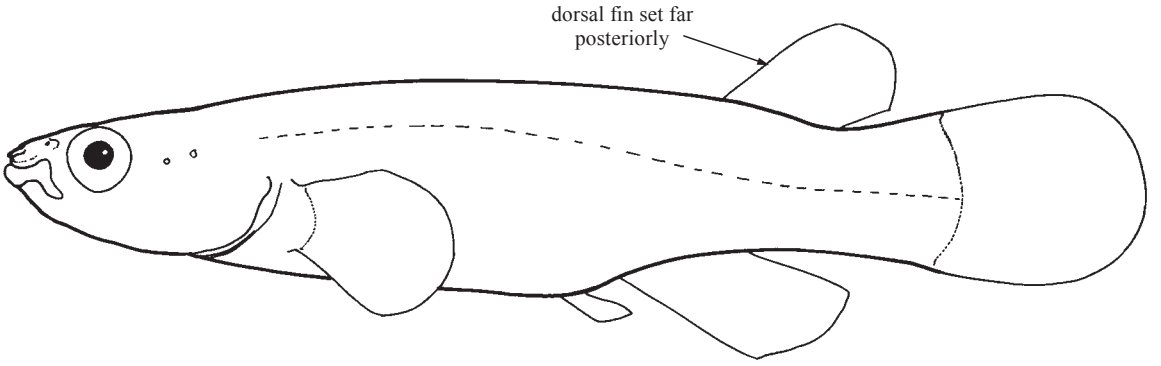
Order CYPRINODONTIFORMES

RIVULIDAE

New World rivulines (rivulid killifishes)

by M.J. Ghedotti, Regis University, Colorado, USA and E.O. Wiley, Museum of Natural History, Kansas, USA

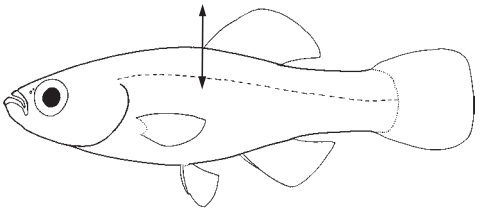
Diagnostic characters: Small fishes (2 to 11 cm standard length, 6 cm maximum in *Rivulus marmoratus*). Body elongate, cylindrical. Head flattened, **lateralis supraorbital sensory system on top of head with grooves and exposed sensory placodes rather than a series of tubes with pores**, mouth slightly upturned, and terminal; teeth unicuspid. **No spines in fins but first rays may be unbranched; dorsal fin set far posteriorly on body, its origin over insertion of last 2 or 3 soft anal-fin rays** (brackish- and saltwater species only); dorsal fin with 8 to 11 soft rays; anal fin with 10 to 17 soft rays, anal-fin origin anterior to dorsal-fin origin; caudal fin rounded; pectoral fins short and rounded and inserted at or slightly below midbody, with 13 to 16 soft rays; pelvic fins abdominal in position, with 5 to 7 soft rays. Lateral line reduced to sensory pits along side of body. Body with cycloid scales. Sexes dimorphic with males having larger anal fins. **Colour:** body background of brown to green with hints of blue, body pattern variable, often mottled with spots and stripes. Sexually dichromatic, **females usually with a distinct ocellus on upper caudal peduncle** just anterior to caudal fin, males often with more distinct colour pattern seasonally. Hermaphroditic individuals of *Rivulus marmoratus* (most common species in area) also with a distinct ocellus on upper caudal peduncle just anterior to caudal fin.



Habitat, biology, and fisheries: Most rivulid killifish species occur in fresh water, some species are very adaptable to varying salinity and temperature. The most common species, the mangrove rivulus (*Rivulus marmoratus*), is hermaphroditic in the area and males are rare. Hermaphrodites are self-fertilizing and lay fertilized eggs. Some populations of *R. marmoratus* in Venezuela and Brazil are non-hermaphroditic. *Rivulus marmoratus* is found over marl substrates where aquatic vegetation is sparse and detritus is common, and in low oxygen environments in salt marshes and mangrove swamps with salinities of 0 to 32 ‰. Diet consists of small invertebrates. Of little importance as a forage fish and of no commercial importance except as aquarium fishes. (Both *R. marmoratus* and species of the *R. hartii/R. holmiae* complex are kept by aquarists but stock is usually raised in aquaria, not caught in the wild.)

Similar families occurring in the area

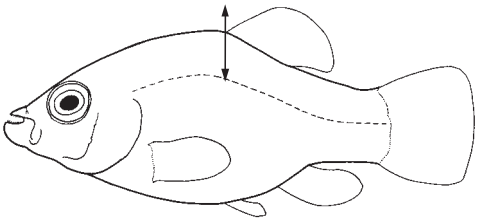
Fundulidae: dorsal fin positioned more anteriorly, dorsal-fin origin anterior to insertion of last 2 or 3 soft anal-fin rays, no ocellus on upper caudal peduncle just anterior to caudal fin, supraorbital sensory system in form of canals and pores in adults.



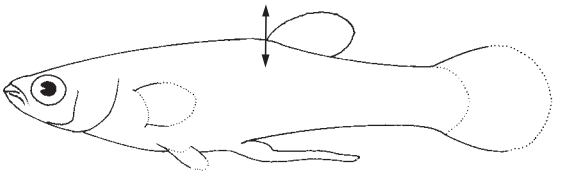
Fundulidae

Cyprinodontidae: generally stouter-bodied; dorsal fin positioned more anteriorly, dorsal-fin origin anterior to anal-fin origin, no ocellus on upper caudal peduncle just anterior to caudal fin, supraorbital sensory system in form of canals and pores in adults; jaw teeth tricuspid.

Poeciliidae: males with long anal fin modified into a non-tubular intromittent organ (gonopodium), no ocellus on upper caudal peduncle just anterior to caudal fin, third anal-fin ray unbranched; viviparous; supraorbital sensory system may be pores, placodes, or a combination.



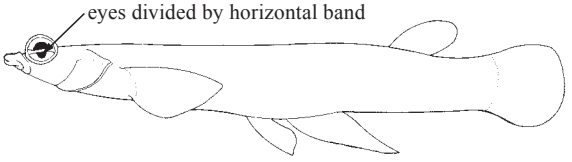
Cyprinodontidae



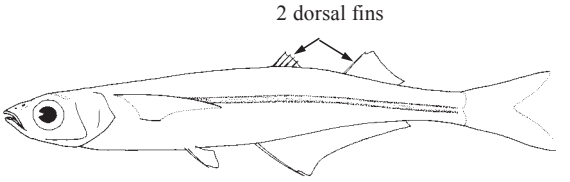
Poeciliidae

Anablepidae: eyes divided by horizontal band of opaque tissue into upper and lower halves; anal fin in males forms tubular intromittent organ; no ocellus on upper caudal peduncle anterior to caudal fin; viviparous.

Atherinidae: 2 dorsal fins, the first with 3 to 9 slender spines, the second with 1 anterior spine; anal and pelvic fins also with spines, pectoral fins set high on body, pelvic fins thoracic; no lateral line; most species with lateral slivery stripe; no ocellus on upper caudal peduncle just anterior to caudal fin; caudal fin forked.



Anablepidae



Atherinidae

Key to the species of Rivulidae occurring in the area

1a. Anal-fin with 13 or more soft rays; 6 to 8 rows of reddish spots on side; adult males with bright orange or yellow coloration on dorsal and ventral margins of caudal fin; adults often larger than 6 cm . . . . . ***Rivulus hartii / R. holmiae*** **complex**

1b. Anal fin with fewer than 13 rays; mottled with irregularly distributed black spots on side; large males (very rarely encountered) with orange coloration on body and fins, dorsal and ventral margins of caudal fin not distinctly coloured; never larger than 6 cm . . . ***Rivulus marmoratus***

List of species occurring in the area

Rivulus hartii (Boulenger, 1890)/*Rivulus holmiae* Eigenmann, 1909 complex. To 10 cm. Venezuela, Margarita Island, Trinidad, Guyana, and Suriname; salt tolerant, occurrence doubtful in bays and estuaries).

Rivulus marmoratus Poey, 1880. To 6 cm. Widely distributed; commonly occurring from S Florida and the Bahamas S in both the Greater and Lesser Antilles to Venezuela.

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Harrington, R. W. and L. R. Rivas. 1958. The discovery in Florida of the cyprinodont fish, *Rivulus marmoratus*, with a redescription and ecological notes. *Copeia,* 1958(2):125-130.

Huber, J. H. 1992. *A review of Rivulus: Ecobiogeography – relationships. The most widespread Neotropical cyprinodont genus.* Société Française d'Ichtyologie, Paris. 572 p.

Lee, D. S., S. P. Platania, and G. H. Burgess. 1983. Atlas of North American Freshwater Fishes: 1983 Supplement. *Occasional Papers of the North Carolina Biological Survey*, 1986(6):1-67.

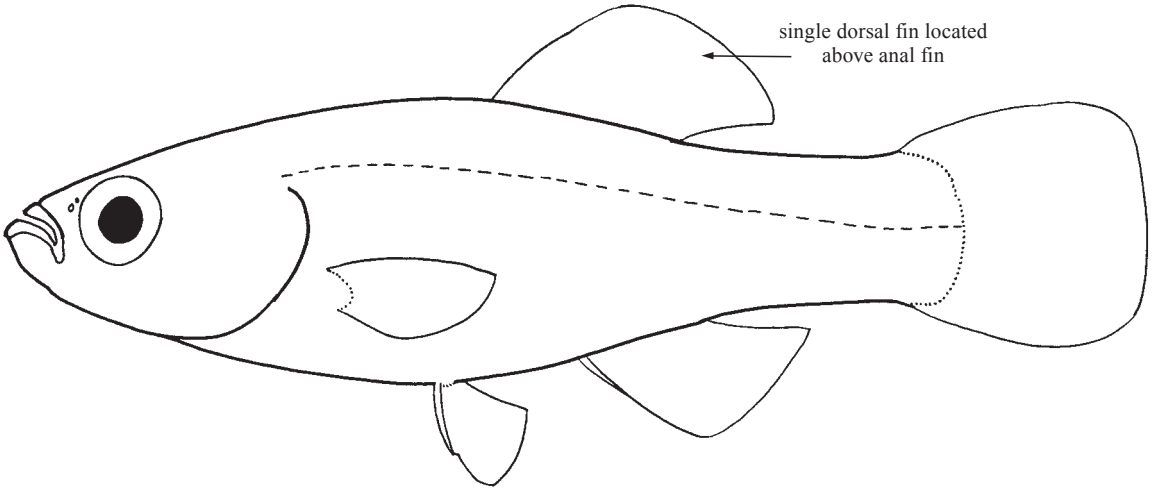
Lee, D. S. et al. 1980. *Atlas of North American Freshwater Fishes.* North Carolina State Museum of Natural History. Raleigh, NC. 867 p.

FUNDULIDAE

Fundulid killifishes

by E.O. Wiley, Museum of Natural History, Kansas, USA and M.J. Ghedotti, Regis University, Colorado, USA

Diagnostic characters: Small fishes (5 to 30 cm). Body elongate to moderately deep. Head flattened, scaled; mouth wide, terminal, oblique, and protrusible. **Fine conical teeth present on edges of jaws. No spines in fins. Single dorsal fin set at approximately midbody above anal fin** and with 7 to 16 soft rays. Origin of dorsal fin slightly anterior to slightly posterior to origin of anal fin. Anal fin with 9 to 15 soft rays. Third anal-fin ray branched in males and females. Caudal fin rounded. Pectoral fins short, rounded, and inserted below the pit organs of lateral line. Pelvic fins abdominal in position and with 6 soft rays. Lateral line reduced to series of separate pit organs along side. Body with large cycloid scales. Sexes usually dimorphic, males having larger anal fins. **Colour:** Variable among and within species, ranging from plain grey (non-breeding *Lucania parva*) to combinations of spots, vertical bars, or stripes. Males frequently differ from females and juveniles in colour pattern, especially when breeding.

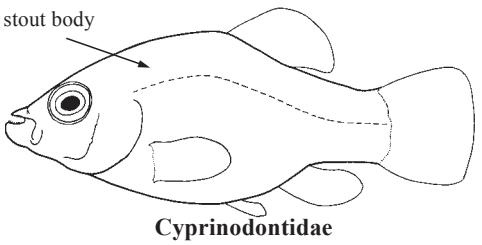


Habitat, biology, and fisheries: Highly adaptable to varying conditions of temperature and salinity. All are oviparous. Most species restricted to fresh water, but other species inhabit estuaries and salt marshes, and some are coastal marine and are even found in hypersaline waters. Diet includes aquatic vegetation, insects, other small invertebrates, and small fishes. Most live near surface or just off bottom in shallow waters. None of the fundulids occurring in Area 31 are of commercial importance, but some of the larger ones (*Fundulus grandis, Fundulus grandissimus*) might be consumed locally. Fundulid killifishes were classified with cyprinodontid pupfishes until recently.

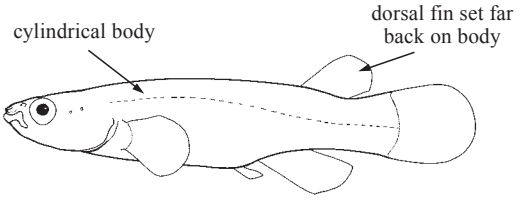
Similar families occurring in the area

Cyprinodontidae: generally stouter bodied (the killifish *Adinia xenica* excepted); jaw teeth tricuspid.

Rivulidae: generally more cylindrical, supraorbital sensory canal open, without sensory pores, dorsal fin set far back on body, its origin over last 2 or 3 anal-fin rays (saltwater species only).



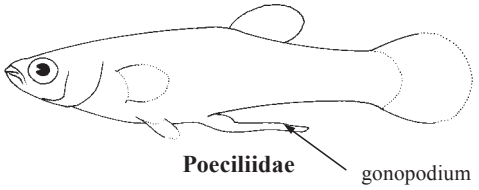
Cyprinodontidae

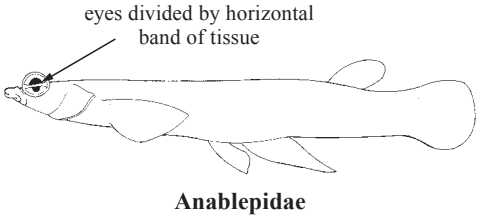


Rivulidae

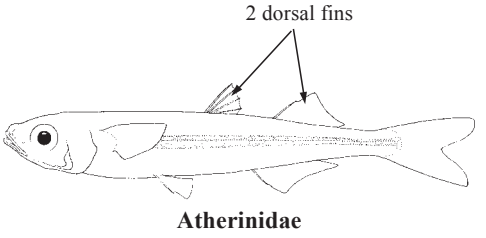
Poeciliidae: males with long anal fin modified into a non-tubular intromittent organ (gonopodium); third anal fin ray unbranched; viviparous.

Anablepidae: eyes divided by horizontal band of opaque tissue into upper and lower halves; anal fin in males forms tubular intromittent organ (gonopodium); dorsal fin set far back on body, approximately halfway between anal and caudal fins.





Atherinidae: 2 dorsal fins, the first with 3 to 9 slender spines, the second with 1 anterior spine; anal and pelvic fins also with spines, pectoral fins set high on body, pelvic fins thoracic; no lateral line; most species with lateral slivery stripe; caudal fin forked.



Key to the species of Fundulidae occurring in the area

This key is valid only for the species appearing in the checklist of species and not for all fundulid taxa, most of which are fresh water and occur only sporadically in brackish waters. Please note that many of the species are allopatric and that possible identification should be checked against geographic occurrence. The Florida Keys populations of *Fundulus similis* are distinctive and may be another species. *Fundulus grandis* and *F. saguanus* are treated as a single species by many authors.

1a. Jaw teeth in a single row; any teeth behind the row not organized into rows; 8 or fewer scale rows between origin of dorsal fin and origin of anal fin . . . . . ***Lucania parva***

1b. Jaw teeth in more than a single row; 9 or more scale rows between origin of dorsal fin and origin of anal fin. . . . . → ***2***

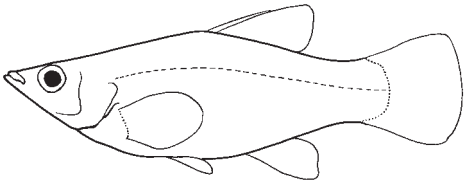


Fig. 1 ***Adinia xenica***

2a. Body stout and trapezoidal in adults, body depth usually 2 to 3 times in standard length; scales large, fewer than 30 scales along midlateral scale row (Fig. 1). . . . . ***Adinia xenica***

2b. Body slender, body depth more than 3 times in standard length; scales small, more than 30 scales along midlateral scale row. . . . . → ***3***

3a. Dorsal fin origin distinctly behind origin of anal fin; dorsal-fin soft rays 8 to 11. . . . . → ***4***

3b. Dorsal fin origin over or anterior to anal fin origin; dorsal-fin soft rays 10 to 15 . . . . . → ***5***

4a. Males and females with 15 or more large dark spots on sides of body; males lacking dark ocellus on dorsal fin (Fig. 2) . . . . . ***Fundulus jenkensi***

4b. Males and females lacking dark spots on body, males with dark ocellus on dorsal fin (Fig. 3) . . . . . ***Fundulus luciae***

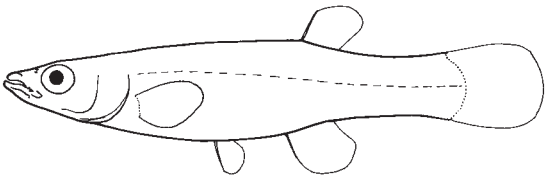


Fig. 2 ***Fundulus jenkensi***

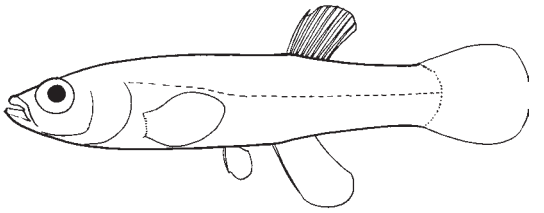


Fig. 3 ***Fundulus luciae***

5a. Total mandibular pores in both jaws 8 (Fig. 4a) . . . . . → ***6***

5b. Total mandibular pores in both jaws 10 to 12 (Fig. 4b). . . . . → ***11***

6a. Mouth distinctly below a horizontal line drawn through the middle of the eye (Figs 5, 6, 7) . . . . . → ***7***

6b. Mouth level with, or slightly above, a horizontal line drawn through the middle of the eye (Fig. 8) . . . . . → ***9***

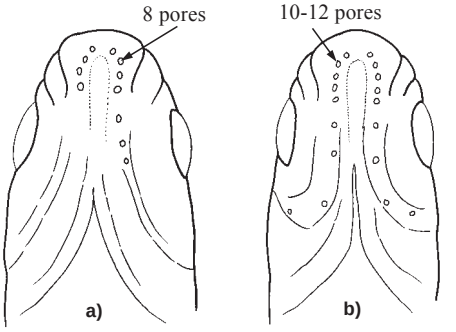


Fig. 4 mandibular pores

7a. Females with 2 or 3 dark horizontal stripes on side of body, males with about 12 vertical bars on side of body (Fig. 5) . . . . . ***Fundulus majalis***

7b. Females lacking horizontal stripes on side of body; males and females with vertical bars on side of body . . . . . → ***8***

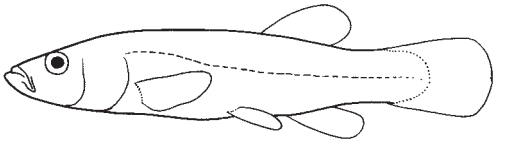


Fig. 5 ***Fundulus majalis***

8a. Frequently with a dark spot on upper base of caudal peduncle (may be diffuse or missing in some individuals), dorsal-fin rays 10 to 14 (mode 12); anal-fin rays 9 to 12 (mode 10); ratio of head length to mouth width 3.15 to 3.75 (Fig. 6) . . . . . ***Fundulus similis***

8b. No dark spot on upper base of caudal peduncle; dorsal-fin rays 9 to 11 (mode10); anal-fin rays 9 or 10 (mode 9); ratio of mouth width to head length 3.8 to 4.5 . . . . . ***Fundulus persimilis***

9a. Origin of dorsal fin distinctly anterior to origin of anal fin, more pronounced in males; males with dark and silvery vertical bars on side of body, silvery dots between bars (Fig. 7) . . . . . ***Fundulus heteroclitus***

9b. Origin of dorsal fin more or less over origin of anal fin; males with numerous dark vertical bars on side of the body but lacking silvery dots . . . . . → ***10***

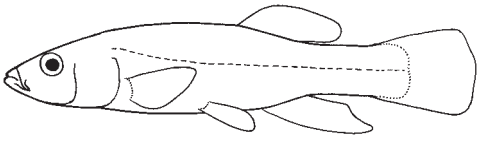


Fig. 6 ***Fundulus similis***

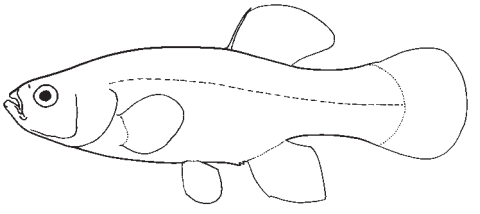


Fig. 7 ***Fundulus heteroclitus***

10a. Females with large black spots on body, concentrated along lateral sensory pores and sometimes forming horizontal lines; males variably with dorsal fin ocellus (Fig. 8)
. . . . . ***Fundulus pulverus***

10b. Females lacking dark spots but with vertical bars posteriorly; females with dorsal fin ocellus, males lacking ocellus (Fig. 9). . . . . ***Fundulus confluentus***

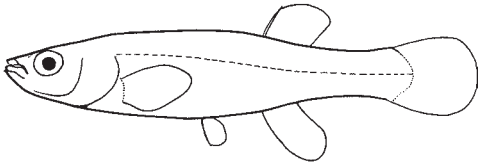


Fig. 8 ***Fundulus pulverus***

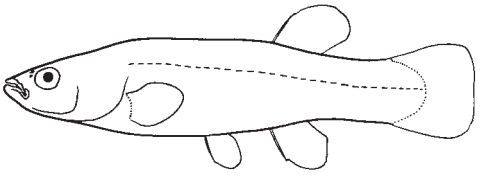


Fig. 9 ***Fundulus confluentus***

11a. Total mandibular pores 10 in both jaws, (Figs 5, 10) . . . . . ***Fundulus grandis* complex**

11b. Total mandibular pores 12 in both jaws
. . . . . ***Fundulus grandissimus***

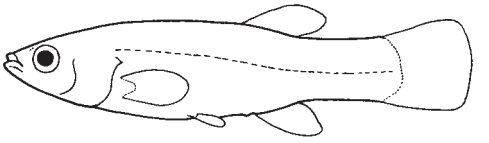


Fig. 10 ***Fundulus grandis* complex**

List of species occurring in the area

Only species occurring in brackish or sea water. The following species show some salt-tolerance, but probably do not occur in estuaries and rarely in salt marshes: *Fundulus chrysotus, Fundulus diaphanus, Fundulus nottii, Fundulus olivaceus, Fundulus seminolis, Lucania goodei*.

Adinia xenica (Jordan and Gilbert, 1882). N Gulf Coast from the tip of Florida to S Texas.

Fundulus confluentus Goode and Bean, 1879. From 35 N S along the Atlantic Coast of the USA and W on the N Gulf Coast to the vicinity of Mobile, Alabama.

Fundulus grandis Baird and Girard, 1853. St. Johns River, Florida, USA S and W to Laguna de Tamiahua, Veracruz, Mexico. Populations in Florida Keys and lower Florida Peninsula may be *F. saguanus*.

Fundulus grandissimus Hubbs, 1936. Restricted to the N Yucatán Peninsula around Progresso.

Fundulus heteroclitus (Linnaeus, 1766). From 35 N to NE Florida, US.

Fundulus jenkinsi (Evermann, 1892). N Gulf Coast from Galveston Bay, Texas E to Escambia Bay, W Florida.

Fundulus luciae (Baird, 1855). From 35 N along the Atlantic Coast to Georgia.

Fundulus majalis (Walbaum, 1792). 35 N S to the Matazas River, NE Florida.

Fundulus persimilis Miller, 1955. N Yucatán Peninsula in the vicinity of Rio Lagartos.

Fundulus pulvereus (Evermann, 1892). From the vicinity of Mobile Bay, Alabama W and S along the Gulf Coast to the vicinity of Corpus Christi, Texas. Reports of occurrence on the Atlantic Coast N of Florida are doubtful.

Fundulus saguanus Rivas, 1948. Cuba and possibly the Florida Keys and S Florida Peninsula.

Fundulus similis (Baird and Girard, 1854). Matanzas River, NE Florida and S and W to just N of Tampico, Mexico. Populations in the Florida Keys and possibly the lower Florida Peninsula are distinctive and may represent another species.

Lucania parva (Baird and Girard, 1855). From 35 N, S, and W along the Atlantic and Gulf Coasts to NE Mexico.

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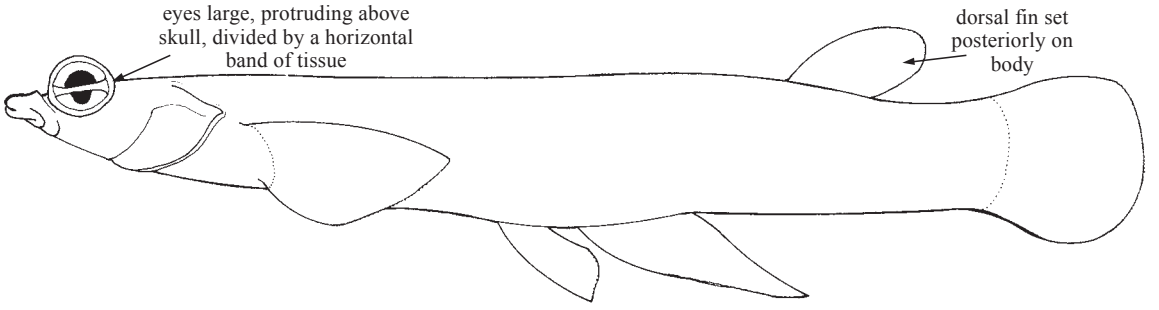
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ANABLEPIDAE

Foureyed fishes

by M.J. Ghedotti, Regis University, Colorado, USA and E.O. Wiley, Museum of Natural History, Kansas, USA

Diagnostic characters: Small to medium-sized fishes (to about 35 cm total length). Body elongate, depressed anteriorly, laterally compressed posteriorly. Head flattened; mouth upturned and terminal; teeth unicuspid in adults and postembryonic juveniles. **Eyes large, protruding above skull and divided horizontally by band of opaque tissue into upper and lower halves**, retina similarly divided, this arrangement allowing for simultaneous aerial and aquatic vision. **No spines in fins; dorsal fin set far posteriorly on body** with 7 to 10 soft rays; anal fin anterior to dorsal fin with 11 soft rays, **anal fin in adult males forms a scaled tubular intromittent organ (gonopodium) which encloses the sperm duct**; caudal fin rounded, often with an indistinct lower lobe; pectoral fins rounded and inserted at or slightly below midbody, with 20 to 26 soft rays; pelvic fins abdominal in position, with 6 soft rays. **Colour:** plain, lacking patterning, to ornamented with series of 1 or more longitudinal stripes along body. Males and females not strikingly different in colour pattern.



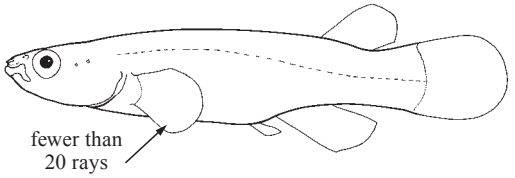
Habitat, biology, and fisheries: Occurring in western Central America and northern South America. Although all 3 species occur mostly in fresh water, they may also be found in very shallow coastal and estuarine waters. They live near the surface and may lurk out of the water on muddy or sandy banks. The divided eyes allow them to search for aerial predators. Diet consists of terrestrial and aquatic invertebrates and periphyton on exposed mudflats. Like the poeciliid live-bearing topminnows, foureyed fishes have internal fertilization and bear 'live' young, but this characteristic has evolved in both lineages independently. None of these species is commercially important as food, but they are locally consumed and are sometimes sold at local fish markets. They are occasionally marketed in the aquarium trade.

Similar families occurring in the area

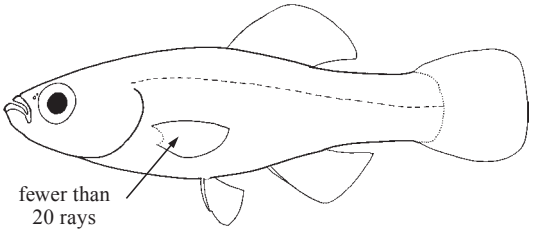
None of the similar families occurring in the area have the protruding and horizontally divided eyes characteristic of the foureyed fishes. Further distinguishing characters of these families are the following:

Rivulidae: males (when present) without gonopodium; fewer than 20 pectoral-fin rays; third anal-fin ray branched; small, not larger than 5 cm standard length.

Fundulidae: males without gonopodium; fewer than 20 pectoral-fin rays; dorsal-fin origin anterior to insertion of last 3 anal-fin rays; third anal-fin ray branched.



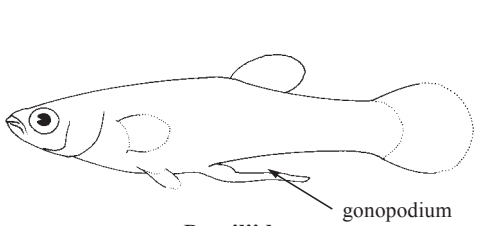
Rivulidae



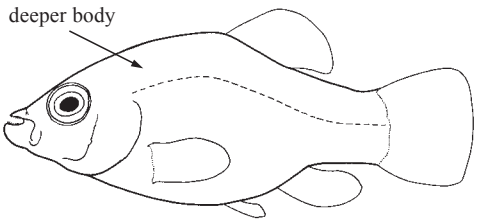
Fundulidae

Poeciliidae: males with anal-fin modified as unscaled, non-tubular gonopodium supported by anal-fin rays 3, 4, and 5; pectoral fins inserted above midbody, fewer than 20 pectoral-fin rays.

Cyprinodontidae: males without gonopodium; dorsal-fin origin anterior to insertion of last 3 anal-fin rays; fewer than 20 pectoral-fin rays; third anal-fin ray branched; usually deeper-bodied.



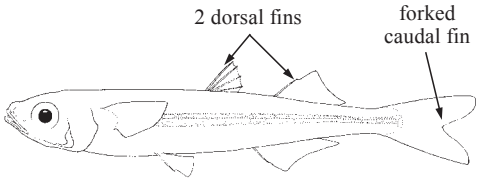
Poeciliidae



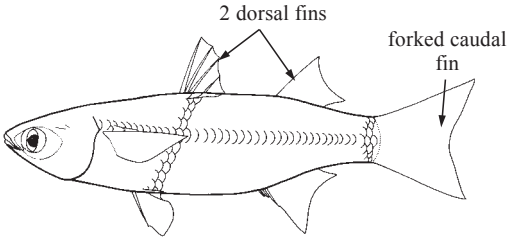
Cyprinodontidae

Atherinidae: 2 dorsal fins, the first with 3 to 9 slender spines, second with 1 anterior spine; anal and pelvic fins also with spines, pectoral fins set high on body, pelvic fins thoracic; no lateral line; most species with lateral slivery stripe; caudal fin forked.

Mugilidae: 2 dorsal fins, the first with slender spines; males without gonopodium; anal and pelvic fins with spines; caudal fin forked.



Atherinidae



Mugilidae

Key to the species of Anablepidae occurring in the area

1a. Scales large, fewer than 64 scales in midlateral scale row . . . . . ***Anableps anableps***

1b. Scales small, greater than 75 scales in midlateral scale row . . . . . ***Anableps microlepis***

List of species occurring in the area

Anableps anableps (Linnaeus, 1758). Amazon River Delta, Brazil NW to Orinoco River Delta, Venezuela.

Anableps microlepis Müller and Troschel, 1844. Amazon River Delta, Brazil NW to Orinoco River Delta, Venezuela.

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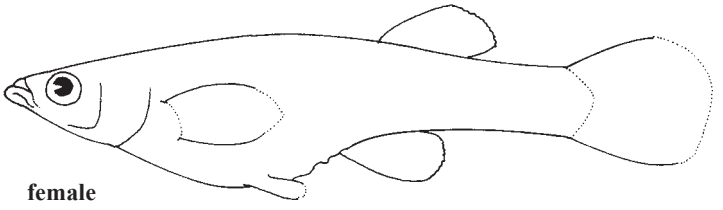
Miller, R.R. 1979. Ecology, habits, and relationships of the Middle American cuatro ojos, *Anableps dowi* (Pisces: Anablepidae). *Copeia,* 1979:82-91.

POECILIIDAE

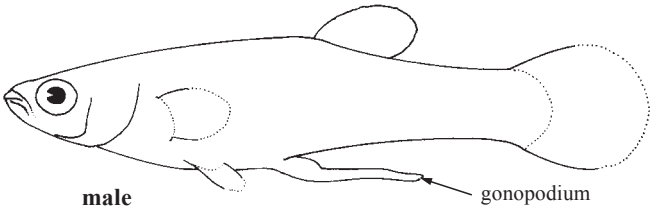
Poeciliids (livebearers)

by M.J. Ghedotti, Regis University, Colorado, USA and E.O. Wiley, University of Kansas, Kansas, USA

Diagnostic characters: Small fishes (4 to 20 cm total length). Body elongate to moderately deep. Head flattened, scaled. Snout short except in *Belonesox*. Mouth wide, terminal, oblique, and protrusible. **No spines in fins**. Single dorsal fin with 6 to 19 soft rays; its position relative to anal fin variable. **Anal fin of male modified into a thin, elongate intromittent organ (gonopodium)** which is not tubular, not scaled, and not enclosing an extension of the sperm duct. Anal fin with 9 soft rays. **Third anal-fin ray unbranched in males and females**. Caudal fin rounded or emarginate. Pectoral fins with 9 to 16 soft rays, short, rounded, and inserted high on side of body. Pelvic fins with 6 soft rays; subthoracic in position in females and thoracic in position in adult males. Body with large cycloid scales. Lateral line reduced to series of separate pit organs along sides. Sexes usually dimorphic, males usually smaller than females. Adult females often obviously pregnant with distended abdomen. **Colour:** highly variable among species. Males usually more colourful than females and juveniles. **Pregnant females often with dark spot (gravid spot) anterior and dorsal to anus.**



female

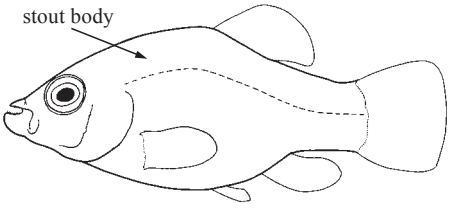


male

Habitat, biology, and fisheries: Found naturally in the Americas from the USA to Argentina. Most species occur in fresh water, but some have wide salinity tolerance and may be found in brackish or marine coastal waters. Common in the fresh waters of Central America and the Greater Antilles. They feed chiefly on insects, other small invertebrates, and aquatic vegetation; some species (especially *Gambusia affinis, G. holbrooki*, and *Poecilia reticulata*) have been widely introduced to control insect-borne diseases. All are viviparous. The larger species may be consumed locally, but most species are too small to be of interest as food. Many have great commercial importance as aquarium fishes.

Similar families occurring in the area

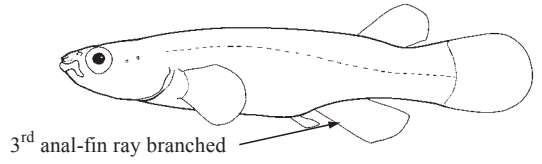
Cyprinodontidae: males without gonopodium; male and female anal fins approximately similar; oviparous; third anal-fin ray branched; usually stouter-bodied; jaw teeth tricuspid.



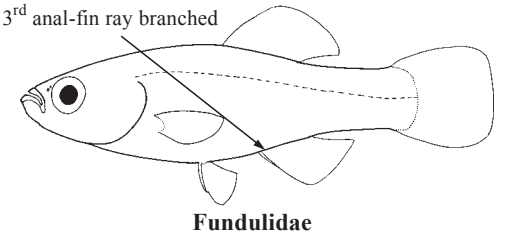
Cyprinodontidae

Rivulidae: males rare, without gonopodium, has larger anal fin than female; third anal-fin ray branched; oviparous; generally more cylindrical; pectoral fins set low on sides; dorsal fin set far back on body, its origin over last 2 or 3 anal-fin rays (saltwater species only).

Fundulidae: males without gonopodium, has larger anal fin than female; third anal-fin ray branched; oviparous; pectoral fin set low on sides.



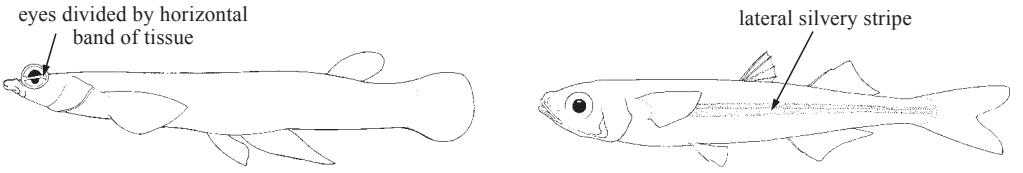
Rivulidae



Fundulidae

Anablepidae: eyes divided by horizontal band of opaque tissue into upper and lower halves; anal fin in males forms scale-covered, tubular gonopodium enclosing an elongate sperm duct; dorsal fin set far back on body, approximately halfway between anal and caudal fins.

Atherinidae: 2 dorsal fins, the first with 3 to 9 slender spines, the second with 1 anterior spine; anal and pelvic fins also with spines, pectoral fins set high on body, pelvic fins thoracic; no lateral line; most species with lateral slivery stripe; caudal fin forked; males without gonopodium; oviparous.



Anablepidae **Atherinidae**

Key to the genera of Poeciliidae occurring in the area

Note: No reliable key to females available. Distinguishing features of genera and species have traditionally been based on the male gonopodium and male pelvic-fin structure. When available, characters applicable to females are provided. Further, the key is designed for the brackish and marine members of each genus and hence does not work for representatives restricted to fresh water. Please note that many of the species are allopatric and that possible identification should be checked against geographic occurrence.

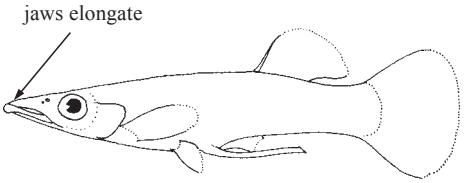


Fig. 1 ***Belonesox***

1a. Jaws elongate, forming a distinctive beak (Fig. 1) . . . . . ***Belonesox***

1b. Jaws of normal proportions not elongated into a beak . . . . . → ***2***

2a. Tips of pelvic fins of adult males swollen, elongate, or both, due to elongation of the second fin ray (Fig. 2a,b); fleshy palp on gonopodial ray 3 . . . . . → ***3***

2b. Tips of pelvic fins of adult males not swollen or elongate, third fin ray approximately as long as second fin ray (Fig. 2c); no fleshy palp on gonopodial ray 3 . . . . . → ***4***

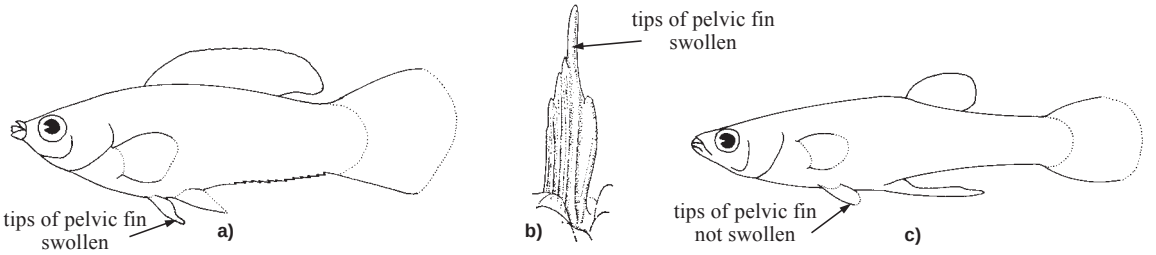


Fig. 2

3a. Subdistal segments of gonopodial ray 3 smooth, lacking spines and processes; gonopodial ray 5p distinctly shorter than 5a, extending distally only to within 10 to 15 segments of the tip of ray 5a (Fig. 3a) . . . . . ***Limia***

3b. Subdistal segments of gonopodial ray with spines and processes; gonopodial ray 5p not distinctly shorter than 5a, extending distally to within 2 to 6 segments of the tip of ray 5a (Fig. 3b) . . . . . ***Poecilia***

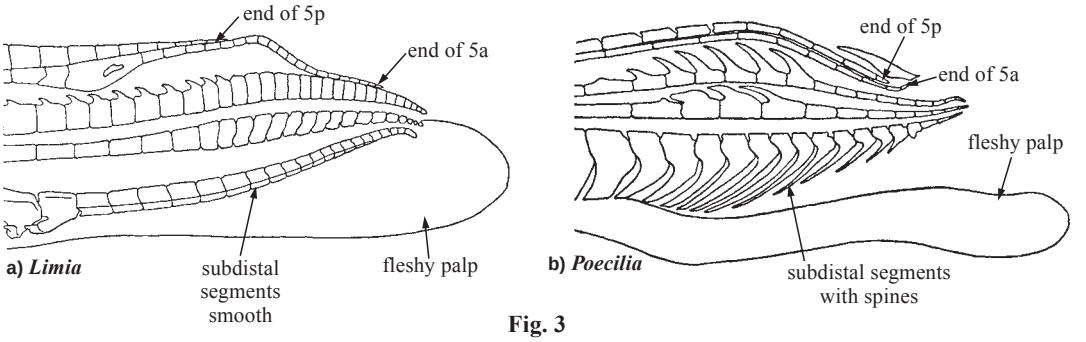


Fig. 3

4a. Tip of gonopodial ray 4a terminating in a decurved (downward curved) hook (Fig. 4a); distinct dark spot in anterior dorsal fin; jaw teeth compressed; females never larger than 3 cm total length . . . . . ***Heterandria (H. formosa* only)**

4b. Tip of gonopodial ray 4a terminating in a slightly recurved (upward curved) hook (Fig. 4b); no distinct dark spot in anterior dorsal fin (except melanistic *Gambusia holbrooki*); jaw teeth conical; females often larger than 3 cm total length . . . . . → ***5***

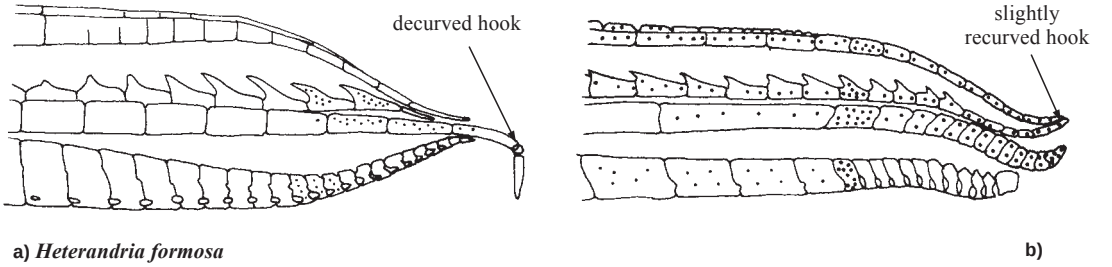


Fig. 4

5a. Distal tips of gonopodial rays 5a and 5p simple and slightly recurved, without distinct recurved hooks (Fig. 4b); posterior portion of male gonopodium distinctly black; distinct black spot or streak on female anal fin . . . ***Brachyrhaphis (B. cascajalensis* only)**

5b. Distal tips of gonopodial rays 5a and 5p slightly decurved and ornamented with distinct recurved hooks (Fig. 5); male gonopodium and female anal fin lack distinct black pigmentation . . . . . ***Gambusia***

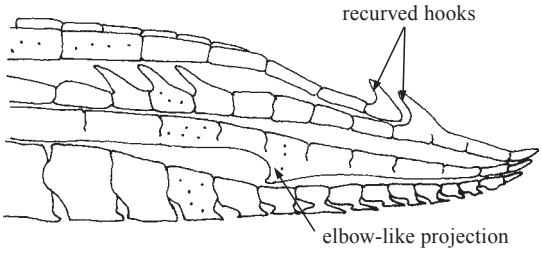


Fig. 5 ***Gambusia***

List of species occurring in the area

Note: List restricted only to those species entering brackish or salt water and those species whose salinity tolerance and geographic location might permit them to be found in these habitats sporadically. There are numerous fresh water members of the family found on the mainlands and islands of Area 31.

Belonesox belizanus Kner, 1860. Veracruz, Mexico to Nicaragua.

Brachyrhaphis cascajalensis (Meek and Hildebrand, 1913). SE Costa Rica to N central Panama.

Gambusia affinis (Baird and Girard, 1853). S central USA and NE Mexico, introduced elsewhere.
Gambusia hispaniolae Fink, 1971. Central Haiti and SW Dominican Republic.
Gambusia holbrooki Girard, 1859. S New Jersey to S Alabama, introduced elsewhere.
Gambusia luma Rosen and Bailey, 1963. Guatemala and Honduras.
Gambusia manni Hubbs, 1927. N Bahamas.
Gambusia nicaraguensis Günther, 1866. Guatemala to Panama.
Gambusia puncticulata Poey, 1854. Cuba, Isle of Youth, Jamaica, Cayman Islands, and the Bahamas.
Gambusia rhizophorae Rivas, 1969. S Florida and N Cuba.
Gambusia xanthosoma Greenfield, 1983. West Bay, Grand Cayman Island.
Gambusia yucatana Regan, 1914. E Veracruz, Mexico to the Yucatan Peninsula.

Heterandria formosa Girard, 1859. SE North Carolina to S Louisiana.

Limia caymanensis Rivas and Fink, 1970. Grand Cayman Island.
Limia rivasi Franz and Burgess, 1983. E La Gonave Island, Haiti.
Limia vittata (Guichenot, 1853). Cuba.

Poecilia latipinna (Lesueur, 1821). SE North Carolina to the W Yucatán Peninsula.
Poecilia mexicana Steindachner, 1863. S Texas to Colombia.
Poecilia orri Fowler, 1943. Belize and Honduras.
Poecilia petenensis (Günther, 1866). E Yucatán Peninsula, Guatemala, and Belize.
Poecilia reticulata Peters, 1859. S Mexico to Guyana and the Lesser Antilles including Trinidad and the Virgin Islands, introduced elsewhere.
Poecilia sphenops Valenciennes, 1846. S Texas to Colombia.
Poecilia velifera (Regan, 1914). N Yucatán Peninsula.
Poecilia vivipara Bloch and Schneider, 1801. W Venezuela to Argentina and the islands of Aruba, Bonaire, Curaçao, the Leeward Islands, and Trinidad.

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Meffe, G.K. and F.F. Snelson, Jr. (eds). 1989. *Ecology and Evolution of Livebearing Fishes (Poeciliidae)*. Englewood Cliffs, New Jersey, Prentice Hall, 453 p.

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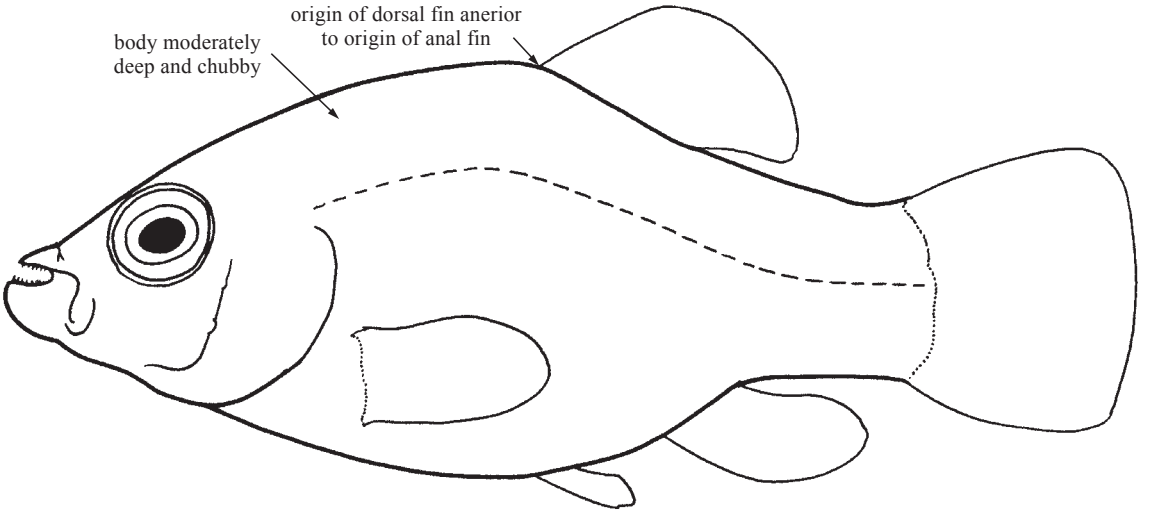
Wischnath, L. 1993. *Atlas of Livebearers of the World.* Neptune City, New Jersey, T.F.H. Publications, 336 p.

CYPRINODONTIDAE

Pupfishes

By E.O. Wiley, Museum of Natural History, Kansas, USA and M.J. Ghedotti, Regis University, Colorado, USA

Diagnostic characters: Small fishes (2 to 8 cm standard length). **Body moderately deep and chubby**. Head flattened and scaled; supraorbital sensory canal with 7 or more pores; sensory placodes not exposed; mouth wide, terminal, oblique, and protrusible. **Teeth tricuspid in all genera except *Cubanichthys***. Single dorsal fin with 10 to 18 rays with or without single spine, set at midbody. **Origin of dorsal fin anterior to origin of anal fin**. Anal fin spineless with 8 to 13 soft rays. **All anal-fin rays branched**. Caudal fin truncate to slightly rounded. Pectoral fins short with 13 to 20 soft rays, rounded and inserted below the pit organs of the lateral line. Pelvic fins small with 6 or 7 soft rays, spineless and abdominal. Lateral line reduced to a series of pit organs along the side of the body. Body with large cycloid scales. Sexes dimorphic, the males having larger anal fins (no gonopodium) and males and females with different colour patterns on the body and/or dorsal and anal fins, especially in the breeding season. **Colour:** highly variable in tone and colour, frequently with bars, stripes, or spots on body and fins.

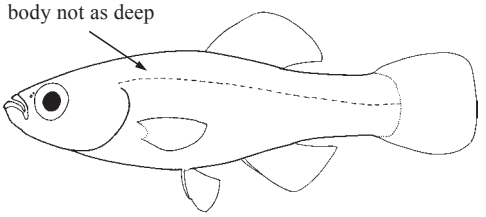


Habitat, biology, and fisheries: Highly adaptable to varying conditions of salinity and temperature. All are oviparous. Many species restricted to fresh water but others are common in salt marshes, mangroves, estuaries, and coastal marine environments. Diet consists of insects, other invertebrates, aquatic vegetation, and small fishes. Most live near the surface or just off bottom. None are commercially important in the Western Central Atlantic but at least 1 species, *Cyprinodon variegatus*, is marketed as a bait fish and another, *Jordanella floridae*, is valued as an aquarium fish.

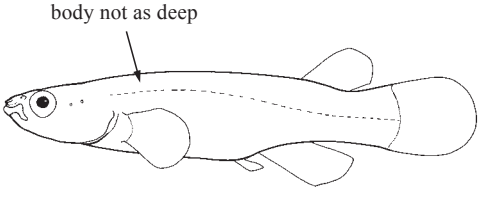
Similar families occurring in the area

Fundulidae: body not as deep, usually more elongate and cylinderical; jaw teeth conical.

Rivulidae: body not as deep, elongate, cylindrical; supraorbital sensory canal open, without sensory pores; dorsal fin set far back on body, its origin over last 2 or 3 anal-fin rays (saltwater species only); jaw teeth conical.



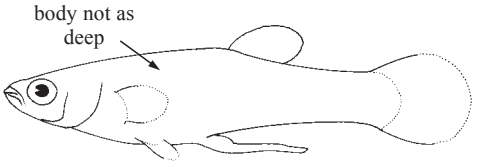
Fundulidae



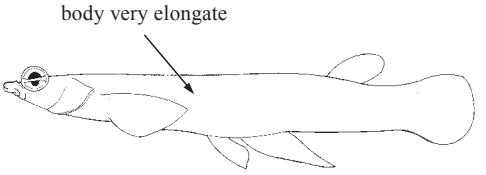
Rivulidae

Poeciliidae: body not as deep, more elongate; males with long anal fin modified into a non-tubular intromittent organ (gonopodium); third anal-fin ray unbranched; viviparous; jaw teeth conical or spatulate.

Anablepidae: body very elongate, eyes divided by horizontal band of opaque tissue into upper and lower halves; anal fin in males forms tubular intromittent organ (gonopodium); dorsal fin set far back on body, approximately halfway between anal and caudal fins; jaw teeth conical in adults.

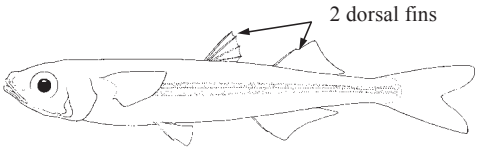


Poeciliidae



Anablepidae

Atherinidae: 2 dorsal fins, the first with 3 to 9 slender spines, the second with 1 anterior spine; anal and pelvic fins with spines; pelvic fins thoracic, no lateral line; most species with a single silvery lateral stripe on body; caudal fin forked.



Atherinidae

Key to the species of Cyprinodontidae occurring in the area

Applies only to brackish- and salt-water representatives. The recognition of *Garmanella* as a valid genus as opposed to being a synonym of *Jordanella* is controversial. Recognition of *Garmanella* here follows Parker and Kornfield (1995) and Costa (1997).

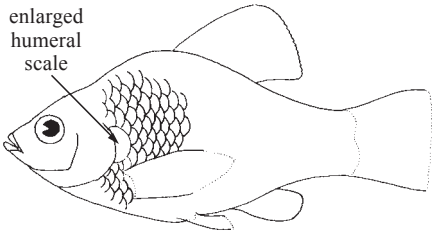


Fig. 1 ***Cyprinodon***

1a. An enlarged humeral scale immediately behind gill cover and above pectoral fin (Fig. 1) . . . . . → *2*

1b. No enlarged humeral scale present . . . . . → *3*

2a. Cheek long, distance from posterior end of suborbital margin to preopercular angle is greater than twice length of the opercle (Fig. 2) . . . . . ***Cyprinodon laciniatus***

2b. Cheek relatively short, distance from posterior end of suborbital margin to preopercular angle is less than length of the opercle (Fig. 3) . . . . . ***Cyrinodon variegatus*** **species complex**

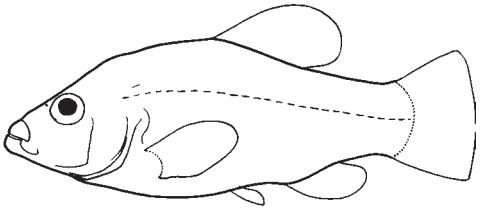


Fig. 2 ***Cyprinodon laciniatus***

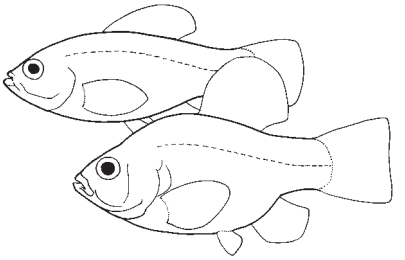


Fig. 3 ***Cyprinodon variegatus*** **species complex**

3a. Dorsal-fin soft rays 10 to 13, pectoral-fin soft rays 18 to 20 (rarely 17) . . . . . → *4*

3b. Dorsal-fin soft rays greater than 13, pectoral-fin soft rays less than 18 . . . . . → *5*

4a. Dark horizontal stripe from chin to top of operculum through eye; male with spots anteriorly which merge to form longitudional stripes posteriorly, females with a single longitudinal stripe (Fig. 4) . . . . . ***Cubanichthys cubensis***

4b. No dark horizontal black stripe from chin to top of operculum through eye, males and females with vertical bars on sides of body posteriorly (Fig. 5) . . . . . ***Floridichthys carpio***

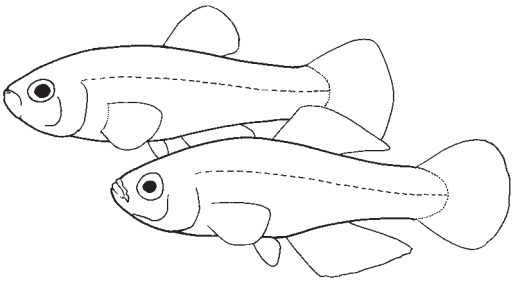


Fig. 4 ***Cubanichthys cubensis***

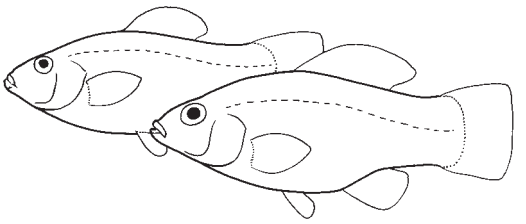


Fig. 5 ***Floridichthys carpio***

5a. Anal-fin soft rays 11 to 13; first dorsal-fin ray of adults spine-like (Fig. 6) . . . . . ***Jordanella floridae***

5b. Anal-fin soft rays 8 to 10; first dorsal-fin ray of adults not spine-like or thickened (Fig. 7) . . . . . ***Garmanella pulchra***

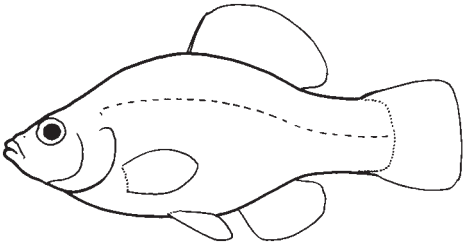


Fig. 6 ***Jordanella floridae***

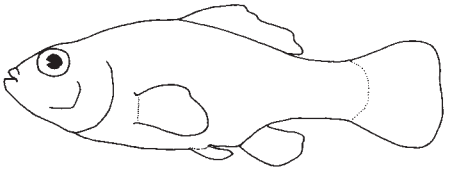


Fig. 7 ***Garmanella pulchra***

List of species occurring in the area

Cyprinodon laciniatus Hubbs and Miller, 1942. Marl-limestone bottom lakes on New Providence Island, Grand Bahama Bank, Bahamas brackish water.

Cyprinodon variegatus complex includes 3 species that are largely allopatric. These species are listed below.

Cyprinodon artifrons Hubbs, 1936. N Yucatán peninsula to Belize.

Cyprinodon dearborni Meek, 1909. N coast of Venezuela and the Dutch Antilles.

Cyprinodon variegatus, Lacepède, 1803. From 35 N S along the Atlantic and W and S along the Gulf Coast to the W Yucatán Peninsula and in the Bahamas, Cuba, Hispaniola, Jamaca, and the Caymans; several subspecies recognized: Bahamian form recognized as *C. v. baconi* Breder, 1932 and Greater Antillean form recognized as *C. v. riverendi* Poey, 1860.

Cubanichthys cubensis (Eigenmann, 1903). W Cuba and the Isle of Youth.

Floridichthys carpio (Günther, 1866). Florida and the Yucatán Peninsula.

Garmanella pulchra Hubbs, 1936. Yucatán Peninsula S to Belize.

Jordanella floridae Goode and Bean, 1879. Florida; salt tolerant, but doubtful occurrence in bays and estuaries.

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Parenti, L.R. 1981. A phylogenetic and biogeographic analysis of cyprinodontiform fishes (Teleostei, Cyprinodontidae). *Bull. Amer. Mus. Nat. Hist*., 168(4):335-557.

Parker, A. and I. Kornfield. 1995. Molecular perspective on evolution and zoogeography of cyprinodontid killifishes (Teleostei, Atherinomorpha). *Copeia*, 1995:8-21.

Robins, C.R. and G.C. Ray. 1986. *A Field Guide to Atlantic Coast Fishes, North America.* Boston, Houghton Mifflin, 354p.

Wildekamp, R.H. 1995. *A World of Killies, Atlas of the Oviparous Cyprinodontiform Fishes of the World*, Volume II. Mishawaka, Indiana, American Killifish Association Inc..

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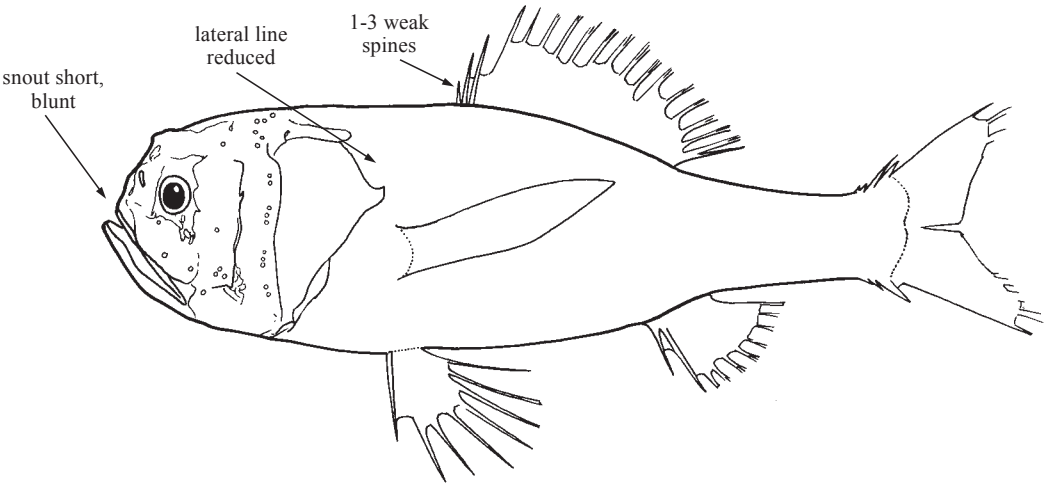
Order STEPHANOBERYCIFORMES

MELAMPHAIDAE

Bigscale fishes (ridgeheads)

by J.A. Moore, Florida Atlantic University, USA

Diagnostic characters: Small (to about 160 mm total length) stephanoberyciform fishes. **Body subcylindrical. Head large; large sensory canals separated by very thin bony ridges and covered with membranous skin**. Eye small in most species. **Snout short and blunt**. Mouth moderately large and oblique, one supramaxilla (absent in *Scopelogadus*). Teeth on jaws minute, in bands or uniserial row; vomer and palatine toothless. **One dorsal fin with 1 to 3 weak spines and 9 to 18 soft rays**; anal fin with 1 weak spine and 7 to 10 soft rays; caudal fin emarginate, with 3 or 4 procurrent spines in upper and lower lobes and 19 principal rays; pectoral fins with 13 to 16 soft rays; pelvic fins with 1 spine and 6 to 8 soft rays. Scales thin and cycloid, usually deciduous, moderate-sized to very large; **lateral line reduced to 1 or 2 pored scales behind upper edge of operculum**; 12 to 40 transverse rows of scales along body. No light organs. **Colour:** body and head dark brown or black.



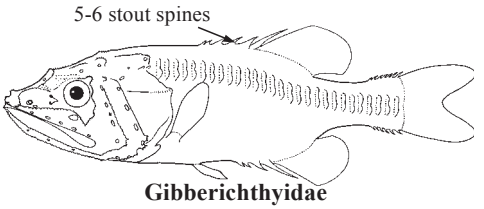
Habitat, biology, and fisheries: Meso- to bathypelagic, at depths of 200 to 2 000 m. Many species widely distributed in Atlantic and Indo-Pacific. Feed primarily on gelatinous organisms and small crustaceans. Frequently taken in deep-water trawls, but of no commercial importance.

Remarks: Family contains 33 species in 5 genera, found in midwaters of all oceans except Arctic Ocean and Mediterranean Sea.

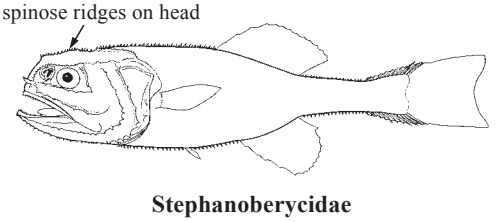
Similar families occurring in the area

Gibberichthyidae: dorsal fin preceded by 5 or 6 stout, wide-based spines; anal fin preceded by 3 to 5 stout, wide-based spines; 5 to 7 procurrent spines in upper and lower caudal lobes; pelvic fins with 1 spine and 5 or 6 soft rays.

Stephanoberycidae: ridges on head extremely spinose; 9 to 12 procurrent spines in upper and lower caudal lobes; pelvic fins with no spine and 5 soft rays; scales firmly adherent, with 1 to 6 outwardly pointing spines (*Stephanoberyx* and *Acanthochaenus*).



Gibberichthyidae



Stephanoberycidae

Key to the genera of Melamphaidae occurring in the area

1a. Very large scales, fewer than 15 transverse scale rows from nape to caudal base (scales almost always lost, leaving large, shaggy scale pockets); scales on cheek absent (no apparent scale pockets); supramaxilla absent . . . . . ***Scopelogadus***

1b. Smaller scales, more than 20 transverse scale rows from nape to caudal base (scales mostly lost, leaving discernable scale pockets); scales on cheek (leaving discernable scale pockets); supramaxilla present . . . . . → ***2***

2a. Ridges on top of head crest-like with serrate edges; conspicuous dorsally-directed spine present between nostrils; ventral edge, angle, and most of posterior edge of preopercle serrate; scales on cheek 3 or 4 (but often lost) . . . . . ***Poromitra***

2b. Ridges on top of head not crest-like with edges smooth; no conspicuous dorsally-directed spine between nostrils; ventral edge, angle, and posterior edge of preopercle smooth; scales on cheek 2 or 3 (but often lost) . . . . . → ***3***

3a. Total number of dorsal-fin elements (spines plus rays) less than 16 . . . . . ***Scopeloberyx***

3b. Total number of dorsal-fin elements (spines plus rays) more than 16 . . . . . ***Melamphaes***

List of species occurring in the area

Melamphaes ebelingi Keene, 1973. 126 mm SL. Subtropical Atlantic.
Melamphaes eulepis Ebeling, 1962. 48 mm SL. Tropical worldwide.
Melamphaes longivelis Parr, 1933. 127 mm SL. Tropical/temperate Atlantic.
Melamphaes polylepis Ebeling, 1962. 73 mm SL. Tropical worldwide.
Melamphaes pumilus Ebeling, 1962. 24 mm SL. Tropical/subtropical N Atlantic.
Melamphaes simus Ebeling, 1962. 29 mm SL. Tropical/temperate worldwide.
Melamphaes suborbitalis (Gill, 1883). 114 mm SL. Subtropical/temperate Atlantic.
Melamphaes typhlops (Lowe, 1843). 100 mm SL. Tropical/subtropical Atlantic.
Melamphaes sp. 76 mm SL. Tropical/subtropical Atlantic.

Poromitra capito Goode and Bean, 1883. 102 mm SL. Subtropical/temperate N Atlantic.
Poromitra crassiceps (Günther, 1878). 187 mm SL. Subtropical/temperate Atlantic.
Poromitra megalops (Lütken, 1877). 76 mm SL. Tropical/subtropical worldwide.
Poromitra sp. 138 mm SL. Tropical/subtropical Atlantic.

Scopeloberyx nigrescens (Brauer, 1906). 25 mm SL. Tropical Atlantic and temperate SE Atlantic.
Scopeloberyx opercularis Zugmayer, 1911. 96 mm SL. Tropical Atlantic.
Scopeloberyx opisthopterus (Parr, 1933). 40 mm SL. Tropical/subtropical N Atlantic.
Scopeloberyx robustus (Günther, 1887). 50 mm SL. Subtropical/tropical Atlantic.
Scopeloberyx sp. 28 mm SL. Tropcial/subtropical W Atlantic.

Scopelogadus beanii (Günther, 1887). 122 mm SL. Subtropical/temperate worldwide.
Scopelogadus mizolepis mizolepis (Günther, 1878). 94 mm SL. Tropical/subtropical worldwide.

References

Ebeling, A.W. and W.H. Weed, III. 1973. Order Xenoberyces (Stephanoberyciformes). In Fishes of the western North Atlantic. *Mem. Sears Found. Mar. Res*., 1(6):397-478.

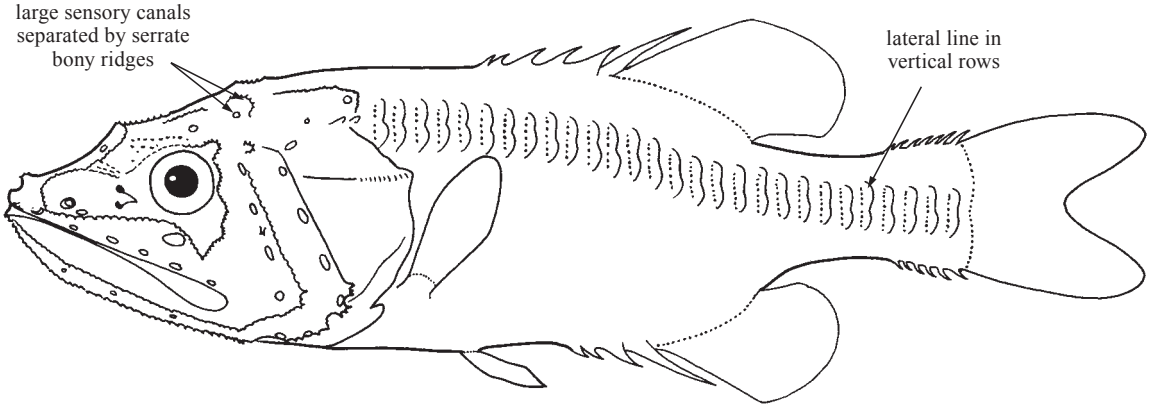
Keene, M.J., R.H. Gibbs, Jr. and W.H. Krueger. 1987. Family Melamphaidae, Bigscales. In Biology of midwater fishes of the Bermuda Ocean Acre, edited by R.H. Gibbs, Jr. and W.H. Krueger. *Smithson. Contrib. Zool*., (452):169-185.

GIBBERICHTHYIDAE

Gibberfish

by J.A. Moore, Florida Atlantic University, USA

Diagnostic characters: Small (to 91 mm standard length) stephanoberyciform fishes. Body elongate, slightly compressed. Head large; **large sensory canals separated by serrate bony ridges and covered with membranous skin**. Eye small in adults. Mouth large, slightly oblique; 1 supramaxilla. Teeth on jaws minute, in bands; vomer and palatine toothless. **Anterior spines in dorsal and anal fins fused to underlying pterygiophores, only last 1 or 2 spines depressible**; dorsal fin single with 5 or 6 spines and 8 or 9 soft rays; anal fin with 3 to 5 spines and 7 to 9 soft rays; caudal fin emarginate, with 5 to 7 procurrent spines in upper and lower lobes and 19 principal rays; pectoral fins with 13 to 15 soft rays; pelvic fins with 1 spine and 5 or 6 soft rays. Scales small and cycloid, deciduous. **Lateral line a series of vertical rows along body, each row with 6 to 8 epidermal papillae**, 28 to 34 scales underlying rows of papillae. **Pelagic larvae with filamentous extensions of pelvic-fin rays bearing fleshy leaf-like structures. Colour:** body and head dark brown or black.



Habitat, biology, and fisheries: Benthopelagic or meso- to bathypelagic as adults, taken at depths of 320 to 1 100 m. Most captures of adults have been near continental margins or islands. Pelagic larvae found in open ocean at depths of less than 50 m at night, likely deeper during day. Diet consists of small crustaceans, especially pelagic amphipods. Ripe gonads found in females larger than 80 mm standard length. Usually taken in bottom and midwater trawls. Of no commercial importance.

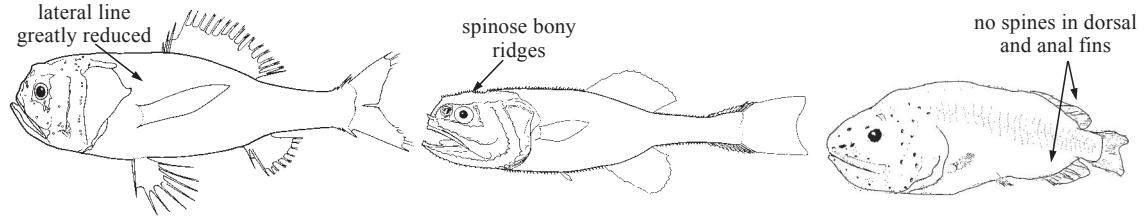
Remarks: Family contains 1 genus with 2 species.

Similar families occurring in the area

Melamphaidae: 1 to 3 weak spines in dorsal fin; 3 or 4 procurrent spines in upper and lower caudal lobes; pelvic fins with one spine and 6 to 8 soft rays; lateral line reduced to 1 or 2 pored scales above opercle.

Stephanoberycidae: bony ridges on head extremely spinose; 0 to 3 spines in dorsal fin; 9 to 12 procurrent spines in upper and lower caudal lobes; pelvic fin with no spine and 5 soft rays; scales firmly adherent, with 1 to 6 outwardly pointing spines.

Rondeletiidae: no dorsal- or anal-fin spines; no pelvic spines; no caudal procurrent spines; scales deeply embedded in skin and not visible.



List of species occurring in the area

Gibberichthys pumilus Parr, 1933. To 91 mm SL. Tropical W Atlantic.

References

de Sylva, D.P. and W.N. Eschmeyer. 1977. Systematics and biology of the deep-sea fish family Gibberichthyidae, a senior synonym of the family Kasidoroidae. *Proc. Calif. Acad. Sci*., 41(6):215-231.

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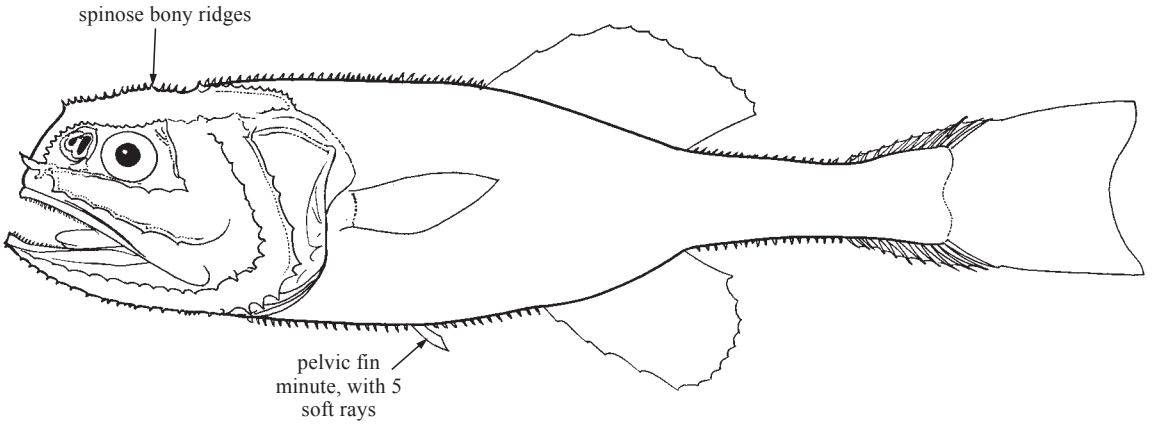
Kotlyar, A.N. 1996. *Beryciform fishes of the world ocean*. Moscow, VNIRO Publishing, 368 p. [in Russian]

STEPHANOBERYCIDAE

Pricklefishes

by J.A. Moore, Florida Atlantic University, USA

Diagnostic characters: Small (to about 141 mm standard length) stephanoberyciform fishes. **Body and head subcylindrical**. Head moderately large, about 1/3 standard length. Eye moderate to small. Snout blunt. Mouth moderate-sized and terminal; 1 supramaxilla. Teeth on jaws minute, in bands; vomer and palatine toothless. **Large sensory canals separated by extremely spinose bony ridges and covered with membranous skin. Single dorsal fin set far back and symmetrical with anal fin**, with 0 to 3 weak spines and 9 to 14 soft rays; anal fin with 0 to 3 weak spines and 9 to 14 soft rays; **caudal fin emarginate with 9 to 12 procurrent spines in upper and lower lobes** and 19 principal rays; pectoral fins with 11 to 14 soft rays; **pelvic fins minute, with no spine and 5 soft rays. Scales firmly adherent with 1 to 6 outwardly pointing spines in *Acanthochaenus* and *Stephanoberyx*. Lateral line obscure. Colour:** brownish overall or dark brown to black head and whitish body with brownish scales and fins.



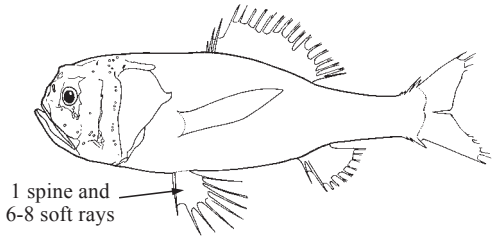
Habitat, biology, and fisheries: Benthopelagic or abyssal benthic, at depths of 945 to 5 308 m. *Acanthochaenus* in the southwestern Indian Ocean feeds on benthic crustaceans and has a maximum age calculated at 12+ years from otoliths. Both *Acanthochaenus* and *Stephanoberyx* are reproductively mature by 80 mm standard length. Occasionally taken in bottom trawls. Rare fishes of no commercial importance.

Remarks: Family contains 3 species in 3 monotypic genera, with an additional undescribed genus and species known from the eastern Atlantic and central Pacific.

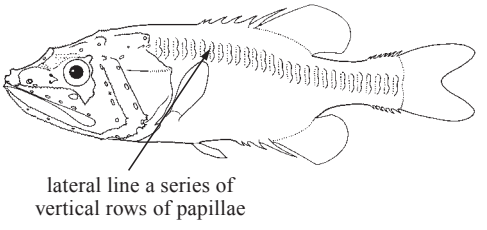
Similar families occurring in the area

Melamphaidae: 3 or 4 procurrent spines in upper and lower caudal lobes; pelvic fins with 1 spine and 6 to 8 soft rays; deciduous cycloid scales on body; lateral line reduced to 1 or 2 pored scales above opercle.

Gibberichthyidae: dorsal and anal fins with several stout, wide-based spines fused to underlying pterygiophores; 5 to 7 procurrent spines in upper and lower caudal lobes; pelvic fins with 1 spine and 5 or 6 soft rays; deciduous cycloid scales; lateral line series of vertical rows of papillae.



Melamphaidae



Gibberichthyidae

Key to the genera and species of Stephanoberycidae occurring in the area

1a. Pelvic fins inserted nearer to pectoral fins than to anal fin; anal fin with 12 or more total elements; gill rakers on first arch 12 to 15 on upper arm, one at angle, and 24 to 27 on lower arm (total 37 to 43) . . . . . ***Stephanoberyx monae***

1b. Pelvic fins inserted nearer to anal fin than to pectoral fins; anal fin with fewer than 12 total elements; gill rakers on first arch 8 to 10 on upper arm, one at angle, and 17 to 20 on lower arm (total 20 to 31) . . . . . ***Acanthochaenus luetkenii***

List of species occurring in the area

Acanthochaenus luetkenii Gill, 1884. 141 mm SL. Subtropical/temperate Atlantic, Indian, and Pacific.

Stephanoberyx monae Gill, 1883. 85 mm SL. Tropical/subtropical W Atlantic.

References

Ebeling, A.W. and W.H. Weed, III. 1973. Order Xenoberyces (Stephanoberyciformes). In Fishes of the western North Atlantic. *Mem. Sears Found. Mar. Res*., 1(6):397-478.

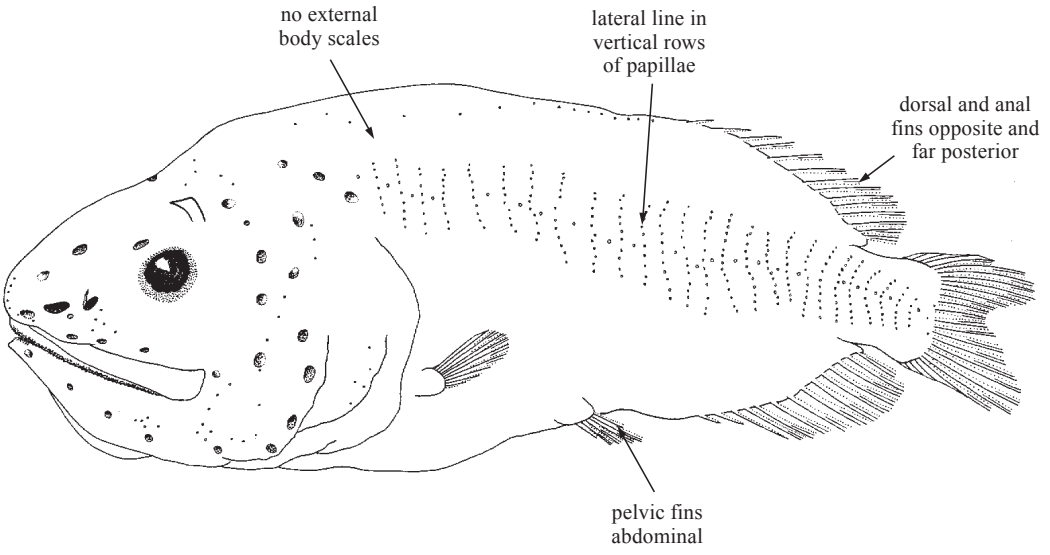
Kotlyar, A.N. 1996. *Beryciform fishes of the world ocean*. Moscow, VNIRO Publishing, 368 p. [in Russian].

RONDELETIIDAE

Redmouth whalefishes

by J.R. Paxton and T. Trnski, Australian Museum, Sydney, Australia

Diagnostic characters: Small (to 11 cm standard length) stephanoberyciform fishes; **body flabby, somewhat whale-shaped with median fins opposite and far posterior**. Head large; mucous cavities on top of head indistinct, covered by thick skin. Eyes small. Snout very long; nasal organ moderately developed; posterior nostril with large, triangular skin flap. Mouth large, **jaws not extending beyond posterior margin of eye**, horizontal. Teeth small and closely set on jaws, vomer, and pharyngobranchials; palatine, ectopterygoid, and basibranchials (copula / tongue) lacking teeth. Gill rakers well developed, lath-like. Fins without spines; 1 dorsal fin with 13 to 16 soft rays; anal fin with 13 to 16 soft rays; caudal fin with 19 principal rays; pectoral fins with 9 to 11 rays; **pelvic fins abdominal with 5 to 6 soft rays. Lateral line as vertical rows of papillae without supporting internal scales. External body scales absent**. Photophores and luminous tissue absent. Cavernous tissue absent. Ribs present. **Total vertebrae 24 to 27. Colour:** in life, orange-brown, inside mouth and gill cavities red-orange; in preservative, brown.

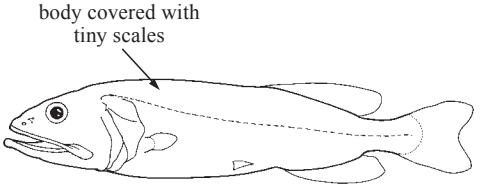


Habitat, biology, and fisheries: Meso- and bathypelagic. Feeds as predator on amphipods and crustaceans. Uncommon deep sea fishes of no commercial importance.

Remarks: One genus with 2 species throughout the world's oceans in tropical and temperate latitudes. A description of the larvae has been published (Paxton et al., 2001).

Similar families occurring in the area

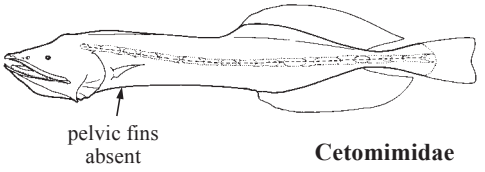
Barbourisiidae: mouth very large with jaws extending far behind eye; head and body covered with tiny scales with central spine giving velvet-like texture; lateral line as tube with moderate pores; live colour bright red-orange.



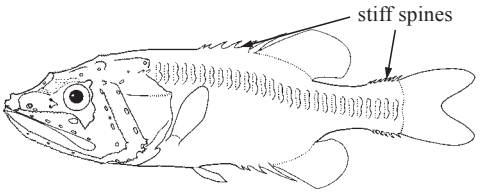
Barbourisiidae

Cetomimidae: pelvic fins absent; mouth extremely large with jaws extending far behind eye; most species with lateral line as broad tube with large pores, only 1 with vertical rows of papillae; ribs absent.

Gibberichthyidae: anterior stiff spines in dorsal, anal, and caudal fins; body covered with scales; colour black.



Cetomimidae



Gibberichthyidae

Key to the species of Rondeletiidae occurring in the area

1a. Vertical rows of lateral line papillae 24 to 26; bony hook over orbit present; large posterior bony extensions of supratemporal or cleithrum absent (Fig. 1) . . . . . ***Rondeletia bicolor***

1b. Vertical rows of lateral line papillae 15 to 19; bony hook over orbit absent; large posterior bony extensions on supratemporal and cleithrum present (Fig. 2) . . . . . ***Rondeletia loricata***

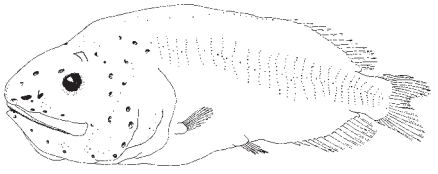


Fig. 1 ***Rondeletia bicolor***

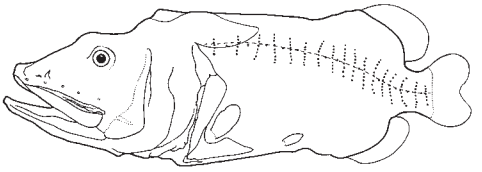


Fig. 2 ***Rondeletia loricata***

List of species occurring in the area

Rondeletia bicolor Goode and Bean, 1895. To 10 cm. Between 40° N and 30° S in 87, 71, W Atlantic 31, 21, 34, 41 and 2 specimens (1 adult, 1 juveniles) in Pacific between 15° and 26° S.

Rondeletia loricata Abe and Hotta, 1963. To 11 cm. Circumglobal 60° N to 50° S, excluding Gulf of Mexico, Caribbean and far NW Atlantic 21.

References

Kotlyar, A.N. 1996. The osteology, intraspecific structure, and distribution of *Rondeletia loricata* (Rondeletiidae). *Vopr. Ikhtiol.*, 36(2):154-168. (In Russian, English transl. *J. Ichthyol.*, 36(3)).

Paxton, J.R. and D.J. Bray. 1986. Family Rondeletiidae. In *Smiths' sea fishes,* edited by M.M. Smith and P.C. Heemstra. Johannesburg, Macmillan South Africa, 434 p.

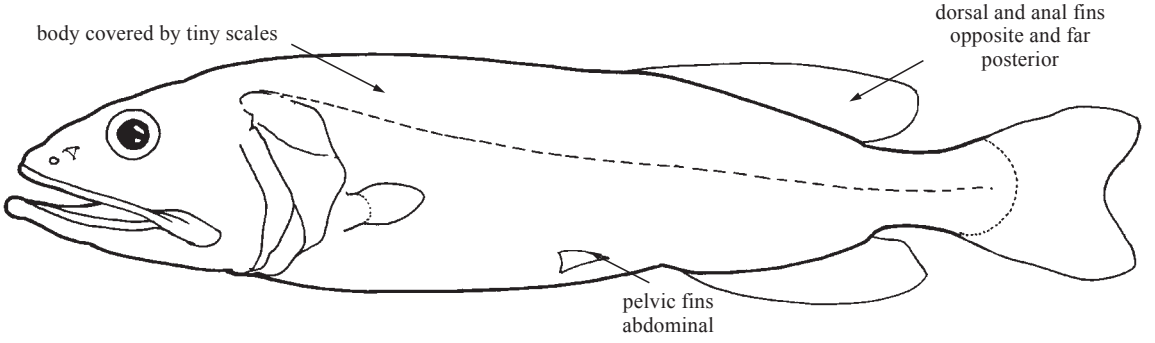
Paxton, J.R., G.D. Johnson, and T. Trnski. 2001. Larvae and juveniles of the deepsea "whalefishes" *Barbourisia* and *Rondeletia* (Stephanoberyciformes: Barbourisiidae, Rondeletiidae), with comments on family relationships. *Rec. Aus. Mus.*, 53:407-425.

BARBOURISIIDAE

Redvelvet whalefish

by J.R. Paxton, Australian Museum, Sydney, Australia

Diagnostic characters: Moderate-sized (to 38 cm standard length) stephanoberyciform fish; **body somewhat flabby**, moderately robust, **whale-shaped with median fins opposite and far posterior**. Head large; mucous cavities on top of head separated by thick ridges and covered by skin. Eye small. Snout very long; nasal organ moderately developed, no skin flap on posterior nostril. **Mouth very large, jaws extending far behind eye, horizontal**. Teeth small and closely set on jaws, vomer, ectopterygoid, and pharyngobranchials; palatine and basibranchials (copula/tongue) lacking teeth. Gill rakers well developed, lath-like. Fins without spines; 1 dorsal fin with 19 to 22 soft rays; anal fin with 15 to 18 soft rays; caudal fin with 19 principal rays; pectoral fins with 13 or 14 rays; **pelvic fins abdominal with 6 soft rays. Lateral line well developed as a broad tube pierced by small pores and supported by internal scales. Body and head covered by small, adherent, non-imbricate scales with a single, central spine giving a velvet-like texture**. Photophores and luminous tissue absent. Cavernous tissue absent. Ribs present. **Total vertebrae 40 to 43. Colour: in life, bright red-orange; in preservative, white.**



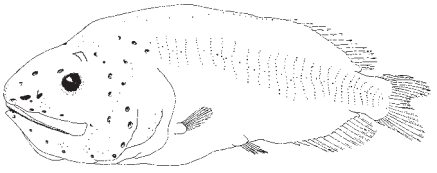
Habitat, biology, and fisheries: Mesopelagic as juveniles, benthopelagic as adults. Feeding mode unknown, presumably as predator on crustaceans. Rare deep sea fish of no commercial importance.

Remarks: One genus and species throughout the world's oceans in tropical and temperate latitudes . A description of the larvae has been published (Paxton et al., 2001).

Similar families occurring in the area

Rondeletiidae: external body scales absent; lateral line as vertical rows of papillae; mouth large, but jaws not extending beyond posterior margin of eye; colour orange-brown in life, brown in preservative.

Cetomimidae: external body scales absent; pelvic fins absent; ribs absent; colour brown or black.



Rondeletiidae



Cetomimidae

List of species occurring in the area

Barbourisia rufa Parr, 1945. To 38 cm SL. Tropical and temperate between 65° N and 40° S Atl, 50° N and S Pacific, 5° to 20° S Indian Ocean.

References

Kotlyar, A.N. 1995. Osteology and distribution of *Barbourisia rufa* (Barbourisiidae). *Vopr. Ikhtiol.,* 35(3):282-289. (In Russian, English transl. *J. Ichthyol.*, 35(6))

Paxton, J.R. and D.J. Bray. 1986. Family Barbourisiidae. In *Smiths' sea fishes*, edited by M.M. Smith and P.C. Heemstra. Johannesburg, Macmillan South Africa, 434 p.

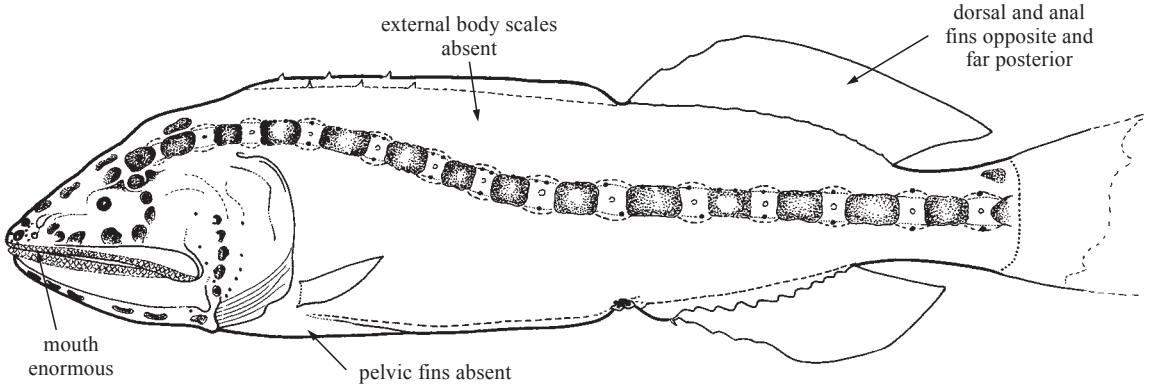
Paxton, J.R., G.D. Johnson, and T. Trnski. 2001. Larvae and juveniles of the deepsea "whalefishes" *Barbourisia* and *Rondeletia* (Stephanoberyciformes: Barbourisiidae, Rondeletiidae), with comments on family relationships. *Rec. Aus. Mus.*, 53:407-425.

CETOMIMIDAE

Whalefishes

by J.R. Paxton, Australian Museum, Sydney, Australia

Diagnostic characters: Small to moderate-sized (to 41 cm standard length) stephanoberyciform fishes; **body soft and flabby**, slender to robust, **whale-shaped with median fins opposite and far posterior. Head very large**; mucous cavities on top of head indistinct and covered by skin in undamaged specimens. Eye tiny and degenerate (small and developed in *Procetichthys*). Snout very long; nasal organ poorly developed (well developed in *Procetichthys*), no skin flap on posterior nostril. **Mouth enormous, jaws extending far behind eye**, horizontal. Teeth tiny and closely set, small and widely spaced, or elongate in well defined, closely set rows; jaws, pharyngobranchials, and **basibranchials (copula/tongue) always with teeth**; vomer, palatine, and ectopterygoid usually with teeth. **Gill rakers club-shaped, or as tooth patches, tooth plates or individual teeth, never lath-like**. Fins without spines; 1 dorsal fin with 13 to 37 soft rays; anal fin with 11 to 34 soft rays; pectoral fins with 15 to 24 rays; **pelvic fins absent; caudal fin with 10 to 19 principal rays. Lateral line very well developed, supported with internal scales; in most as a broad tube pierced by large pores** (*Procetichthys* with vertical rows of lateral-line papillae). **External body scales absent**. Photophores or apparent luminous tissue absent. **Unique cavernous tissue around anus in most species, over base of anal fin and other areas in many species. Ribs absent. Total vertebrae 38 to 59. Colour:** brown or black; in fresh specimens fin rays and inside mouth reddish orange.



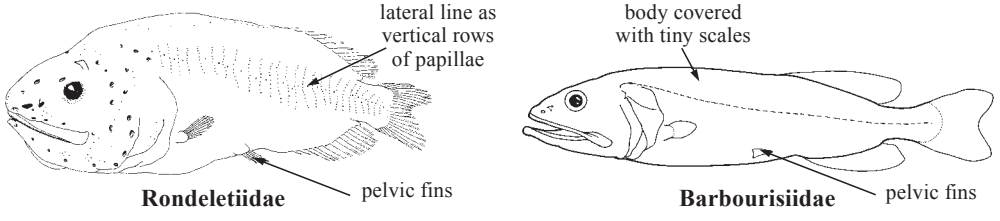
Habitat, biology, and fisheries: Bathypelagic as adults, some may be benthopelagic, some juveniles mesopelagic; larvae unknown. Feeds as predator on crustaceans. Rare deep-sea fishes of no commercial importance.

Remarks: Nine genera with about 35 species (including 15 undescribed) throughout the world's oceans from boreal latitudes to the Antarctic. A revision of *Gyrinomimus* (Paxton, ms) is nearing completion; a revision of *Cetomimus* is in early stages.

Similar families occurring in the area

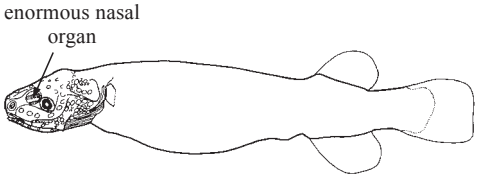
Rondeletiidae: pelvic fins present; lateral line as vertical rows of papillae; jaws not extending beyond posterior margin of eye; ribs present.

Barbourisiidae: pelvic fins present; head and body covered with tiny scales, central spine giving velvet-like texture; ribs present; live colour bright red-orange.

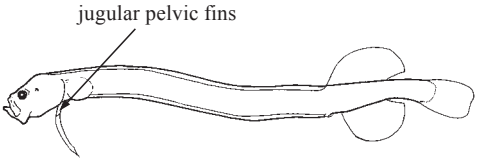


Megalomycteridae: nasal organ enormous; jaws not extending behind eye; pelvic fins present or absent; body scales present or absent; maximum size 7 cm standard length.

Mirapinnidae: jaws not extending behind eye; pelvic fins present; maximum size 5 cm standard length.



Megalomycteridae



Mirapinnidae

Key to the genera of Cetomimidae occurring in the area

1a. Dorsal-fin rays 29 to 37; anal-fin rays 24 to 26; dorsal and anal fins abruptly elevated on bases higher than body; slit of fourth gill arch tiny and tubular, at angle of arch; 3 separate copular tooth plates (Fig. 1) . . . . . ***Cetostoma regani***

1b. Dorsal- and anal-fin rays 12 to 21; dorsal- and anal-fin bases not abruptly elevated above body; slit behind ventral arm of fourth gill arch elongate or absent; 1 copular tooth plate . . . . . → ***2***

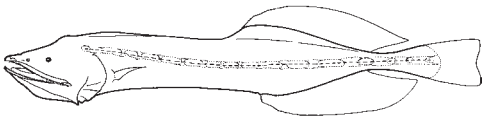


Fig. 1 ***Cetostoma regani***

2a. Free gill arches 4, with elongate slit behind ventral arm of fourth arch present; gill rakers/tooth plates separate and raised, domed to club-shaped; lateral-line scales round to rectangular and flat, without dorsal and ventral projections; vertebrae 38 to 46 . . . . . → ***3***

2b. Free gill arches 3, with slit behind ventral arm of fourth arch absent; gill tooth plates contiguous, fusing with age, and flat; lateral line scales elongate and curved with dorsal and ventral projections supporting lateral-line canal; vertebrae 44 to 59 . . . . . → ***4***



Fig. 2 ***Ditropichthys storeri***

3a. Dorsal-fin rays 19 to 22; vertebrae 38 to 42; lateral-line scales (= pores - 1) 10 to 13; jaw teeth tiny in irregular diagonal rows; gill rakers club-shaped; ventral pharyngeal tooth plate absent (Fig. 2) . . . ***Ditropichthys storeri***

3b. Dorsal-fin rays 14 to 16; vertebrae 43 to 46; lateral line scales 16 to 18; jaw teeth elongate in well-defined longitudinal rows; gill tooth plates round to ellipsoidal, slightly raised; ventral pharyngeal tooth plate present on fifth gill arch . . . . . ***Danacetichthys galathenus***

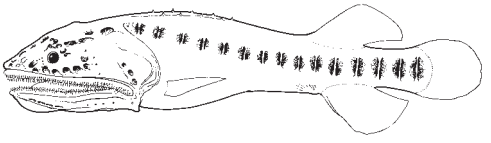


Fig. 3 ***Danacetichthys galathenus***

4a. Jaw teeth in distinct longitudinal rows, all but newest teeth elongate with length more than 3 times basal width; vomerine tooth plate flat and rectangular or oval (Fig. 4) . . . . . ***Gyrinomimus***

4b. Jaw teeth in indistinct diagonal rows, all teeth short with length less than 2 times basal width; vomerine tooth plate domed and round or rarely oval (Fig. 5). . . . . ***Cetomimus***

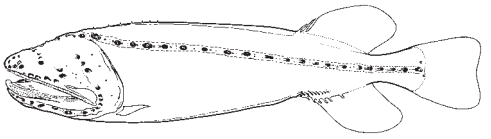


Fig. 4 ***Gyrinomimus***



Fig. 5 ***Cetomimus***

List of species occurring in the area

(all sizes are maximum in centimetres standard length; sizes and ranges incomplete for species of *Cetomimus*)

Cetomimus craneae Harry, 1952. To 8 cm. Recorded only from WC Atlantic 31.

Cetomimus gillii Goode and Bean, 1895. To 11 cm, possibly to 14 cm. Recorded from WC Atlantic 31, ES Pacific 87, and possibly Indian 51.

Cetomimus hempeli Maul, 1969. To 15 cm. Recorded from WC Atlantic 31, EC Atlantic 34.

Cetomimus kerdops Parr, 1934. To 8 cm. Recorded only from WC Atlantic 31.

Cetomimus teevani Harry, 1952. To 10 cm. Recorded only from WC Atlantic 31. Possibly a synonym of *C. craneae*.

Cetostoma regani Zugmayer, 1914. To 25 cm. Circumglobal between 50 N and 40 S.

Danacetichthys galathenus Paxton, 1989. To 5 cm. Presumed circumglobal (except E Pacific) between 30 N and 25 S.

Ditropichthys storeri (Goode and Bean, 1895). To 13 cm. Circumglobal between 45 N and S.

Gyrinomimus bruuni Rofen, 1959. To 22 cm. Circumglobal between 30 N and 10 S.

Gyrinomimus myersi Parr, 1934. To 30 cm. Circumglobal 40 N to 20 S Atlantic, tropics Indian, 40 to 20 N Pacific; *Gyrinomimus simplex* Parr, 1945 (synonym).

Gyrinomimus parri Bigelow, 1961. To 39 cm. WC Atlantic 31, NWPacific 61, SW Pacific 81.

Gyrinomimus sp. nov. R (Paxton, ms). To 41 cm. WC Atlantic 31, 45 to 10 N Pacific.

References

Paxton, J.R. 1989. Synopsis of the whalefishes (family Cetomimidae) with descriptions of four new genera. *Rec. Aust. Mus.*, 41(2):135-206.

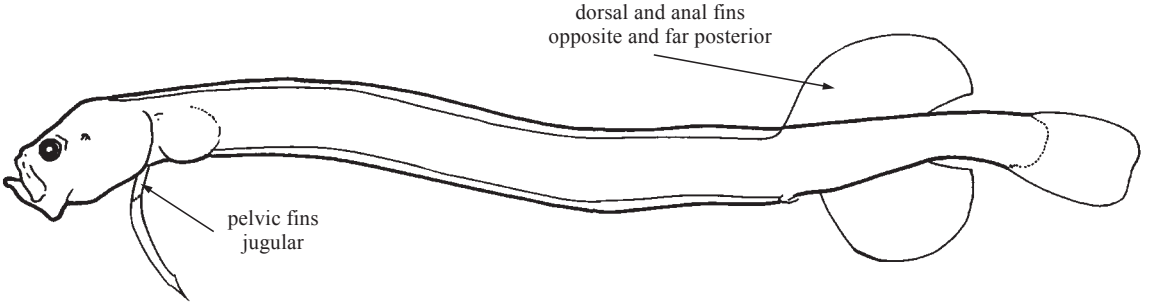
Tolley, S.G., J.V. Gartner, and T.M. Lancraft. 1989. Whalefishes (Beryciformes: Cetomimoidei) of the Gulf of Mexico. *Bull. Mar. Sci.*, 45(3):671-677.

MIRAPINNIDAE

Tapertails (hairyfish)

by J.R. Paxton, Australian Museum, Sydney, Australia

Diagnostic characters: Small (to 5 cm standard length) stephanoberyciform fishes, **body slender to very elongate, with median fins opposite and far posterior**. Head moderate. Eye small to moderate, well developed. Snout moderate; **nasal organ poorly developed**, no skin flap on posterior nostril. **Mouth moderate, jaws not extending behind eye, oblique to subvertical**. Teeth small and closely set in 1 row on premaxillary and several rows on dentary; no teeth on vomer, palatine, ectopterygoid, basihyals (copula/tongue), or pharyngobranchials (all species). Gill rakers lath-like. Fins without spines. One dorsal fin with 16 to 33 soft rays; anal fin with 14 to 29 soft rays; caudal fin with 19 principal rays; pectoral fins with 13 to 24 rays; **pelvic fins jugular with 4 to 10 soft rays; caudal streamer longer than body in larvae. Lateral line absent or a line of organs on projections of the skin. Scales absent. Body of one covered with dense, hair-like papillae about 1 to 1.5 mm long (*Mirapinna*)**; others with minute papillae about 0.05 mm long. Photophores and luminous tissue absent. Cavernous tissue absent. Ribs absent. Total vertebrae 42 to 55. **Colour:** brown, black, or transparent.



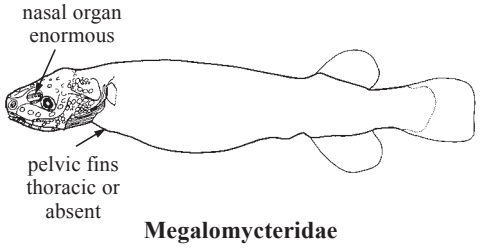
Habitat, biology, and fisheries: Larvae and juveniles epipelagic; mature adults unknown, perhaps mesopelagic. Feed as zooplankton pickers on copepods. Rare oceanic fishes of no commercial importance.

Remarks: Three genera with 6 species (1 undescribed) throughout the world's oceans in tropical and subtropical latitudes. A revision is needed, but no mature adults, or even specimens with gonads in good condition, are available.

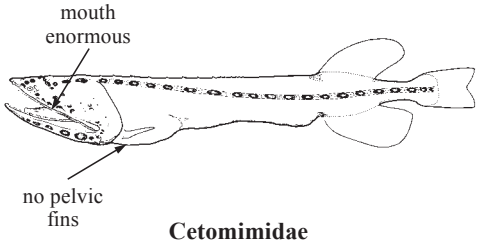
Similar families occurring in the area

Megalomycteridae: nasal organ enormous; pelvic fins thoracic with 1 to 3 rays, or absent; scales present in some; no skin papillae or caudal streamer.

Cetomimidae: pelvic fins absent; mouth enormous, jaws extending far behind eye.



Megalomycteridae



Cetomimidae

Key to the species of Mirapinnidae occurring in the area

1a. Pelvic-fin rays 4 or 5; dorsal-fin rays 16 to 20; anal-fin rays 15 to 18 (Fig. 1) . ***Eutaeniophorus festivus***

1b. Pelvic-fin rays 9 or 10; dorsal-fin rays 28 to 33; anal-fin rays 23 to 29 (Fig. 2) . . . . . ***Parataeniophorus gulosus***



Fig. 1 ***Eutaeniophorus festivus***

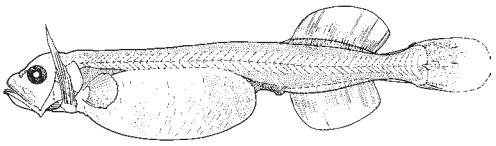


Fig. 2 ***Parataeniophorus gulosus***

List of species occurring in the area

Eutaeniophorus festivus (Bertelsen and Marshall, 1956). To 5 cm. All oceans between 35°N and 25°S excluding E Pacific.

Parataeniophorus gulosus Bertelsen and Marshall, 1956. To 3.5 cm. Between 45° and 20°N in N Atlantic 31, 34, 27 and between 0° and 25°SW Indian 51.

References

Bertelsen, E. 1986. Family Mirapinnidae. In *Smiths' sea fishes*, edited by M.M. Smith and P.C. Heemstra. Johannesburg, Macmillan South Africa, pp. 406-407.

Bertelsen, E. and N.B. Marshall, 1984. Mirapinnatoidei: development and relationships. In Ontogeny and systematics of fishes, edited by H.G. Moser, W.J. Richards, D.M. Cohen, M.P. Fahay, A.W. Kendall, Jr., and S.L. Richardson. *Amer. Soc. Ichth. Herp. Spec. Publ.*, (1):380-383.

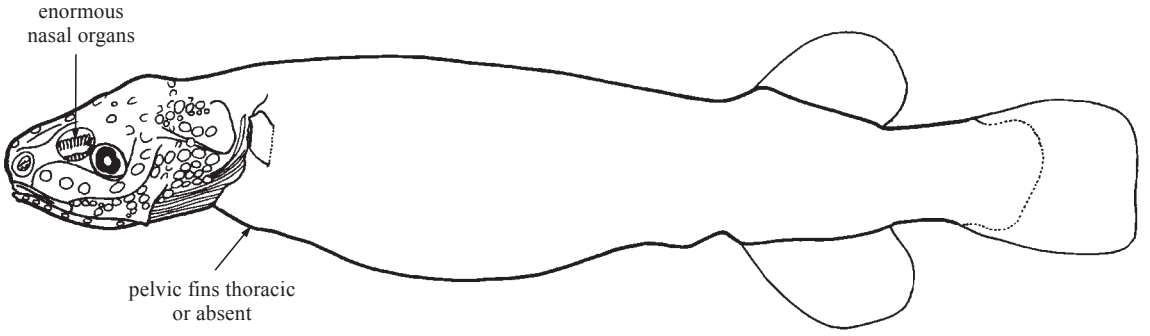
Herrera, G.A. and R.J. Lavenberg. 1995. Record of a larval *Parataeniophorus brevis* from Hawaii. *J. Fish. Biol.*, 46:908-911.

MEGALOMYCTERIDAE

Bignose fishes

by J.R. Paxton and T. Trnski, Australian Museum, Sydney, Australia

Diagnostic characters: Small (to 7 cm standard length) stephanoberyciform fishes, **body elongate, with median fins opposite and far posterior**. Head moderate. Eye small to moderate, often degenerate. Snout elongate to very large; **nasal organ enormous, covering much of snout**; posterior nostril without skin flap. **Mouth moderate, jaws not extending behind eye**, horizontal to somewhat oblique. Teeth small and closely set in 1 to several rows on premaxillary and dentary; teeth present or absent on vomer, absent on palatine, ectopterygoid, basihyals (copula/tongue), and pharynogbranchials (all species). Gill rakers poorly developed, few in number. Fins without spines. One dorsal fin with 15 to 31 soft rays; anal fin with 13 to 29 soft rays; caudal fin with 16 principal rays; pectoral fins with 18 to 23 rays; **pelvic fins thoracic with 1 to 3 soft rays, or absent. Lateral line poorly developed or condition unknown. Body scales small to moderate**, imbricate or **non-imbricate, cycloid, or absent**. Photophores and luminous tissue absent. Cavernous tissue absent. **Ribs absent. Total vertebrae 41 to 55. Colour:** brown, black, or unknown.



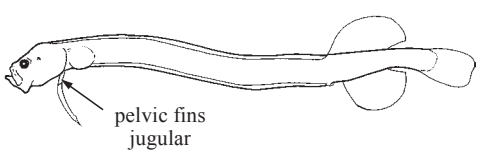
Habitat, biology, and fisheries: Meso- and bathypelagic. Feeds as zooplankton picker on copepods. All specimens histologically examined (more than 20) are males. Very rare deep-sea fishes of no commercial importance.

Remarks: Three or 4 genera (*Ataxolepis* may be synonymous with *Vitiaziella*) with 7 or 8 species (3 undescribed) throughout the world's oceans in tropical and subtropical latitudes. A needed revision has begun, but no females are known, nor is fresh or alcohol-only preserved tissue available to determine DNA relations.

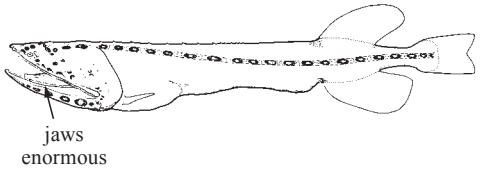
Similar families occurring in the area

Mirapinnidae: nasal organ poorly developed; pelvic fins jugular with 4 to 10 rays.

Cetomimidae: jaws extending far behind eye; lateral line well developed; all but one species with poorly developed nasal organs.



Mirapinnidae



Cetomimidae

Key to the species of Megalomycteridae occurring in the area

1a. Pelvic fins with 3 long rays; scales present only on body between dorsal and anal fins and caudal peduncle; eyes small to moderate, but well developed; lateral line of head weakly developed; mouth strongly oblique (Fig. 1). . . . . ***Megalomycter teevani***

1b. Pelvic fin with 0 or 1 ray; scales (usually lost) on head and body; eyes small and degenerate; lateral line of head well developed; mouth nearly horizontal. . . . . → ***2***

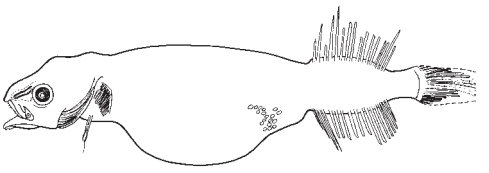


Fig. 1 ***Megalomycter teevani***

2a. Dorsal-fin rays 29 to 31; anal-fin rays 25 to 29 (rarely 20); anal-fin origin under dorsal-fin ray 4 to 6 (Fig. 2) . . . . . ***Cetomimoides parri***

2b. Dorsal fin rays 15 to 18; anal-fin rays 13 to 19; anal-fin origin under dorsal-fin ray 1 to 4 (Fig. 3) . . . . . ***Ataxolepis apus***

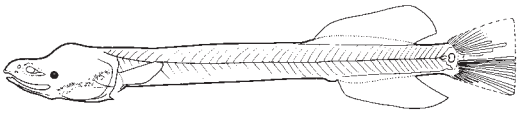


Fig. 2 ***Cetomimoides parri***

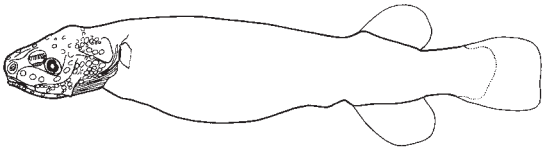


Fig. 3 ***Ataxolepis apus***

List of species occurring in the area

Ataxolepis apus Myers and Freihofer, 1966. To 6 cm. Recorded from WC Atlantic 31, EC Atlantic 34, possibly WC Pacific 71, unpublished records from NW Atlantic 21, SW Atlantic 41, SE Pacific 87, EC Pacific 77, and NW Pacific 61.

Cetomimoides parri Koefoed, 1955. To 4 cm. Recorded from EC Atlantic 34, unpublished records from WC Atlantic 31, WS Atlantic 41, and WC Pacific 71 (4 specimens examined, Paxton and Trnski, ms).

Megalomycter teevani Myers and Freihofer, 1966. To 3 cm. Known only from the holotype from WC Atlantic 31.

References

Becker, V.E. 1981. On the first record of a rare bathypelagic fish from the genus *Ataxolepis* (Megalomycteridae) in the Southern Hemisphere. *Vopr. Ikhtiol.*, 21(3):558-561. (in Russian, English transl. *J. Ichthyol.*, 21(3)).

Myers, G.S. and W. Freihofer. 1966. Megalomycteridae, a previously unrecognized family of deep-sea cetomimiform fishes based on two new genera from the North Atlantic. *Stan. Ichthy. Bull.*, 8(3):193-206.

Swinney, G.N. 1991. The first record of the rare deep-sea family Megalomycteridae (Lampriformes) from the north-eastern Atlantic. *J. Fish Biol.*, 38:839-843.

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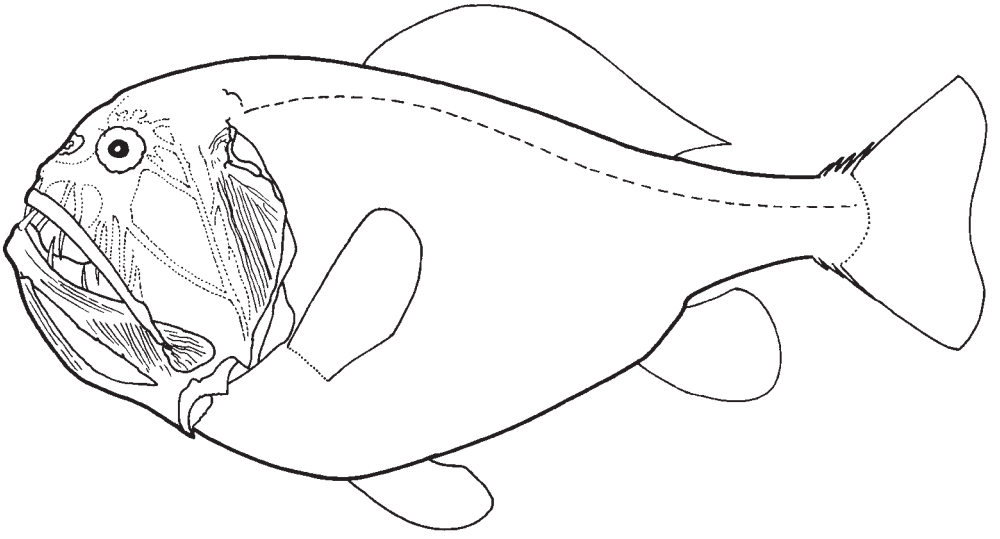
Order BERYCIFORMES

ANOPLOGASTRIDAE

Fangtooths (ogrefish)

by J.A. Moore, Florida Atlantic University, USA

Diagnostic characters: Small (to about 160 mm standard length) beryciform fishes. Body short, deep, and compressed, tapering to narrow peduncle. Head large (1/3 standard length). **Eye smaller than snout length in adults**, but larger than snout length in juveniles. **Mouth very large and oblique, jaws extend behind eye in adults; 1 supramaxilla**. Bands of villiform teeth in juveniles are replaced with **large fangs on dentary and premaxilla in adults**; vomer and palatines toothless. Deep sensory canals separated by serrated ridges; very large parietal and preopercular spines in juveniles of one species, all disappearing with age. **Gill rakers as clusters of teeth on gill arch in adults** (lath-like in juveniles). **No true fin spines; single, long-based dorsal fin with 16 to 20 rays; anal fin very short-based with 7 to 9 soft rays**; caudal fin emarginate; pectoral fins with 13 to 16 soft rays; pelvic fins with 7 soft rays. **Scales small, non-overlapping, spinose, goblet-shaped in adults; lateral line an open groove partially bridged by scales**; no enlarged ventral keel scutes. **Colour:** entirely dark brown or black in adults.



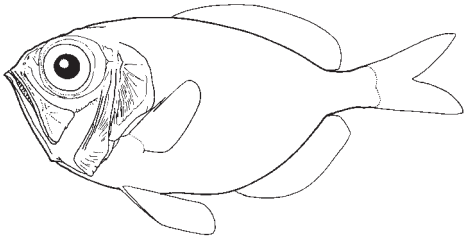
Habitat, biology, and fisheries: Meso- to bathypelagic, at depths of 75 to 5 000 m. Carnivores, with juveniles feeding on mainly crustaceans and adults mainly on fishes. May sometimes swim in small groups. Uncommon deep-sea fishes of no commercial importance.

Remarks: The family was revised recently by Kotlyar (1986) and contains 1 genus with 2 species throughout the tropical and temperate latitudes.

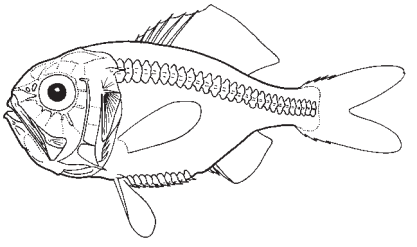
Similar families occurring in the area

Diretmidae: no fangs; anal fin long-based, with 18 to 24 rays; ventral keel scutes.

Trachichthyidae: no fangs; spines in dorsal and anal fins; ventral keel scutes.



Diretmidae



Trachichthyidae

Key to the species of Anoplogastridae occurring in the area

The species *Anoplogaster brachycera* has so far only been identified from juveniles, no specimens larger than 60 mm standard length have been recognized. Some adults currently identified as *A. cornuta* may eventually be reidentified as *A. brachycera* once a method for distinguishing adults has been determined.

1a. Parietal and preopercular spines very long in young juveniles (e.g. parietal 26 to 31% standard length and preopercular 31% standard length in a 19 mm standard length specimen, Fig. 1), but becoming relatively shorter with age (parietal 8 to 9% standard length and preopercular 7 to 8% standard length in 57 mm standard length specimen) . . . ***Anoplogaster cornuta***

1b. Parietal and preopercular spines very short in young juveniles (e.g. parietal 5% standard length and preopercular 3.4% standard length in a 20 mm standard length specimen, (Fig. 2), and becoming even shorter with age (parietal and preopercular both 1.7% standard length in 60 mm standard length specimen) . . . . . ***Anoplogaster brachycera***

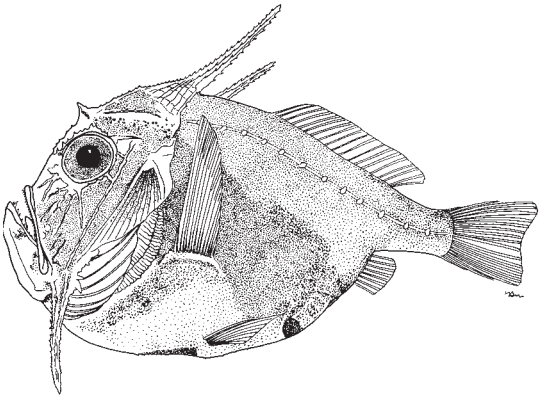


Fig. 1 ***Anoplogaster cornuta***

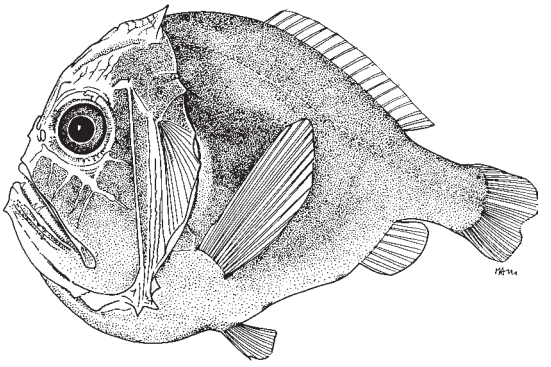


Fig. 2 ***Anoplogaster brachycera***

List of species occurring in the area

Anoplogaster brachycera Kotlyar, 1986. 60 mm SL. Areas 31, SW21, W71.
Anoplogaster cornuta (Valenciennes, 1833). 160 mm SL. Tropical and temperate worldwide.

Reference

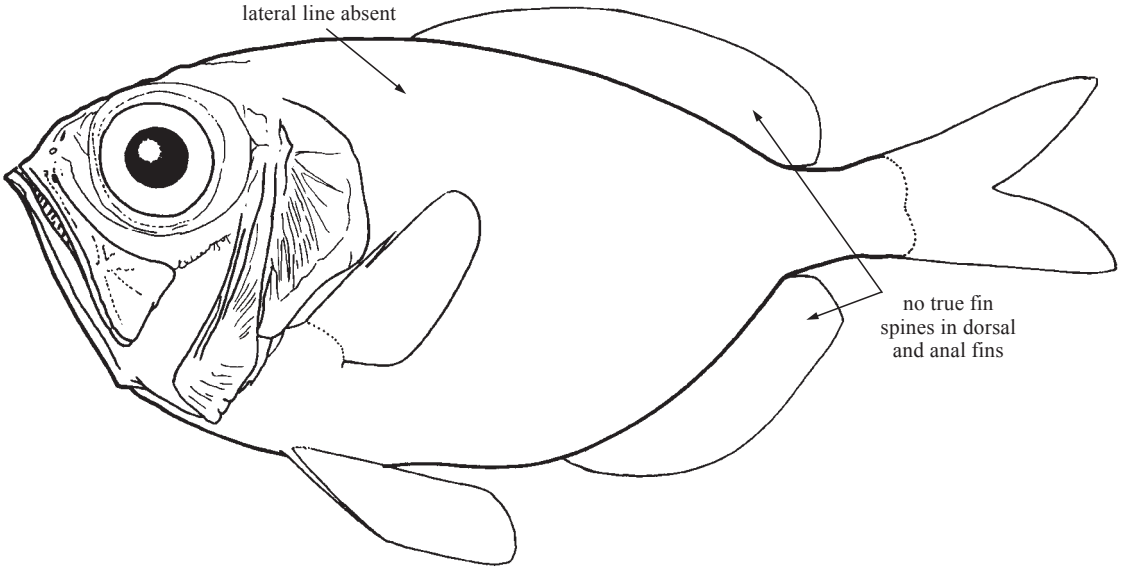
Kotlyar, A. N. 1986. Classification and distribution of fishes of the family Anoplogastridae. *Vopr. Ikhtiol.*, 26(4):531-551. [in Russian, English translation *J. Ichthyol.*, 26(4):133-152].

DIRETMIDAE

Spinyfins (discfishes)

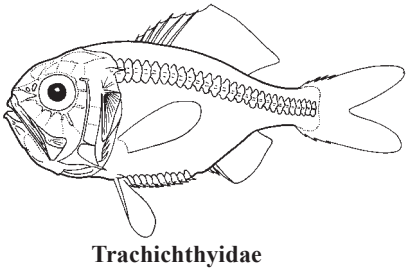
by J.A. Moore, Florida Atlantic University, USA

Diagnostic characters: Moderate-sized (to about 370 mm standard length) beryciform fishes. Body round to oval, strongly laterally compressed. Head moderate to large; deep sensory canals separated by thin serrated ridges and covered with membranous skin; no spine on preopercle in adults. **Eye very large, much longer than snout length**. Mouth large and oblique, jaws not extending behind eye; 1 supramaxilla. Teeth small, in villiform bands, on premaxilla and dentary, vomer and palatine toothless. **No true fin spines in dorsal or anal fins, soft rays with rows of very small spinules (hence spinyfins); dorsal- and anal-fin membranes have small roundish "windows" between bases of more posterior rays**; single dorsal fin very long based, with 23 to 30 soft rays; anal fin with 18 to 24 soft rays; caudal fin forked; pectoral fins with 16 to 20 soft rays; pelvic fins with 1 flattened serrate spine and 6 soft rays. Scales small and spinose; **enlarged scales along midventral line, forming an abdominal keel of spiny scutes. Lateral line absent**. Total number of vertebrae 26 to 32. **Glandular tissue found beneath gill cover, posteroventral to last gill arch**. Juveniles up to 1.5 cm have prominent spines on preopercle and parietals. **Colour:** silvery or greyish black.



Habitat, biology, and fisheries: Meso- and bathypelagic, adults found from 200 to 2 100 m; larger adults of some species benthopelagic. Reportedly feed on small planktonic crustaceans. Uncommon deep sea fishes occasionally taken in trawls, sometimes locally abundant. No present commercial importance.

Remarks: Small family of 3 genera with 4 species, found in tropical to temperate waters worldwide. The most recent reviews are by Post and Quero (1981) and Kotlyar (1988, 1996).



Trachichthyidae

Similar families occurring in the area

Trachichthyidae: dorsal and anal fins with spines; lateral line present.

Key to the species of Diretmidae occurring in the area

1a. Anus immediately anterior to anal fin; series of keeled scutes along ventral midline anterior to pelvic fins; 7 to 20 bony ridges on upper half of operculum; body profile round . . . ***Diretmus argenteus***

1b. Anus midway between pelvic and anal fins (separated from anal fin by at least 5 scutes); no series of keeled scutes along ventral midline anterior to pelvic fins; 3 to 6 bony ridges on upper half of operculum; body profile elliptical in adults . . . . . → *2*

2a. Tips of pelvic fins extend to or beyond anal-fin origin; 26 to 30 (usually 27 or 28) soft dorsal-fin rays; 18 to 20 rakers on first gill arch . . . . . ***Diretmichthys parini***

2b. Tips of pelvic fins do not extend to anal-fin origin; 24 to 26 (usually 25) soft dorsal-fin rays; 12 to 16 rakers on first gill arch . . . . . ***Diretmoides pauciradiatus***

List of species occurring in the area

Diretmichthys parini (Post and Quéro, 1981). 370 mm SL. Tropical and temperate worldwide.

Diretmoides pauciradiatus (Woods, in Woods and Sonoda 1973). 140 mm SL. Tropical and temperate worldwide.

Diretmus argenteus Johnson, 1864. 110.5 mm SL. Tropical and temperate worldwide.

References

Kotlyar, A. N. 1988. Classification and distribution of fishes of the family Diretmidae (Beryciformes). *J. Ichthyol.*, 28(2): 1-15.

Kotlyar, A. N. 1996. *Beryciform fishes of the world*. Moscow, VNIRO Publishing, 368 p. [in Russian]

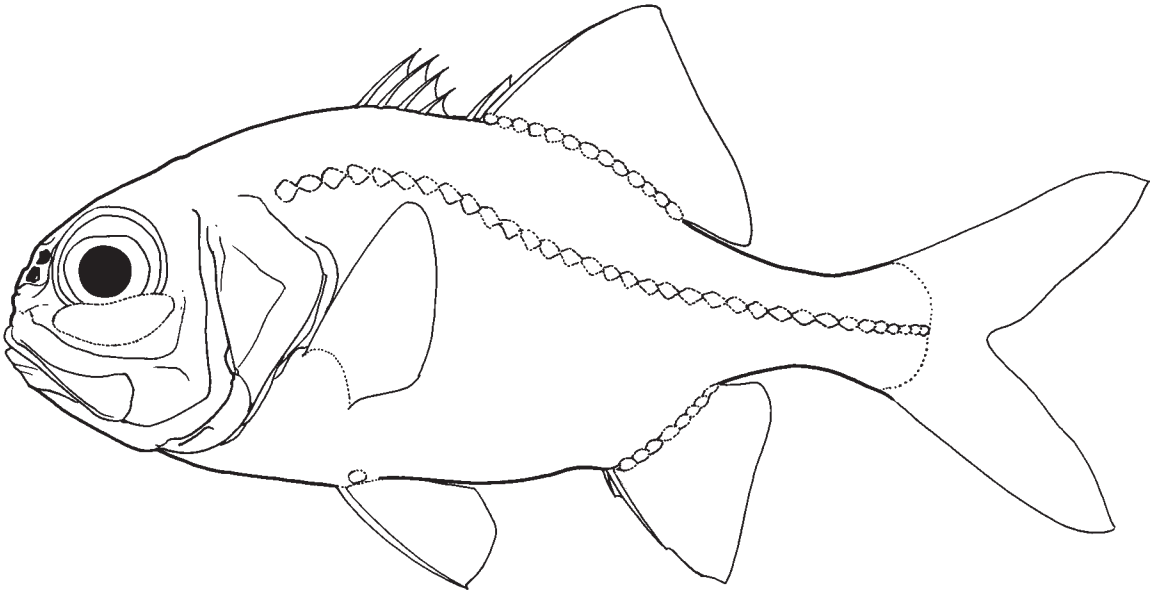
Post, A. and J. C. Quero. 1981. Revision des Diretmidae (Pisces, Trachichthyoidei) de L'Atlantique avec description d'un nouveau genre et d'un nouvelle espece. *Cybium*, 5(1):33-60.

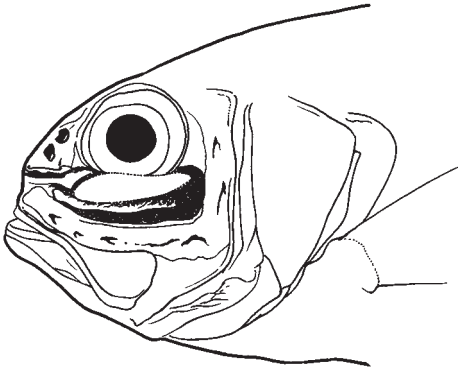
ANOMALOPIDAE

Flashlight fishes

by J.A. Moore, Florida Atlantic University, USA

Diagnostic characters: Small beryciform fishes (to 110 mm standard length); moderately deep-bodied, 34 to 40% standard length. Head moderate-sized; sensory canals on top of head separated by broad ridges and covered by skin; no preopercular spine. **Eye large, its diameter longer than snout length; large bacterial light organ below eye, black membranous shutter can be raised to cover light organ**. Snout short and somewhat blunt. Mouth oblique and moderate-sized, posterior end of maxilla reaching to midline of eye; 2 supramaxillae. Teeth small and conical on jaws and palatines, vomer toothless. Branchiostegal rays 8. Gill rakers 6 or 7 on upper limb and 18 to 20 on lower limb of first gill arch. **Two dorsal fins, first dorsal fin with 4 spines, second dorsal fin with 2 spines and 14 soft rays, second dorsal fin twice as high as first dorsal fin**; anal fin with 2 spines and 10 soft rays; caudal fin deeply forked with 9 principal rays in upper lobe and 10 principal rays in lower lobe; pectoral fins with 16 or 17 soft rays; pelvic fins with 1 spine and 6 soft rays. Scales small, strongly spinoid; enlarged, pored lateral-line scales 32 to 34, lateral body scale rows about 140, midventral scutes 7 to 9. Vertebral column with 15 precaudal and 14 caudal (total 29) vertebrae. **Colour: body, head, and pectoral fins black; lateral-line scales, ventral scutes, and enlarged scales at bases of second dorsal and anal fins white**. In life, the white scales and distal margins of dorsal, anal, caudal, and pelvic fins are light reflective. The light organ emits blue-green light in life and is pale in preserved specimens.





lateral view of head with shutter partially covering light organ

Habitat, biology, and fisheries: Nocturnal reef fish, day spent in caverns in the deep reef (>100 m), at night ascending to shallower waters (27 to 76 m). Swims close to substrate, momentarily covering light organ when changing direction. Feeds on small shrimps and copepods. Apparently uses light organ to search for prey. Ripe females found January to April. Of no importance to fisheries.

Remarks: Seven species in 6 genera, distributed in the Caribbean, eastern Pacific, South Pacific islands, western Pacific, Red Sea, and western Indian Ocean. Most recent review of the family is in Baldwin et al. (1997) and redescription of the sole Atlantic species is by Colin et al. (1979). Fin ray, gill raker, and scale counts given above are for the Atlantic species only.

Similar families occurring in the area

The conspicuous light organ below the eye is unique to this family and distinguishes this fish from all other families in the area.

List of species occurring in the area

Kryptophanaron alfredi Silvester and Fowler, 1926. To 110 mm SL. Likely widespread in the Carib., currently known off the Cayman Is., Puerto Rico, Curaçao, Virgin Is., and S of Kingston, Jamaica.

References

Baldwin, C. C., G. D. Johnson, and J. R. Paxton. 1997. *Protoblepharon rosenblatti*, a new genus and species of flashlight fish (Beryciformes: Anomalopidae) from the tropical South Pacific, with comments on anomalopid phylogeny. *Proc. Biol. Soc. Wash*. 110(3):373-383.

Colin, P. L., D. W. Arneson, and W. F. Smith-Vaniz. 1979. Rediscovery and redescription of the Caribbean anomalopid fish *Kryptophanaron alfredi* Silvester and Fowler (Pisces: Anomalopidae). *Bull. Mar. Sci*. 29(3):312-319.

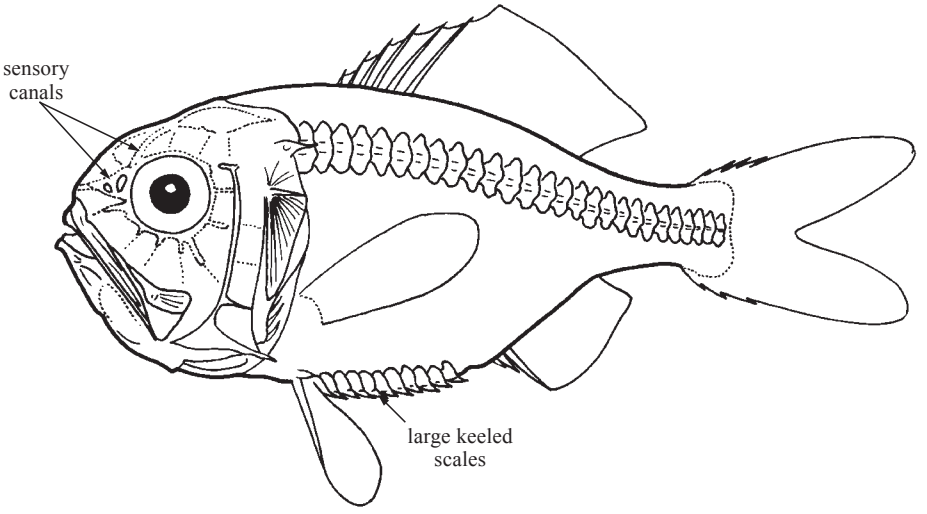
McCosker, J. E. and R. H. Rosenblatt. 1987. Notes on the biology, taxonomy, and distribution of flashlight fishes (Beryciformes: Anomalopidae). *Japan. J. Ichthyol*. 34(2):157-164.

TRACHICHTHYIDAE

Slimeheads (roughies)

by J.A. Moore, Florida Atlantic University, USA

Diagnostic characters: Medium-sized (to about 600 mm standard length, commonly to 200 mm) beryciform fishes; body oval, laterally compressed. Head large. Eyes moderate to large in diameter. Snout rounded, pair of anteriorly pointing rostral spines in *Gephyroberyx* and some *Hoplostethus*. Mouth large and obliquely angled when closed; **1 supramaxilla**. Teeth small, in villiform bands on jaws, present or absent on vomer, present on palatines. **Extensive sensory canals separated by spinous ridges and covered with membranous skin; flat, triangular spine on preopercle. One dorsal fin with 3 to 8 striated spines and 12 to 18 soft rays**; anal fin with 2 to 3 spines and 8 to 12 soft rays; caudal fin forked with 4 to 8 procurrent spines in upper and lower lobes; pectoral fins with 11 to 20 rays; pelvic fins with 1 spine and 6 rays. Scales thick and spinoid or thin and cycloid, adherent to deciduous. **Large keeled scales along midventral belly between pelvic and anal fins, forming row of well-developed scutes in most species. Colour:** generally reddish orange, pinkish, or dusky silver.

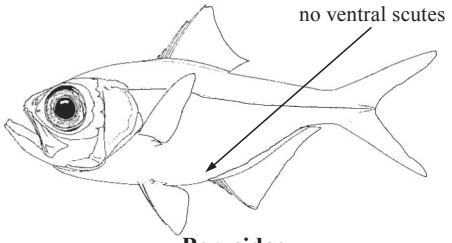


Habitat, biology, and fisheries: Occurring near the bottom over deeper parts of continental shelf, upper slope, and around seamounts at depths of 75 to more than 1 500 m, although most species are found in less than 750 m. Diets consist of mostly mesopelagic shrimp, small fishes, and squid. Some species are known to be locally abundant in feeding or spawning aggregations. Little known about reproduction or age and growth. Usually caught in bottom or pelagic trawls. Fisheries exist for orange roughy (*Hoplostethus atlanticus*) in the Atlantic off Namibia, west of Britain, and along the northern Mid Atlantic Ridge; fisheries also exist off New Zealand and Australia in the Pacific. However, recruitment in that species appears to be low and aggregations can be quickly depleted. Maximum age for orange roughy is reported at over 125 years.

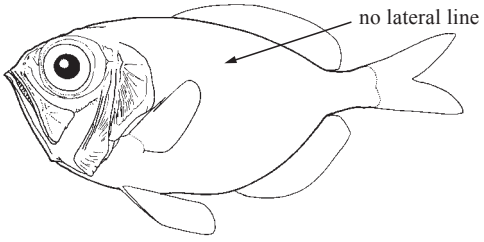
Similar families occurring in the area

Berycidae: 2 supramaxillae; base of dorsal fin shorter than that of anal fin; pelvic fins with 9 to 13 soft rays; ventral scutes absent.

Diretmidae: no spine on preopercle; no lateral line; no true spines in dorsal or anal fins.



Berycidae



Diretmidae

Key to the species of Trachichthyidae occurring in the area

1a. Striated areas along isthmus, before pectoral-fin base and over abdominal scutes and anal fin (Fig. 1); anus between pelvic fins, dark ring-like structure surrounds anus; abdominal scutes between anus and anal fin (Fig. 2); no enlarged predorsal scales . . . . . ***Aulotrachichthys argyrophanus***

1b. No striated areas on body; anus just anterior to anal fin; abdominal scutes between pelvic fins and anus (Fig. 3); scales in midline between skull and dorsal-fin origin slightly enlarged to form predorsal keel . . . . . → ***2***

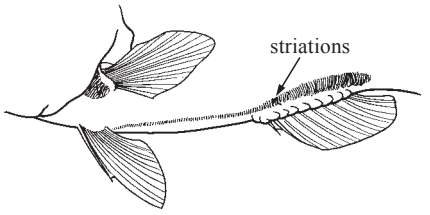


Fig. 1 lateral view
Aulotrachichthys argyrophanus

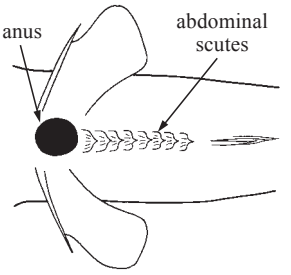


Fig. 2 ventral view
Aulotrachichthys argyrophanus

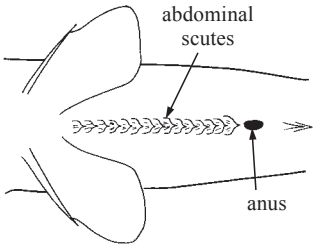


Fig. 3 ventral view

2a. Dorsal fin with 8 (very rarely 7) spines; lateral-line scales only slightly larger than surrounding body scales with a small flat triangular spine on each lateral-line scale (Fig. 4); prominent spine on opercle extending beyond posterior edge of opercle . . . . . ***Gephyroberyx darwini***

2b. Dorsal fin with 4 to 7 spines; lateral-line scales much larger than surrounding body scales and diamond-shaped (Fig. 5), no spine on each lateral-line scale; no prominent spine extending beyond posterior edge of opercle . . . . . → ***3***

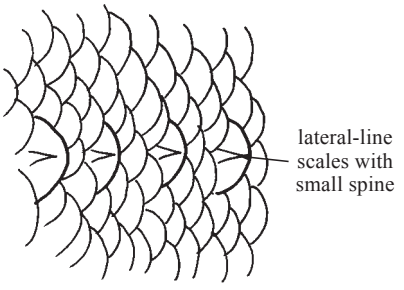


Fig. 4 lateral-line scales

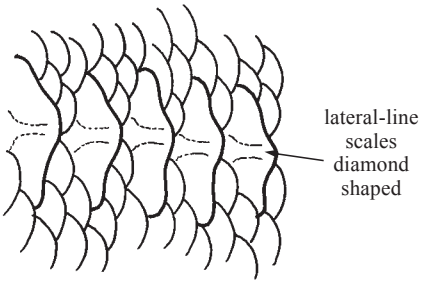


Fig. 5 lateral-line scales

3a. Dorsal-fin soft rays 15 to 18; anal-fin soft rays 10 to 12 (usually 11); pectoral-fin rays 17 to 20 (usually 19); ventral keel scutes smaller, 13 to 20 or even indistinct in some specimens . . . . . ***Hoplostethus atlanticus***

3b. Dorsal-fin soft rays 12 to 14; anal-fin soft rays 8 to 10; pectoral-fin rays 14 to 16; ventral keel scutes 8 to 17 and always distinctly enlarged . . . . . → ***4***

4a. Anal-fin soft rays 9 or 10 (usually 10); abdominal scutes 8 to 12 (usually 9 to 11); upper gill rakers 7 or 8, total number of gill rakers 23 to 26; widespread silvery areas on lower jaw, cheek, gill cover, abdomen, and flank below lateral line . . . . . ***Hoplostethus mediterraneus***

4b. Anal-fin soft rays 8 to 10 (usually 9); abdominal scutes 10 to 17 (usually 11 to 16); upper gill rakers 5 or 6, total number of gill rakers 18 to 22; no widespread silvery areas on jaw, cheek, gill cover, abdomen, or lower sides . . . . . ***Hoplostethus occidentalis***

List of species occurring in the area

The symbol is given when species accounts are included.

Aulotrachichthys argyrophanus (Woods, 1961).

Gephyroberyx darwinii (Johnson, 1866).

Hoplostethus atlanticus Collett 1889.
Hoplostethus mediterraneus Cuvier, 1829.
Hoplostethus occidentalis Woods, in Woods and Sonoda 1973.

References

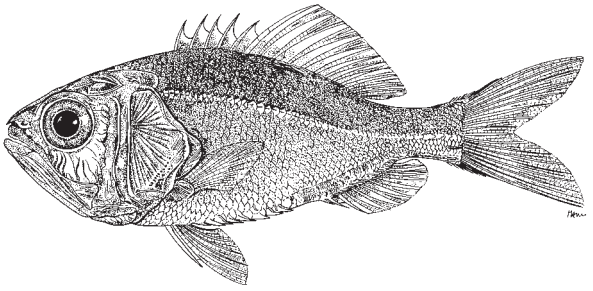
Kotlyar, A.N. 1996. *Beryciform fishes of the world oceans*. Moscow, VNIRO Publishing, 368 p. [in Russian].

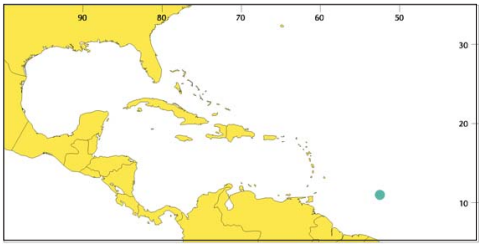
Woods, L.P. and P. Sonoda. 1973. Order Berycomorphi (Beryciformes). In: Fishes of the Western North Atlantic. *Mem. Sears Found. Mar. Res.*, 1(6):263-396.

Aulotrachichthys argyrophanus (Woods, 1961)

En - Western luminous roughy.

Maximum size to 75 mm standard length; common to 45 mm. Originally described from edge of the shelf near the mouth of Amazon River. Larvae are found in our area over 1 seamount and adult populations may possibly occur there and along the continental slope of South America or the Lesser Antilles. Of no commercial importance.

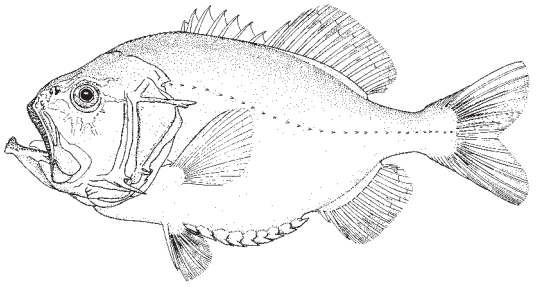


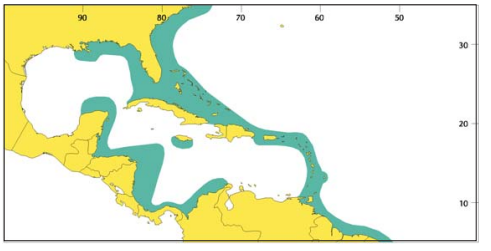


Gephyroberyx darwinii (Johnson, 1866) GXW

En - Darwin's slimehead, (AFS: Big roughy); **Fr** - Hoplostète de Darwin; **Sp** - Reloj de Darwin.

Maximum size to 480 mm standard length; common to 250 mm. Known throughout the area from slopes of continents and islands in Caribbean, Gulf of Mexico, and southeastern USA between depths of 73 and 640 m. Reportedly found over hard bottoms. Taken occasionally in trawls. Similarity in size to orange roughy and potential for aggregations could make this a target for deep-water fisheries.

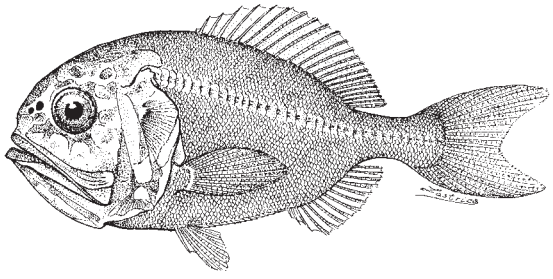


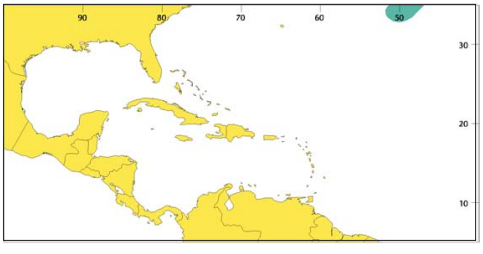


Hoplostethus atlanticus Collett 1889 ORY

En - Orange roughy; **Fr** - Hoplostète orange; **Sp** - Reloj anaranjado.

Maximum size to 600 mm standard length; commonly to 450 mm. Only known in our area from Corner Rise Seamounts, but could potentially be found around higher elevations along Mid-Atlantic Ridge. Benthopelagic, aggregating near high-relief topographic features at depths of 500 to 1 500 m or more. Caught in trawls. Commercial catches to the west of Britain by French vessels peaked in 1992 at 4 462 t, but have since declined to 1 300 t in 1997. Iceland landed 800 t in 1997 from the Mid-Atlantic Ridge south of that island.

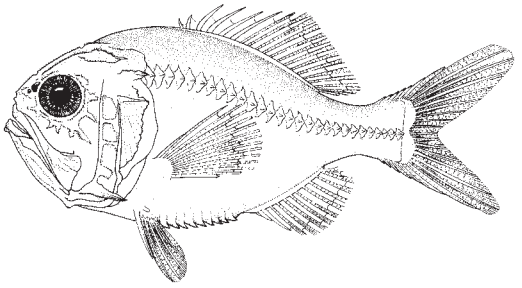


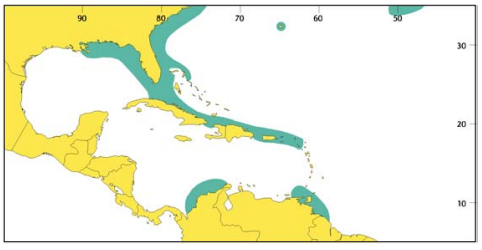


Hoplostethus mediterraneus Cuvier, 1829 HPR

En - Mediterranean slimehead (AFS: Silver roughy); **Fr** - Hoplostète argenté; **Sp** - Reloj mediterráneo.

Maximum size reportedly 420 mm standard length; common 100 to 200 mm. Uncommon in northern Gulf of Mexico and Caribbean, more common along southeast coast of USA. Also known from Bermuda and Corner Rise Seamounts. Living near bottom in deep water, from 100 to 950 m depth. Taken as bycatch in Russian trawl fishery for slender alfonsino in vicinity of Corner Rise Seamounts.

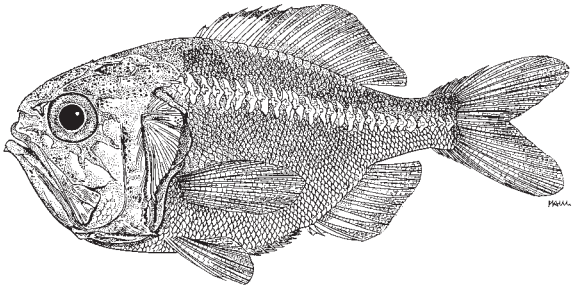


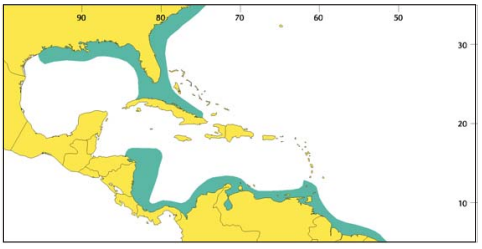


Hoplostethus occidentalis Woods, in Woods and Sonoda 1973

En - Western roughy; **Sp** - Reloj occidental.

Maximum size to 173 mm standard length; common to 120 mm. More common around northern South America, in Caribbean, and in Gulf of Mexico, rarer along southeastern USA. Living near bottom along slopes at depths of 150 to 550 m. Of no commercial importance.



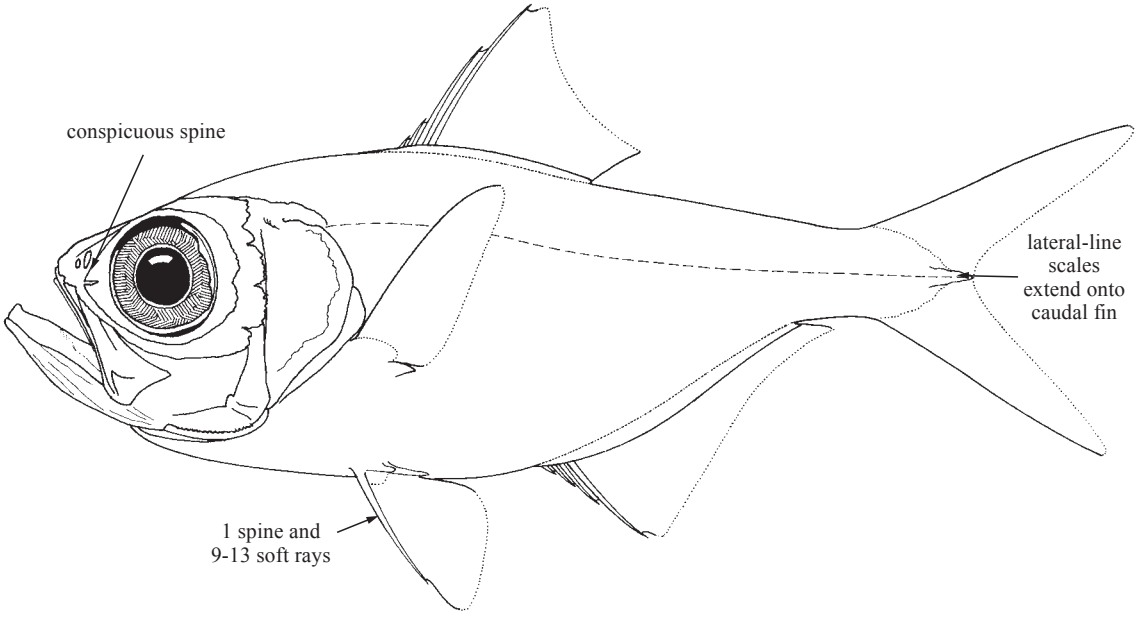


BERYCIDAE

Alfonsinos

by J.A. Moore, Florida Atlantic University, USA

Diagnostic characters: Moderate-sized (to about 550 mm standard length) beryciform fishes. Body oval, moderately deep to very deep, compressed. Head moderately large. Eyes very large, its diameter greater than snout length. Mouth large, oblique, jaws not reaching posterior margin of eye; maxilla expanded posteriorly; **2 supramaxillae**. Teeth small, in villiform bands on jaws, vomer, and palatines. **Large sensory canals on top of head separated by thin ridges and covered with membranous skin; conspicuous laterally-projecting spine on lachrymal, anterior to eye and ventral to nostrils**; cheeks and opercle largely covered by scales; **no spines on preopercle**. In young individuals (less than 75 mm standard length), anterior dorsal-fin soft rays and pelvic-fin rays can be elongate; 1 dorsal fin with 3 to 5 spines and 12 to 20 soft rays; anal fin with 3 or 4 spines and 25 to 30 soft rays; caudal fin deeply forked; pectoral fins with 15 to 18 soft rays; **pelvic fins with 1 spine and 9 to 13 soft rays**. Scales spinose; **lateral line with 61 to 82 pored scales, the last few extending onto caudal fin**; no enlarged scales along ventral midline. Pyloric caeca 23 to 100. **Colour:** generally bright red on head, back, and fins, silvery pink or yellowish pink on lower sides and belly.



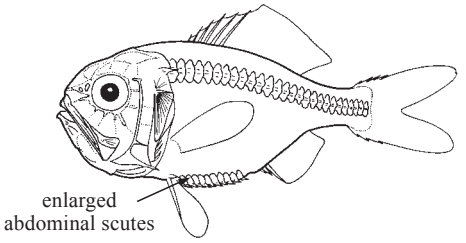
Habitat, biology, and fisheries: Benthic or benthopelagic fishes on shelf and slope, also associated with seamounts; found down to 1 300 m; sometimes known to vertically migrate into shallower waters at night. They are carnivores feeding mostly on mesopelagic crustaceans, fishes, and squids. Species in the genus *Beryx* are commercially important in many parts of the world. FAO statistics report landings ranging from 15 to 278 t from 1995 to 1999. Usually caught in trawls or on longlines.

Remarks: Two genera with 9 or 10 species found throughout the tropical and temperate oceans, except the northeast Pacific.

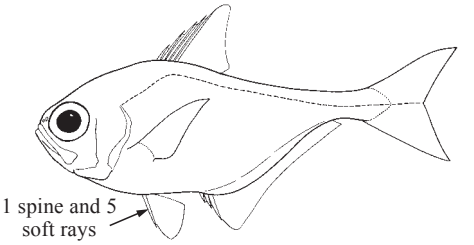
Similar families occurring in the area

Trachichthyidae: pelvic fin with 1 spine and 6 soft rays; enlarged abdominal scutes present; 1 supramaxilla.

Pempheridae: pelvic fin with 1 spine and 5 soft rays; no supramaxillae.



Trachichthyidae



Pempheridae

Key to the species of Berycidae occurring in the area

1a. Greatest body depth 44 to 50% of standard length; 4 pairs of spines on head: on nasal, lachrymal, frontal, and lower cheek (Fig. 1); dorsal fin with 16 to 20 soft rays; anal-fin origin below middle of dorsal fin; pelvic fins with 9 or 10 soft rays; lateral-line scales 61 to 73; pyloric caecae 74 to 100 . . . . ***Beryx decadactylus***

1b. Greatest body depth 33 to 40% of standard length; only 1 pair of spines on head (lachrymal); dorsal fin with 13 to 15 soft rays; anal-fin origin behind or just below posterior end of dorsal fin; pelvic fins with 11 to 13 soft rays; lateral-line scales 69 to 82; pyloric caecae 23 to 30. . . . . ***Beryx splendens***

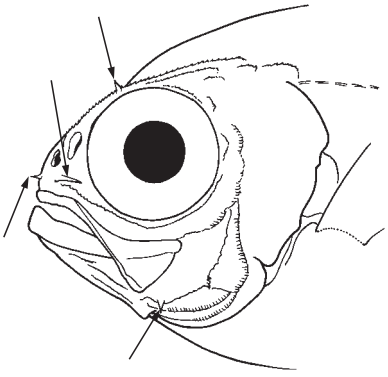


Fig. 1 pairs of spines on head
Beryx decadactylus

List of species occurring in the area

The symbol is given when species accounts are included.

Beryx decadactylus Cuvier, 1829.

Beryx splendens Lowe, 1834.

References

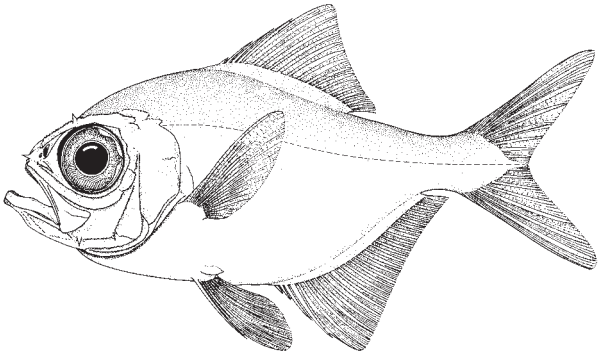
Busakhin, S.V. 1982. Systematics and distribution of the family Berycidae (Osteichthyes) in the world ocean. *J. Ichthyol.*, 22(2):1-21.

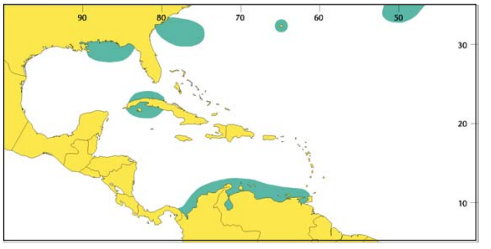
Kotlyar, A.N. 1996. *Beryciform fishes of the world ocean*. Moscow, VNIRO Publishing, 368 p. [in Russian].

Beryx decadactylus Cuvier, 1829 BXD

En - Alfonsino (AFS: Red bream); **Fr** - Béryx commun; **Sp** - Alfonsino palometón.

Maximum size to 430 mm standard length; common to 350 mm. Known from isolated records off northern coast of South America, Greater Antilles, northern Gulf of Mexico, southeastern US, Bermuda, and Corner Rise Seamounts. Probably widespread throughout the area, but uncommon. Benthopelagic from 150 to 1 000 m. Widespread fisheries in eastern Atlantic and elsewhere. Caught using longlines or trawls. Highly regarded food fish.

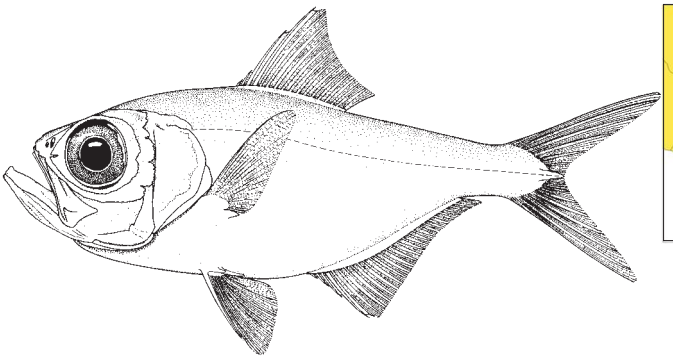


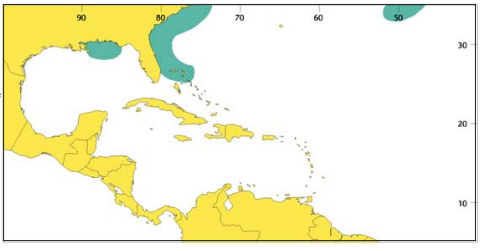


Beryx splendens Lowe, 1834 BYS

En - Splendid alfonsino; **Fr** - Béryx long; **Sp** - Alfonsino besugo.

Maximum size to 550 mm standard length; common to 400 mm. Known from northern Gulf of Mexico, Bahamas, southeastern US, and Corner Rising Seamounts. Probably more widespread in the area. Benthopelagic from 25 to 1 240 m. Forms dense aggregations. Russian trawl fishery for this species at Corner Rise Seamounts has landed 19 000 t since 1976.





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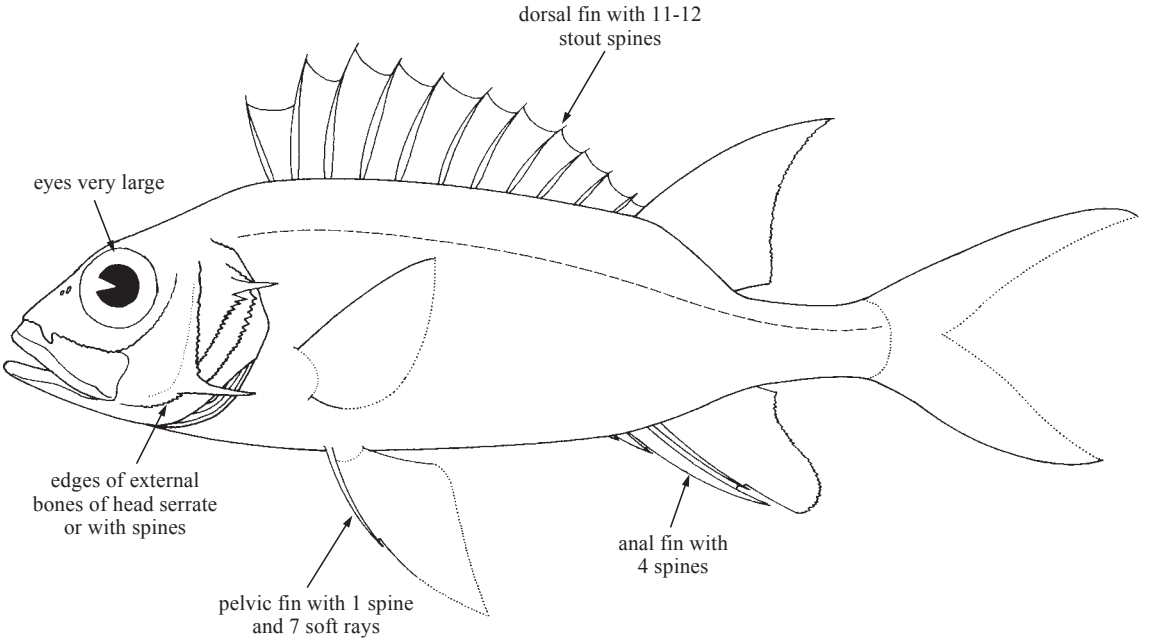
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HOLOCENTRIDAE

Squirrelfishes (soldierfishes)

by D.W. Greenfield, University of Hawaii, USA

Diagnostic characters: Small to medium-sized (to 34.5 cm standard length in Atlantic, 36 cm worldwide); body ovate to moderately elongate; **body compressed; caudal peduncle slender**; head with upper profile rounded; **ridges and mucous channels dorsally on head; edges of external bones of head serrate or with spines. Eyes very large**. Mouth terminal or with lower jaw projecting; gape slightly to strongly oblique; mouth moderately large, the maxilla extending posteriorly at least to a vertical at front edge of pupil (often beyond middle of eye); upper jaw protractile; 2 supramaxillae present; small villiform teeth in bands in jaws and on roof of mouth (on vomer, palatines, and for some species, on ectopterygoids). Branchiostegal rays 8. Dorsal-fin base long, base of spinous portion 2 to 4 times that of soft portion; **dorsal fin with 11 or 12 (worldwide rarely 13) stout spines** (includes one in second part of dorsal fin if present) and 12 to 16 (to 17 worldwide) soft rays, deeply or completely notched between spinous and soft portions or between last 2 dorsal-fin spines; **anal fin with 4 spines, the third stoutest and often longest, and 8 to 13 (7 to 16 worldwide) soft rays; caudal fin forked with 17 branched rays; pelvic fins with 1 spine and 7 soft rays. Lateral line complete, the pored scales 28 to 57 (25 to 57 worldwide); scales of body strongly spinoid**; surface of scales smooth or with ridges. **Colour: usually red or pink**, scale centres of body often lighter (may be silvery white), thus may form stripes; black pigment may be present on opercular membrane or as markings on fins. Fins may also have yellow or white markings.



Habitat, biology, and fisheries: Most of the squirrelfishes (subfamily Holocentrinae) and soldierfishes (subfamily Myripristinae) live in relatively shallow water on coral reefs or rocky bottoms, but a few (particularly the genus *Ostichthys*) occur in depths of 200 m or more. Their large eyes suit them well for their nocturnal habits. The family also is well known for sound production. Squirrelfishes feed mainly on crustaceans living on or near the bottom, whereas soldierfishes of the genus *Myripristis* feed on larger elements of night zooplankton. The preopercular spine of at least some species of *Sargocentron* in the Indo-Pacific region is venomous; it is not known if Atlantic species are venomous. Although wounds from these spines may be very painful, they are not as serious as those from the dorsal-fin spines of most scorpionfishes. Many of the holocentrids are too small to be of any commercial value; the largest are frequently seen in local markets, but rarely in abundance. They are sometimes used in the aquarium trade.

Similar families occurring in the area

None. The serrate bony edges and spines on the head, in combination with the large eyes, the very long spinous portion (as compared to soft portion) of the dorsal fin, the presence of 4 spines in the anal fin and of 7 soft rays in the pelvic fins, readily distinguishes squirrelfishes and soldierfishes from other fish families occurring in the area.

Key to the species of Holocentridae occurring in the area

1a. Preopercle with a sharp angle and a single strong spine much longer than broad (Fig. 1); 11 spines in anterior portion of dorsal fin, none in posterior portion (except in *Neoniphon* which has 10 spines in anterior portion and 1 in posterior); 7 to 10 segmented (soft) rays in anal fin . . . . . **(subfamily Holocentrinae)** → ***2***

1b. Preopercle crescentric, usually without a single spine (Fig. 2) (*Ostichthys* has a short triangular projection, and *Corniger* has 1 or 2 strong spines); 10 or 11 spines in anterior portion of dorsal fin and always 1 spine in posterior portion; anal-fin rays more than 10 . . . **(Subfamily Myripristinae)** → ***8***

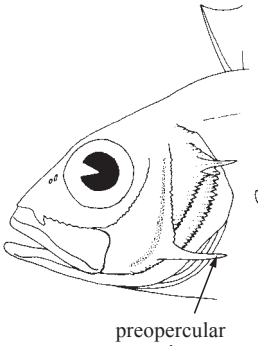


Fig. 1 ***Holocentrus***

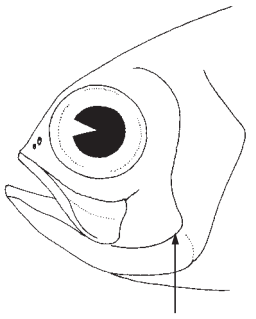


Fig. 2 ***Myripristis***

2a. Upper lobe of caudal fin notably longer than lower lobe; anterior segmented (soft) dorsal-fin rays elongate (Fig. 3); gill rakers on lower limb of first gill arch 15 to 18 (including rudiments and the raker at the angle of arch); white chevron band on body below posterior spinous dorsal fin . . . . . ***Holocentrus*** → ***3***

2b. Lobes of caudal fin nearly equal in length; anterior segmented dorsal-fin rays not elongate; gill rakers on lower limb of first gill arch 10 to 14 . . . . . → ***4***

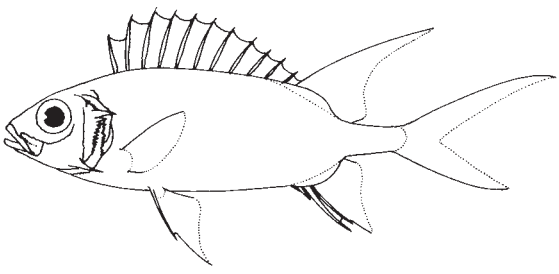
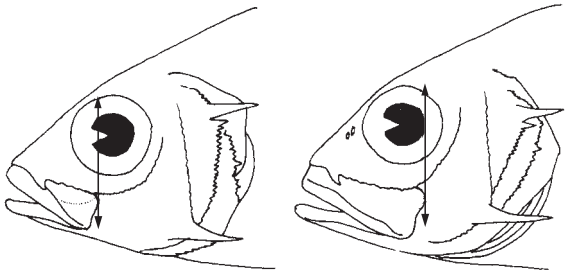


Fig. 3 ***Holocentrus***



a) ***Holocentrus rufus*** **b)** ***Holocentrus adscensionis***

Fig. 4 lateral view of head

3a. Upper jaw short, extending posteriorly at most to centre of pupil (11.4 to 13.4% standard length) (Fig. 4a); pored lateral-line scales 50 to 57, usually 51 to 54; postorbital length (to tip of opercular spine) usually less than length from rear of orbit to tip of spine at angle of preopercle; dorsal fin with a distinct white spot behind the tip of each spine . . . . ***Holocentrus rufus***

3b. Upper jaw longer, extending beyond centre of eye (13.6 to 15.8% standard length) (Fig. 4b); pored lateral-line scales 45 to 51, usually 47 to 49; postorbital length usually greater than length from orbit to tip of spine at angle of preopercle; dorsal fin lacking white spots behind spine tips, usually yellowish anteriorly . . . . . ***Holocentrus adscensionis***

4a. Last dorsal-fin spine much closer to first soft dorsal-fin ray than to penultimate spine and connected by a membrane (Fig. 5a); lower jaw extending beyond upper, entering dorsal profile (except in small juveniles) (Fig. 6a); in life, yellow stripes on body and broad yellow stripe in dorsal fin . . . . . ***Neoniphon marianus***

4b. Last dorsal-fin spine about equidistant to first soft ray and penultimate spine, separated from first dorsal-fin ray (Fig. 5b); lower jaw equal or shorter than upper (Fig. 6b) . ***(Sargocentron)*** → ***5***

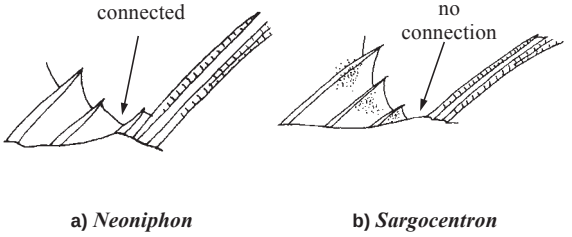


Fig. 5 junction of spinous and soft dorsal fins

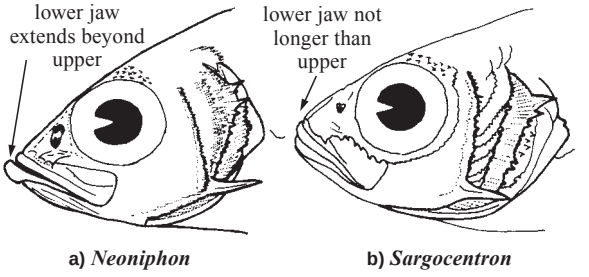


Fig. 6 lateral view of head

5a. Pectoral-fin axil jet black (in small specimens) to dusky brown (in large specimens) (dark red in life); dorsal-fin rays usually 13 (12 to 14); pectoral-fin rays usually 15 (14 to 16); anal-fin rays usually 9 (8 to 10); in life, first dorsal fin with broad red markings on membranes . . . . . ***Sargocentron vexillarium***

5b. Pectoral-fin axil pale; in life, dorsal fin mostly red with white along spines; dorsal-fin rays 11 to 13 (usually 13 only in *Sargocentron poco* which has a dark blotch below second dorsal fin); pectoral-fin rays usually 14 or fewer; anal-fin rays usually 7 or 8, rarely 9 . . . . . → ***6***

6a. No large black spot on first membrane of dorsal fin; a small black line on membrane behind distal tip of first dorsal spine in smaller individuals (Fig. 7); no spines by nostril, snout spinules small, limited to rim of premaxillary groove; pectoral-fin rays usually 14 (13 to 15); dorsal-fin rays 11 or 12, usually 12 . . . . . ***Sargocentron bullisi***

6b. A large black spot on anterior portion of spinous dorsal fin (Fig. 8); snout spinules either by nostril or between nostril and premaxillary groove; pectoral-fin rays 12 to 14; dorsal-fin rays 11 to 13 . . . . . → ***7***

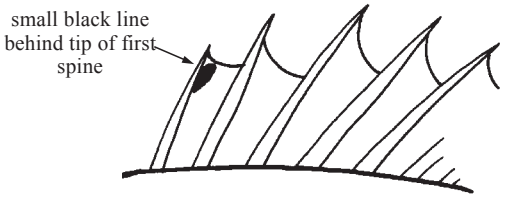


Fig. 7 spinous dorsal fin (*Sargocentron bullisi*)

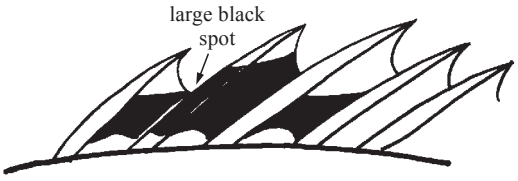


Fig. 8 spinous dorsal fin (*Sargocentron poco*)

7a. A dark blotch below second dorsal fin and a second blotch on caudal peduncle (Fig. 9); pored lateral-line scales 37 to 40; dorsal-fin rays 13; pectoral-fin rays 13 or 14 (usually 14); a single spine between nostril and premaxillary groove and 1 spine on margin of premaxillary groove . . . . . ***Sargocentron poco***

7b. No dark blotch below second dorsal fin or on caudal peduncle; pored lateral-line scales 41 to 45; dorsal-fin rays 11 to 13 (usually 12); pectoral-fin rays 12 or 13 (usually 13); snout spinules prominent, a single spine extending into posterior narial opening . . . ***Sargocentron coruscum***

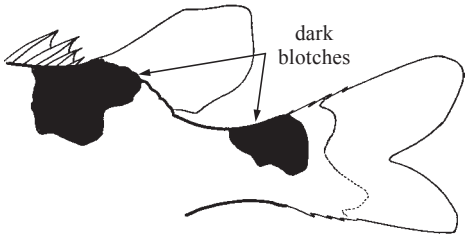


Fig. 9 *Sargocentron poco*

8a. Ten spines in anterior portion of dorsal fin, 1 in posterior portion; first gill arch with 20 to 22 gill rakers on lower limb (including 1 at angle), total gill rakers 27 to 32; a dark bar from upper edge of gill opening to pectoral-fin axil . . . . . ***Myripristis jacobus***

8b. Eleven spines in anterior portion of dorsal fin, 1 in posterior portion; first gill arch with 7 to 17 gill rakers on lower limb (including 1 at angle), total gill rakers 18 to 27; no dark bar from upper gill opening to pectoral-fin axil . . . . . ***→ 9***

9a. No spines on suborbital bones (Fig. 10); premaxillary groove broadly V-shaped (Fig. 11a); body with alternating broad red and white bands running length of body in life . ***Ostichthys trachypoma***

9b. Long spines present on suborbital bones (Fig. 12); premaxillary groove not broadly V-shaped (Fig. 11b, c); body bright red, no white bands in life . . . . . ***→ 10***

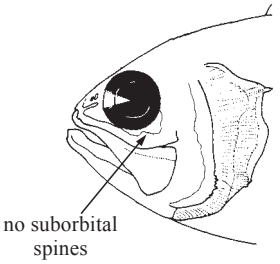


Fig. 10 ***Ostichthys***

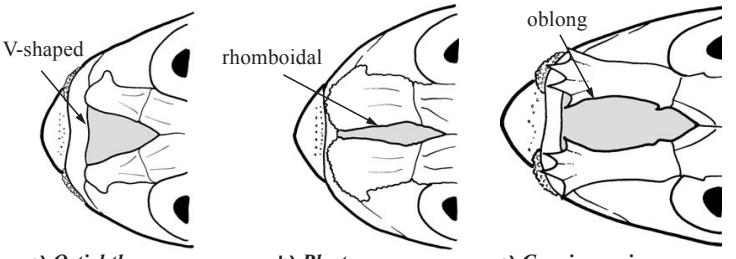


Fig. 11 dorsal detail of head showing premaxillary groove

10a. Suborbital spines slender, curved, partly antrorse (forward pointing, Fig. 12a); preopercular spines small; last dorsal-fin spine shorter than penultimate; lateral-line scales 32 to 42; premaxillary groove rhomboidal (Fig. 11b) . . . . . ***Plectrypops retrospinis***

10b. Suborbital spines long, strong, retrorse (directed posteriorly, Fig. 12b); 2 enlarged preopercular spines present; last dorsal-fin spine equal to or longer than penultimate; lateral-line scales 28 to 30; premaxillary groove oblong (Fig. 11c) . . . . . ***Corniger spinosus***

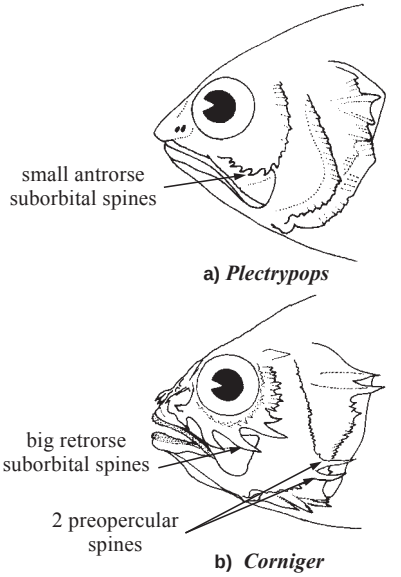


Fig. 12 lateral view of head

List of species occurring in the area

The symbol ◄ is given when species accounts are included.

Subfamily Holocentrinae

◄ *Holocentrus adscensionis* (Osbeck, 1765).
◄ *Holocentrus rufus* (Walbaum, 1792).
◄ *Neoniphon marianus* (Cuvier, 1829).
◄ *Sargocentron bullisi* (Woods, 1955).
◄ *Sargocentron coruscum* (Poey, 1860).
◄ *Sargocentron poco* (Woods, 1965).
◄ *Sargocentron vexillarium* (Poey, 1860).

Subfamily Myripristinae

◄ *Corniger spinosus Agassiz* 1831.
◄ *Myripristis jacobus* Cuvier 1829.
◄ *Ostichthys trachypoma* (Günther, 1859).
◄ *Plectrypops retrospinis* (Guichenot, 1853).

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McMillan, D.R. 1999. Geographic variation in *Holocentrus adscensionis*, with revision of the genus *Holocentrus* (Pisces: Beryciformes: Holocentridae). *Unpublished masters thesis*, University of Charleston, Charleston, South Carolina.

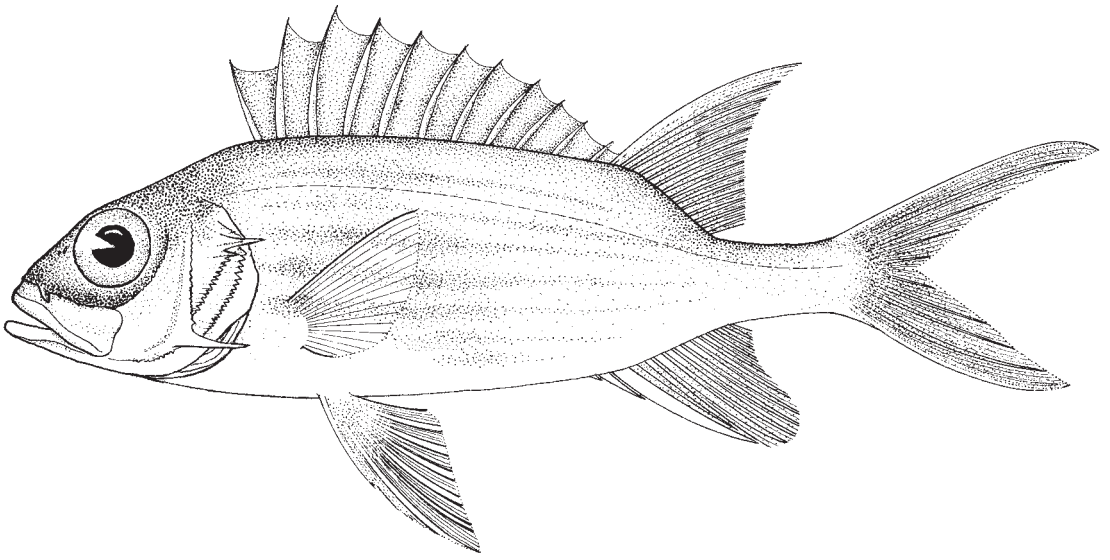
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Holocentrus adscensionis (Osbeck, 1765) HOO

Frequent synonyms / misidentifications: *Holocentrus ascensionis* (Osbeck, 1771).

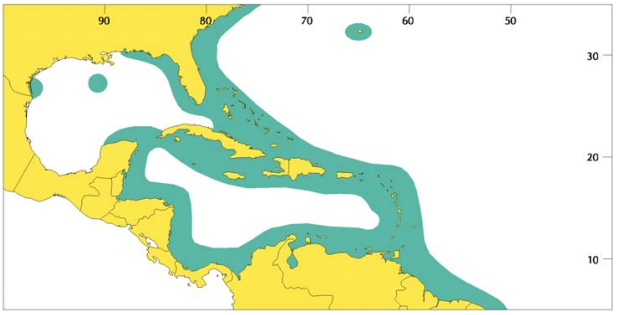
FAO names: En - Squirrelfish; **Fr** - Marignon coq; **Sp** - Candil gallito.



Diagnostic characters: A large species with a moderately compressed, relatively slender, oblong body; caudal peduncle slender and long. Edges of membrane bones of head serrate and spiny; a long strong spine present at angle of preopercle; **upper jaw long, extending to or beyond posterior margin of pupil; postorbital length usually greater than length from orbit to tip of spine at angle of preopercle**; total gill rakers on first gill arch 23 or 24. Anterior portion of dorsal fin with 11 spines, posterior portion of fin with 14 to 16 soft rays; anal fin with 4 spines followed by 10 soft rays; **anterior soft dorsal-fin rays and upper caudal-fin rays elongate. Pored lateral-line scales 45 to 51, usually 47 to 49. Colour:** back and upper sides reddish with gold reflections; silvery stripes following scale intersections on upper sides; stripes broader on lower scale rows; lower sides, belly, and breast white. Snout and top of head dark red; upper portion of maxilla white; a white streak diagonally across cheek, lower jaw white; iris bright red near pupil, distal margin blackish. Dorsal-fin spines yellowish or yellowish green; interspinal membranes yellowish green adjacent to spines and basally; margin of membrane red; soft dorsal-fin rays pink; outer caudal-fin rays white, the rest pink; first 3 anal-fin spines white, fourth spine and soft rays pink; pectoral fin pink, upper edge of first 2 rays darker red; pelvic-fin spine and anterior margin of first ray white, other pelvic-fin rays pink.

Size: Maximum to at least 34.5 cm standard length, reported to reach 60.8 cm total length in the literature.

Habitat, biology, and fisheries: Found from shallow coral reefs to offshore deeper waters up to more than 90 m, but more common at inshore reef zones. A nocturnal species, hiding by day in deep crevices or under coral ledges; at night usually feeding away from the reef over sand and grass beds, taking mainly crabs, shrimps, and other small crustaceans. Caught incidentally throughtout its range, regularaly taken in some artisanal fisheries on the Venezuelan cast (i.e. Los Roques, La Orchila, Los Frailes). Caught mainly in traps, occasionally with trammel nets. Marketed mostly fresh. Separate fisheries statistics are not reported for this species.

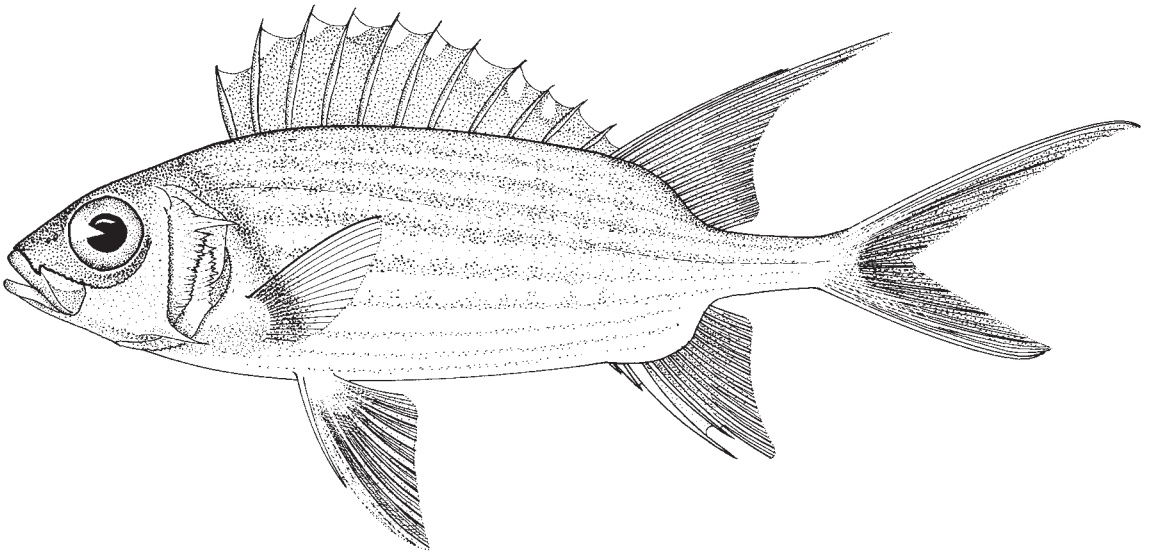


Distribution: Shore and shallow waters of Bermuda, Chesapeake Bay, Virginia south through Florida, northwestern, northeastern, and southern Gulf of Mexico, throughout the West Indies, and Caribbean shores south to Santos, Brazil. Also the islands of the tropical and subtropical Atlantic, south Trinidad, St. Helena, Ascension, and the African coast from Sao Tome Island and Gabon south to Angola.

Holocentrus rufus (Walbaum, 1792)

Frequent synonyms / misidentifications: None / None.

FAO names: En - Longspine squirrelfish; **Fr** - Marignon soldat; **Sp** - Candil soldado.

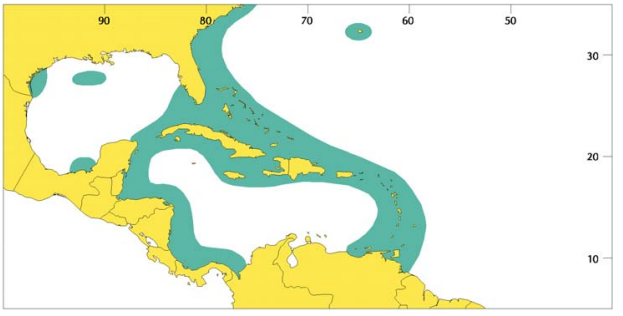


Diagnostic characters: A large species with a moderately compressed, relatively slender, oblong body; caudal peduncle slender and long. Edges of membrane bones of head serrate and spiny; a long, strong spine present at angle of preopercle; **upper jaw short extending at most to below centre of pupil; postorbital length usually less than length from orbit to tip of spine at angle of preopercle**; total gill rakers on first gill arch 24 to 26. Anterior portion of dorsal fin with 11 spines, posterior portion of fin with 14 to 16 soft rays; anal fin with 4 spines followed by 10 soft rays (rarely 9 or 11); **anterior soft dorsal-fin rays and upper caudal-fin rays elongate. Pored lateral-line scales 50 to 57, usually 51 to 54. Colour:** top of head and suborbital brick red; iris red; lips and branchiostegal membranes pink, cheeks and opercular bones shining white. Lines on sides above lateral line red, diffuse, about equal in width to light interspaces; lines very indistinct, pink below lateral line. Dorsal-fin spines and membranes red or pink basally, a white triangular or round spot distally just posterior to each spine tip; soft rays of dorsal, anal, caudal, and pelvic fins pink; third anal-fin and pelvic-fin spines white at least on anterior portion; pectoral fins pale, a faint red spot on basal portion of upper rays.

Size: Maximum to at least 32 cm standard length.

Habitat, biology, and fisheries: Inhabits shallow reefs, from the surface to 32 m in the Gulf of Mexico. A nocturnal species, hiding by day in deep crevices or under coral ledges; at night usually feeding away from the reef over sand and grass beds, taking mainly crabs, shrimps, gastropods, and brittle stars. Caught incidentally throughout its range. Caught mainly in traps, occasionally with trammel nets. Marketed mostly fresh. Separate fisheries statistics not reported for this species.

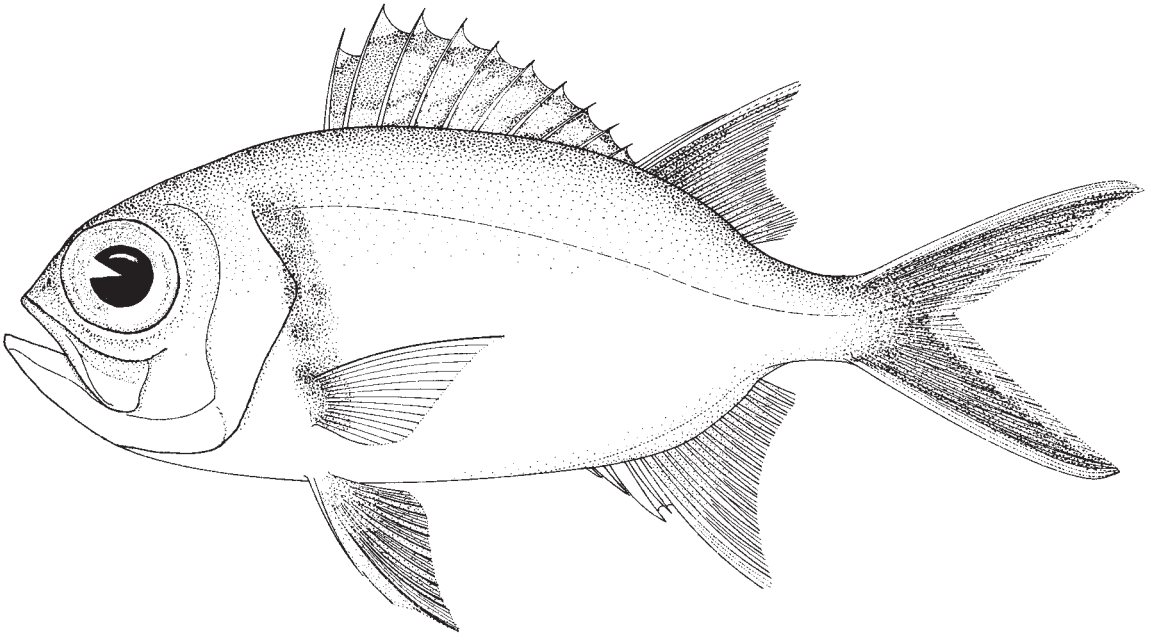
Distribution: Bermuda, Carolinas to Florida and Gulf of Mexico, and throughout the West Indies; Central American coast south to northern South America. More abundant in the northern part of its range.



Myripristis jacobus Cuvier, 1829 MJA

Frequent synonyms / misidentifications: None / None.

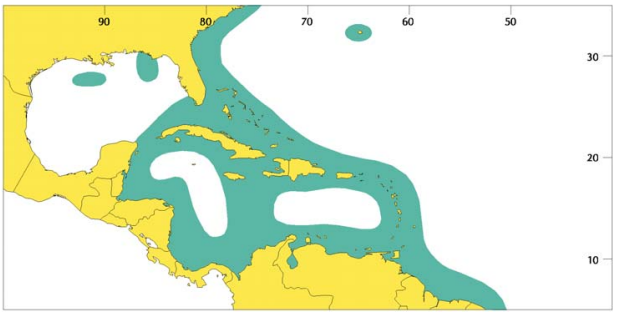
FAO names: En - Blackbar soldierfish; **Fr** - Marignon mombin; **Sp** - Candil de piedra.



Diagnostic characters: A large species with a moderately compressed, relatively deep, oblong body. Anterior profile triangular; eyes very large; bones of head smooth except their margins usually finely serrate; **no spine on preopercle or on preorbital bone**; total gill rakers on first gill arch 29 to 33, usually 31. Anterior portion of dorsal fin with 10 spines, posterior portion of fin with 1 spine followed by 12 to 15 soft rays, usually 14; anal fin with 4 spines followed by 12 to 14 soft rays, usually 13. **Scales present on the membranes between rays of soft dorsal and anal fins, covering over 1/2 of the fin length**; pored lateral-line scales 33 to 37, usually 35. **Colour:** head and back reddish orange above, shading into a more reddish pink on flanks and silvery below; reddish black pigment on post-temporal, supracleithrum, cleithrum, posterior margin of opercle, and opercular flap, **giving the appearance of a broad rectangular bar running from the upper end of gill opening to pectoral-fin base**. Central portion of membranes between first 2 dorsal-fin spines reddish orange, with white on distal and basal portions; membranes of remaining dorsal-fin spines reddish orange only on distal portions; anterior border of pelvic fins, soft dorsal and anal fins, and caudal fin white, with a darker bank of reddish orange directly posterior to the white edge.

Size: Maximum to 21.6 cm standard length.

Habitat, biology, and fisheries: Found from shallow coral reefs to offshore deeper waters to depths of about 90 m. A nocturnal species aggregating around coral reefs and deeper rocky reefs. Feeds at night, predominantly on planktonic organisms. Caught incidentally throughout its range, more regularly taken in some local artisanal fisheries (i.e. Venezuela). Caught mainly in traps and marketed mostly fresh. Separate statistics not reported for this species.

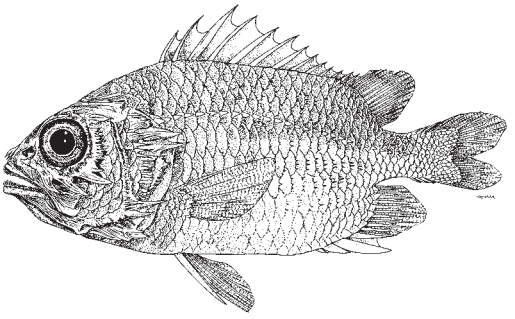


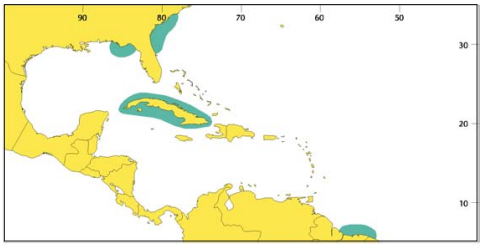
Distribution: North Carolina to Rio de Janeiro, Brazil, including Bermuda, the Gulf of Mexico, throughout the West Indies, Central American coast, Campeche Bank, Venezuela, and offshore Guyanas. Also occurs at Cape Verde Islands, Ascension Island, Principe, St. Helena Islands, and coast of Africa at Ghana, Benin, and Sao Tome Island.

Corniger spinosus Agassiz, 1831

En - Spinycheek soldierfish.

Maximum size to 19.5 cm standard length. Recorded only from South Carolina, Florida, Gulf of Mexico, Cuba, French Guiana, Suriname, and Rio de Janeiro, Brazil. This species usually found in deeper water (50 m or more) and certainly is more widespread in other areas than collections indicate. Also present in eastern Atlantic at St. Helena.

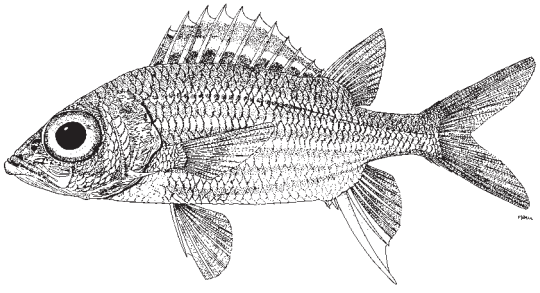


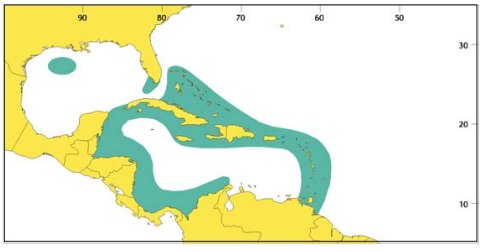


Neoniphon marianus (Cuvier, 1829)

En - Longjaw squirrelfish.

Maximum size to 17 cm standard length. Known from the Florida Keys, the Bahamas, Gulf of Mexico, Antilles south to Trinidad, and throughout the Caribbean. Rarely seen in water less than 13 m; feeds mainly on shrimps but also takes crabs. *Flammeo* is a junior synonym.

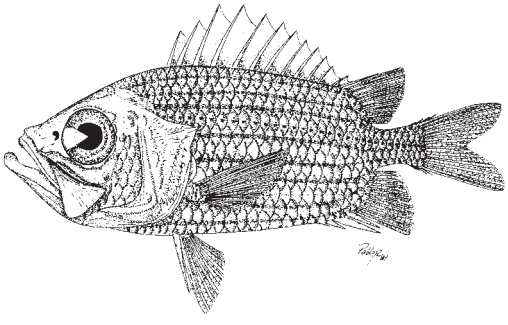


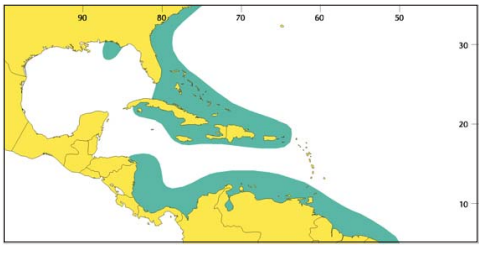


Ostichthys trachypoma (Günther, 1859)

En - Bigeye soldierfish.

Maximum size to 19 cm standard length. This species usually lives on or near the bottom in waters 200 to 460 m, but has been taken as shallow as 37 m. Known from New York south to Florida and the Greater Antilles, Gulf of Mexico, and the Caribbean Sea to northern Brazil.

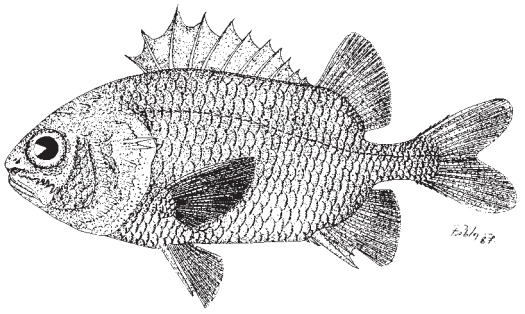


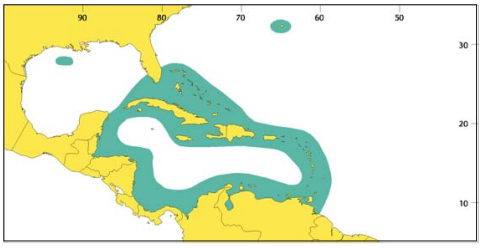


Plectrypops retrospinis (Guichenot, 1853)

En - Cardinal soldierfish.

Maximum size to 11.8 cm standard length. Known from Bermuda, the Bahamas and Florida Keys, Cuba, Jamaica, Puerto Rico, northwestern Gulf of Mexico, western Caribbean, Panama, and southern Brazil. Although this species occurs in shallow water, it is more common in deeper water and thus certainly is more widespread than records indicate. Feeds mainly on shrimp, but also takes crabs and polychaetes. Lives well within the reef structure and seldom seen. More common at shelf edge.

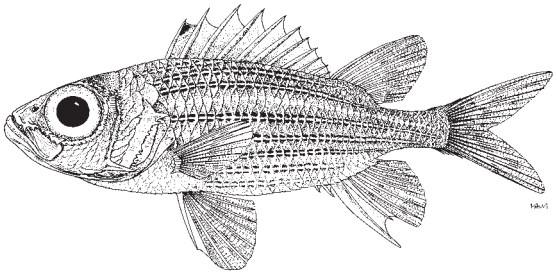


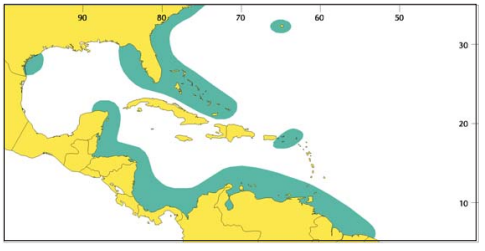


Sargocentron bullisi (Woods, 1955)

En - Deepwater squirrelfish.

Maximum size to 12.9 cm standard length. Recorded from Bermuda, the Bahamas, South Carolina south to the Dry Tortugas and the Gulf of Mexico, western Caribbean, Virgin Islands, and Suriname. Known mostly from offshore deeper waters 36 to 120 m. The few stomachs examined contained small cycloid scales. *Adioryx* is a junior synonym.

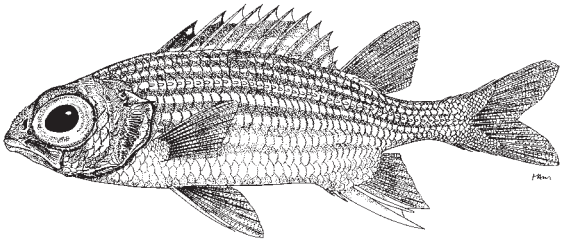


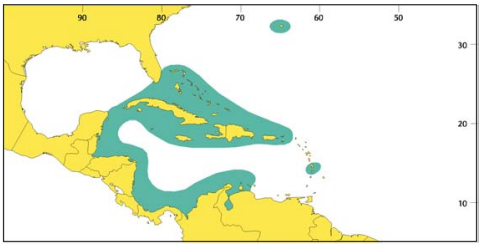


Sargocentron coruscum (Poey, 1860)

En - Reef squirrelfish.

Maximum size to 10.4 cm standard length. Known from Bermuda, the Bahamas, Florida Keys, Greater Antilles, Virgin Islands, Campeche Bank south along the Central American coast to Panama and Curaçao. Feeds mainly on shrimp but also takes crabs. More often found in low profile sand or carbonate pavement habitats at night but in the reef by day. *Adioryx* is a junior synonym.

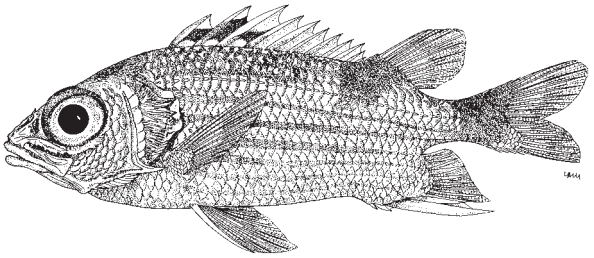


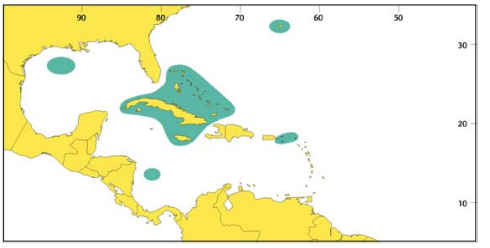


Sargocentron poco (Woods, 1965)

En - Saddle squirrelfish.

Maximum size to 10.7 cm standard length. Reported from Bermuda, the Bahamas, Cuba, Grand Cayman, Virgin Islands, Gulf of Mexico, Providencia Island. Feeds mainly on shrimp but also takes crabs. *Adioryx* is a junior synonym.

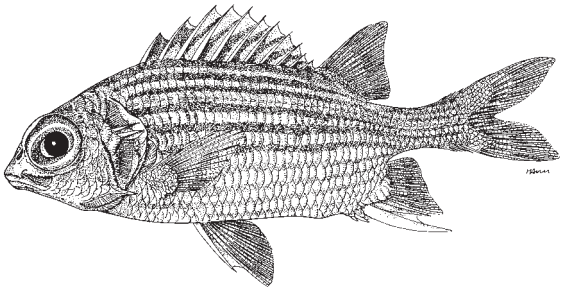


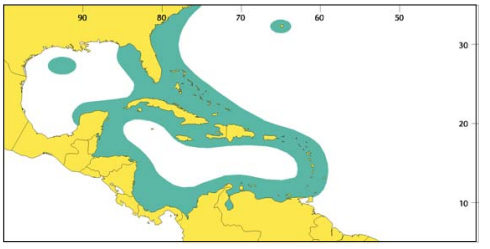


Sargocentron vexillarium (Poey, 1860)

En - Dusky squirrelfish.

Maximum size to 13.9 cm standard length. Known from Bermuda, the Bahamas, Florida south through the Lesser Antilles, Gulf of Mexico, Campeche Bank south along the Central American coast to Panama and Colombia. This is the most common inshore squirrelfish in the West Indies. It feeds mainly on crabs, but also takes shrimps and gastropods, and is widely distributed across most reef zones. *Adioryx* is a junior synonym.





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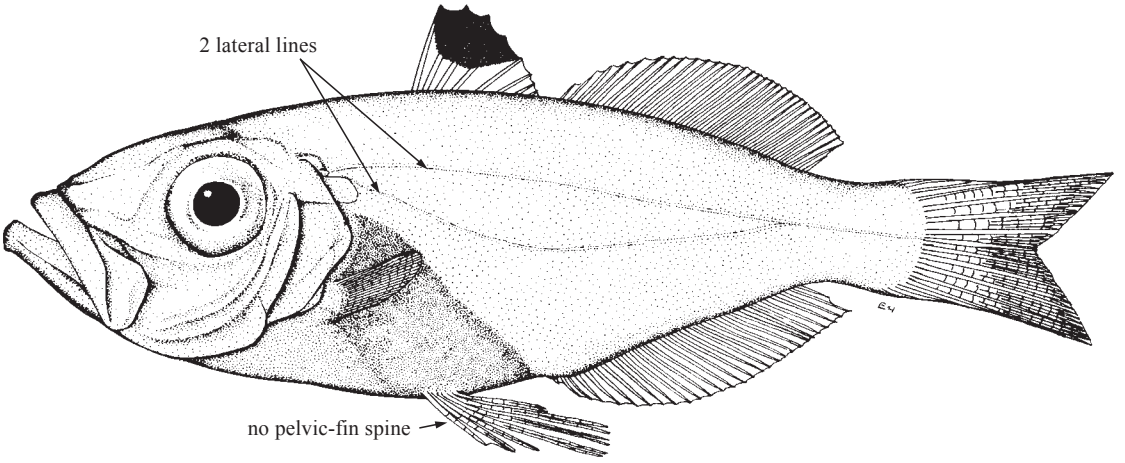
Order ZEIFORMES

PARAZENIDAE

Parazens

P.C. Heemstra, South African Institute for Aquatic Biodiversity, South Africa

Diagnostic characters: Small to moderate-sized (to 30 cm) oblong fishes, the **head and body compressed; body depth slightly less than head length, contained 2.6 to 2.9 times in standard length; head naked, the bones thin and soft; opercular bones weakly serrate; mouth large, terminal, the upper jaw extremely protrusile; maxilla widely expanded posteriorly, and mostly exposed when mouth is closed**; no supramaxilla; jaws with 1 or 2 rows of small, slender, conical teeth; vomer with a few short stout teeth; gill rakers (including rudiments) 2 on upper limb, 8 on lower limb. Eye diameter about 1/3 head length and slightly less than snout length. Branchiostegal rays 7. **Dorsal fin divided, with 8 slender spines and 26 to 30 soft rays; anal fin with 1 minute spine and 30 to 32 soft rays; dorsal-, anal-, and pectoral-fin rays unbranched; caudal fin forked, with 11 principal rays and 9 branched rays; pectoral fin with 15 or 16 rays, shorter than eye diameter; pelvic fins with 1 unbranched and 5 or 6 branched soft rays, but no spine, fin origin posterior to a vertical at pectoral-fin base**. Scales moderate in size, weakly ctenoid, and deciduous; **2 lateral lines originating on body at upper end of operculum and running posteriorly about 4 scale rows apart, gradually converging to form a single line on caudal peduncle**. Caudal peduncle stout, the least depth about equal to its length and slightly less than eye diameter. Vertebrae 34. **Colour:** body reddish or silvery; large black blotch on anterior margin of dorsal fin.



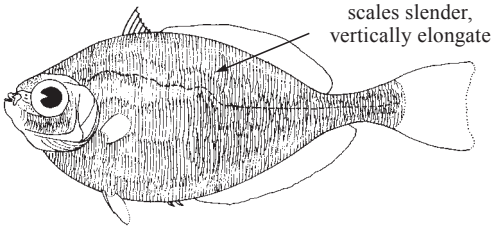
Habitat, biology, and fisheries: Caught with bottom trawls in depths of 150 to 600 m. The species is apparently too rare to be considered a fishery resource.

Remarks: This monotypic family is closely related to the Zeidae.

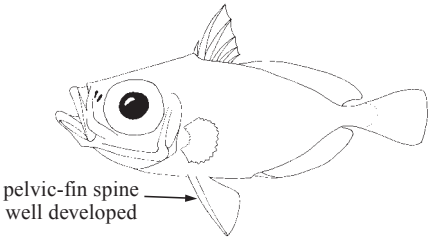
Similar families occurring in the area

Grammicolepidae: body depth 2 to 4 times head length; mouth small, upper-jaw length less than eye diameter; scales slender, greatly elongated vertically; single lateral line.

Zeniontidae: eye diameter much larger than snout length; body depth about equal to head length, contained 2.3 to 2.7 times in standard length; pelvic-fin spine well developed.



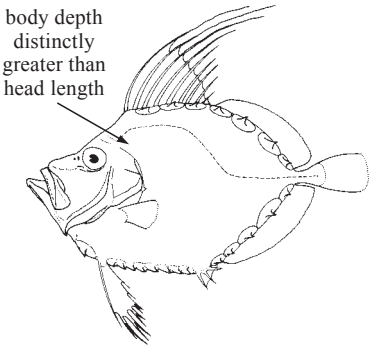
Grammicolepidae



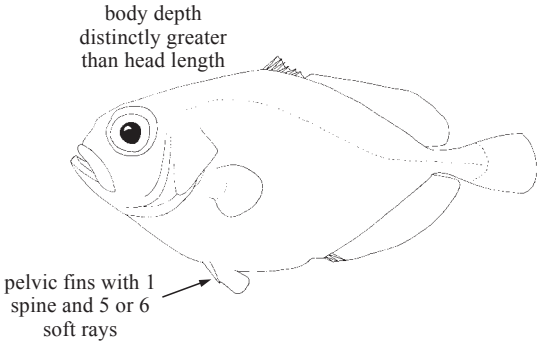
Zeniontidae

Zeidae: body depth distinctly greater than head length, contained 1.6 to 2.1 times in standard length; single lateral line; pelvic fins much longer than pectorals, about equal to head length.

Oreosomatidae: body depth distinctly greater than head length, contained 1.4 to 1.8 times in standard length; pelvic fin with 1 spine and 5 or 6 soft rays.



Zeidae



Oreosomatidae

List of species occurring in the area

Parazen pacificus Kamohara, 1935. Maximum 30 cm. Gulf of Mexico, Cuba, Puerto Rico, Colombia, South Africa, Tanzania, Japan.

Reference

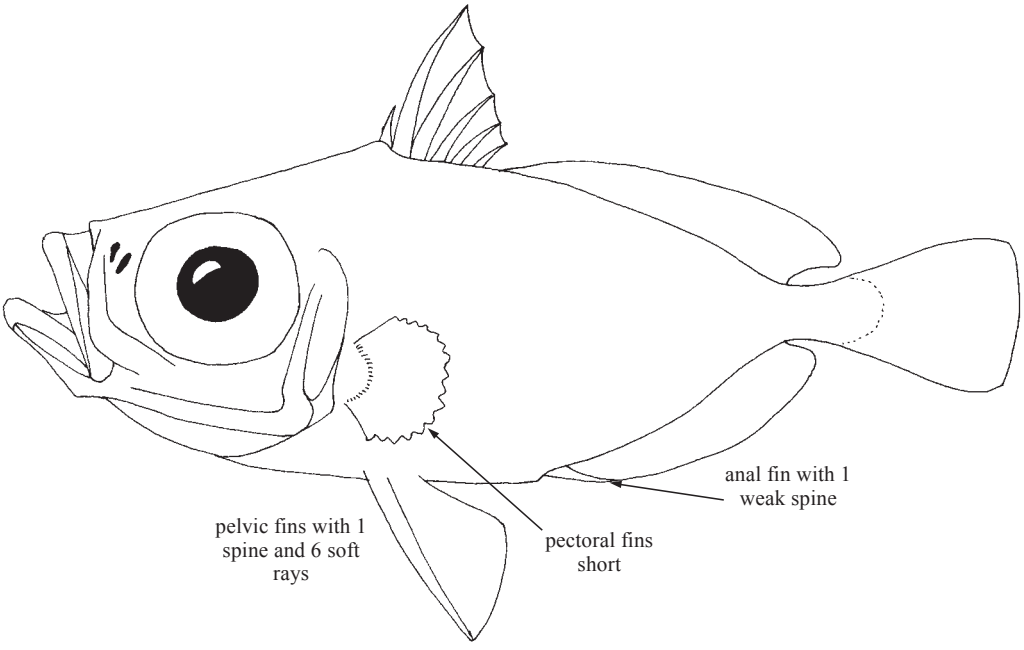
Mead, G. 1957. An Atlantic Record of the zeoid fish *Parazen pacificus. Copeia*, 1957(3):235-237.

ZENIONTIDAE

Zeniontids

by P.C. Heemstra, South African Institute for Aquatic Biodiversity, South Africa

Diagnostic characters: Small (to 16 cm) **oblong fishes, body compressed; body depth about equal to head length (with upper jaw retracted), contained 2.3 to 2.7 times in standard length; head bones thin and soft; mouth large, oblique, lower jaw projecting; upper jaw extremely protrusile, its length about equal to eye diameter**; jaws with a few minute, conical teeth, none on vomer or palatines. Eyes large, diameter contained 1.9 to 3.0 times in head. Scales minute. Branchiostegal rays 7. **Dorsal fin with 6 or 7 spines and 25 to 31 rays; anal fin with 1 weak spine and 23 to 28 rays; dorsal-, anal-, and pectoral-fin rays unbranched; caudal fin with 11 branched rays; pectoral fins with 15 to 17 soft rays, much shorter than head length; pelvic fins with a long slender spine and 6 soft rays, the fins widely separated from and much longer than pectoral fins**. Vertebrae 25 to 27. **Colour:** body dusky silver; head orange.

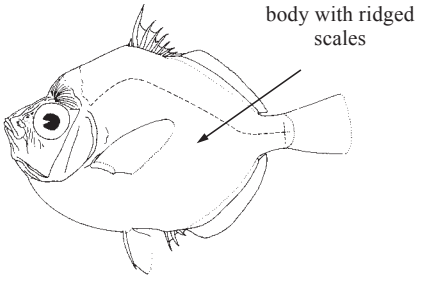


Habitat, biology, and fisheries: Zeniontids occur in depths of 300 to 600 m in a variety of habitats. Nothing has been published on the biology. They are usually caught near the bottom with trawls; because of their small size, zeniontids are of no commercial interest.

Remarks: The family comprises 2 or 3 genera and about 8 species; at least 1 species occurs in Area 31. If the genus *Macrurocyttus* Fowler, 1934 with 2 species, is included in this family, the correct family name may be Macrurocyttidae.

Similar families occurring in the area

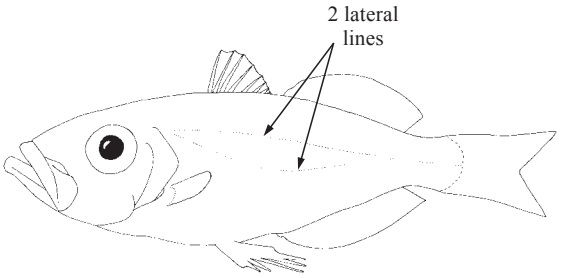
Caproidae: body oval, the depth 0.8 to 1.6 times in standard length and 2 to 3 times head length; body with ridged scales; pectoral fins about equal to head length; anal-fin spines 3.



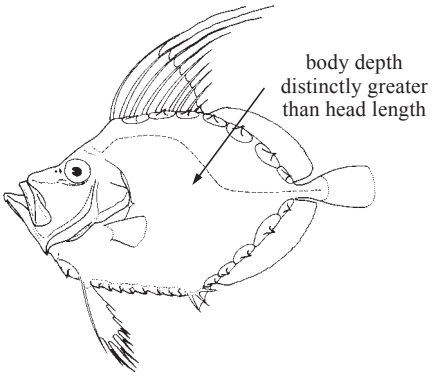
Caproidae

Parazenidae: 2 lateral lines; pelvic fins with 7 rays and no spine.

Zeidae: body depth distinctly greater than head length, 1.6 to 2.1 times in standard length.

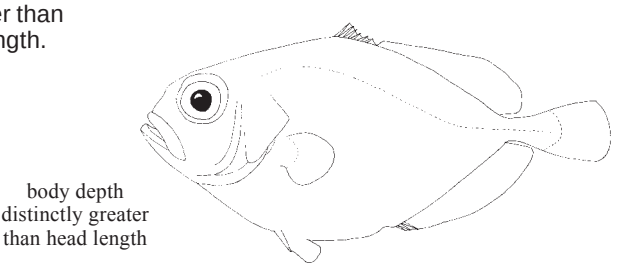


Parazenidae



Zeidae

Oreosomatidae: body depth distinctly greater than head length, 1.4 to 1.8 times in standard length.



Oreosomatidae

List of species occurring in the area

Zenion hololepis Goode and Bean, 1896. Maximum 10 cm. Nova Scotia, Bermuda, Bahamas, E coast Florida, Gulf of Mexico, Venezuela, Suriname, E Atlantic, Mozambique, Tanzania, Japan.

References

Heemstra, P.C. 1986. Family No. 141: Zeniontidae. In *Smiths' Sea Fishes,* edited by M.M. Smith and P.C. Heemstra. Macmillan, South Africa, 1024 p.

Karrer, C. 1990. Zeniidae. In *Check-list of the fishes of the eastern tropical Atlantic (Clofeta)*, edited by J.C. Quero, J.C. hureau, C. Karrer, A. Post, and L. Saldanha. Lisbon, JNICT; Paris, SEI; and Paris, UNESCO, Vol.2:629-630.

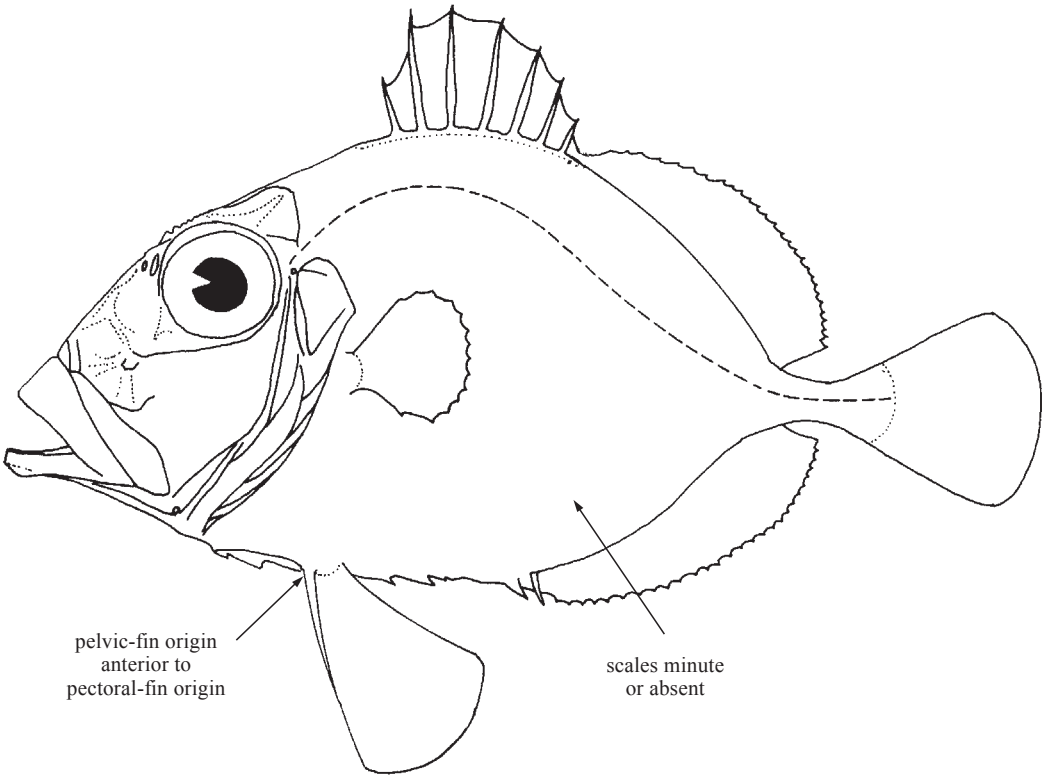
Uyeno, T., K. Matsuura, and E. Fujii. 1983. *Fishes Trawled off Suriname and French Guiana*. Japan Marine Fishery Resource Research Center. Tokyo, 491 p.

ZEIDAE

Dories

by P.C. Heemstra, South African Institute of Aquatic Biodiversity, South Africa

Diagnostic characters: Moderate-sized (to 90 cm) oval fishes, head and body greatly compressed; body depth greater than head length, contained 1.5 to 2.1 times in standard length. Head bones thin and soft. Mouth large, oblique, the upper jaw extremely protrusile; maxilla widely expanded posteriorly, and mostly exposed when mouth is closed; supramaxilla absent; jaws with a few minute, conical teeth, and a few similar teeth on vomer. No spines or serrae on opercular bones. Branchiostegal membranes separate, the gill openings unrestricted; branchiostegal rays 7. Gill rakers short, few. **Dorsal fin with 7 to 10 spines and 24 to 30 soft rays; anal fin with 1 to 3 spines and 24 to 30 soft rays; dorsal-, anal-, and pectoral-fin rays unbranched; caudal fin convex, with 13 or 14 principal rays and 11 or 12 branched rays; pectoral fin with 12 to 14 soft rays, much shorter than head length or pelvic fins; pelvic fins with 1 slender spine and 5 rays or no spine and 9 or 10 soft rays, fin origin anterior to a vertical at pectoral-fin base**. Scales minute or absent. Vertebrae 29 to 34. **Colour:** body reddish or silvery.



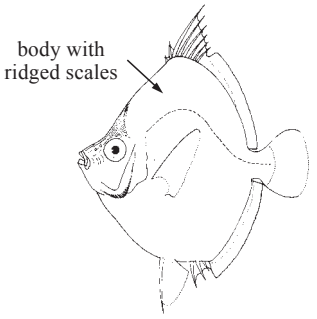
Habitat, biology, and fisheries: Zeids occur in depths of 100 to 400 m in a variety of habitats. They are usually caught near the bottom with trawls. Although zeids are good food fishes, they are not taken in sufficient quantities in the western Atlantic area to be considered an important fishery resource.

Remarks: Five genera, with a total of 9 species; 2 species in the western Atlantic.

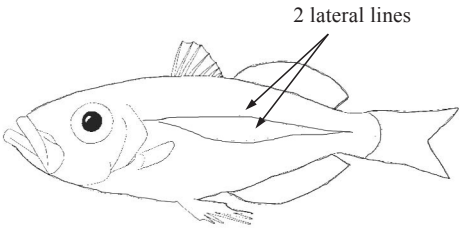
Similar families occurring in the area

Caproidae: mouth small, upper-jaw length not much greater than eye diameter; eye diameter about equal to snout length; body with ridged scales; pectoral fins longer than pelvic fins.

Parazenidae: 2 lateral lines; body depth slightly less than head length; pelvic-fin origin behind vertical at pectoral-fin base; caudal fin with 9 branched rays.



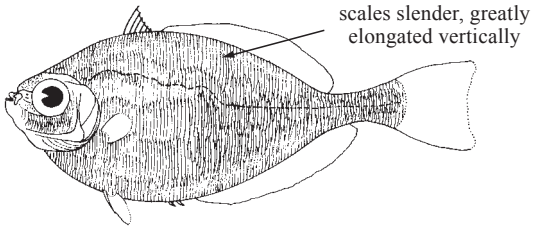
Caproidae



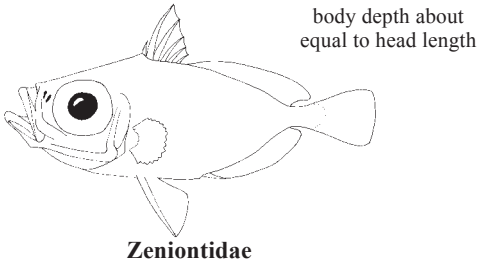
Parazenidae

Grammicolepidae: mouth small, upper jaw length about half eye diameter; scales slender, greatly elongated vertically.

Zeniontidae: Eye diameter much larger than snout length; body depth about equal to head length, contained 2.3 to 2.7 times in standard length.

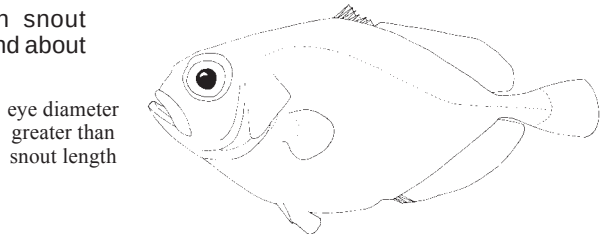


Grammicolepidae



Zeniontidae

Oreosomatidae: eye diameter greater than snout length; pelvic fins about equal to pectoral fins and about half head length.



Oreosomatidae

Key to the species of Zeidae occurring in the area

1a. Pelvic fins with 9 or 10 soft rays and no spine; thoracic region broad and flattened; no bony bucklers along bases of dorsal and anal fins; dorsal-fin with 7 or 8 stiff spines, shorter than head length . . . . . ***Cyttopsis rosea***

1b. Pelvic fins with 1 slender spine and 5 soft rays; thoracic region narrow; 7 large, bony bucklers along base of dorsal fin and 5 or 6 along base of anal fin; dorsal fin with 9 or 10 long, flexible spines, the third or fourth spines longer than head . . . . . ***Zenopsis conchifera***

List of species occurring in the area

The symbol is given when species accounts are included.

Cyttopsis rosea (Lowe, 1843).

Zenopsis conchifera (Lowe, 1850).

References

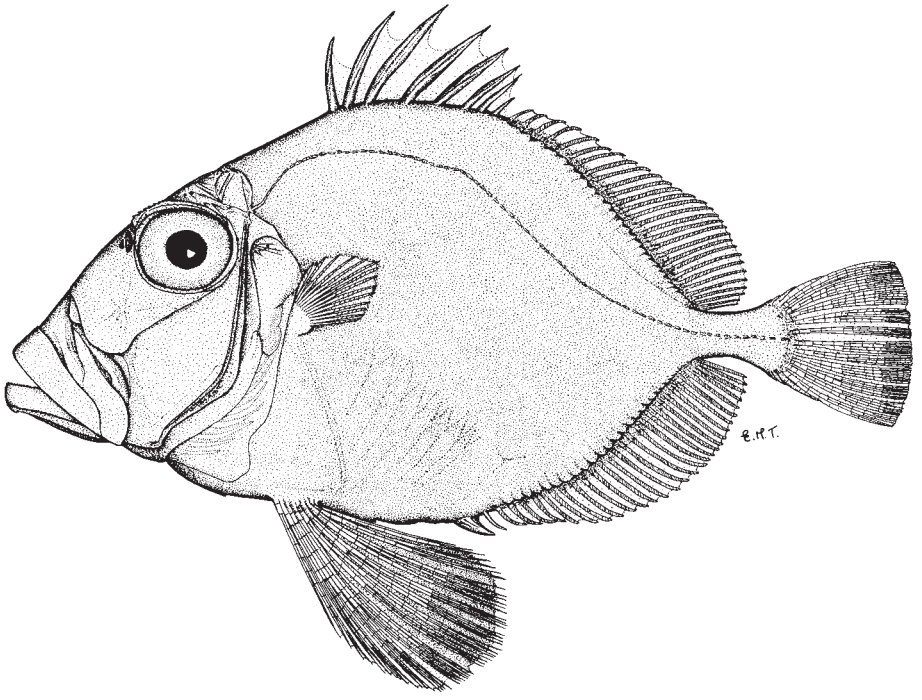
Heemstra, P.C. 1980. A revision of the zeid fishes (Zeiformes: Zeidae) of South Africa. *Ichthyol. Bull Rhodes Univ.*,41:1-18.

Heemstra, P.C. 1986. Family No. 138: Zeidae. In *Smiths' Sea Fishes,* edited by M.M. Smith and P.C. Heemstra. Johannesburg, Macmillan South Africa, pp. 435-438.

Cyttopsis rosea (Lowe, 1843)

Frequent synonyms / misidentifications: *Cyttopsis roseus* / None.

FAO names: En - Red dory; **Fr** - Saint Pierre rouge; **Sp** - San Pedro colorado.

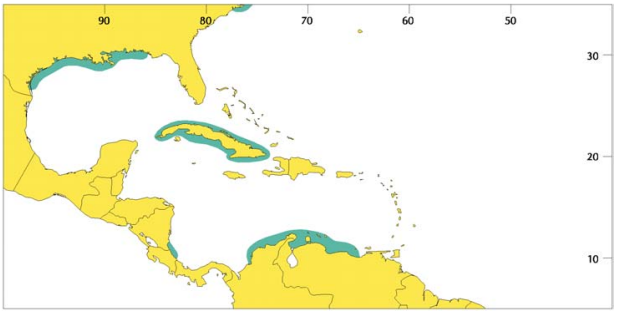


Diagnostic characters: Oval fishes, with head and body greatly compressed; body depth greater than head length, contained 1.7 to 2.0 times in standard length; thoracic region (between or in front of pelvic fins) broad and flattened ventrally. Head bones thin and soft; mouth large, oblique, the upper jaw extremely protrusile; maxilla widely expanded posteriorly and mostly exposed when mouth is closed; jaws with bands of villiform granular teeth; similar teeth on vomer. No spines or serrae on opercular bones. Gill rakers rudimentary, 1 on upper limb, 8 to 10 on lower limb. **Dorsal fin with 7 or 8 stiff spines and 28 to 30 short soft rays; anal fin with 1 or 2 spines (first short, broad, and immovable, second spine very small) and 29 or 30 soft rays; caudal fin convex, with 13 principal rays and 11 branched rays; pectoral fin with 13 or 14 soft rays, much shorter than head length or pelvic fins; pelvic fins with 9 or 10 soft rays and no spine. Scales small, cycloid, deciduous; a row of low bony ridges on each side of base of soft dorsal and anal fins; 2 keeled scutes between pelvic fins and anus. Colour:** body reddish silvery; pelvic fins reddish, the membranes black.

Size: Maximum to 22 cm.

Habitat, biology, and fisheries: Red dory are common in depths of 100 to 600 m in a variety of habitats. Biology little known. Usually caught near the bottom with trawls. Although the flesh is excellent, this species is too small to be considered an important fishery resource.

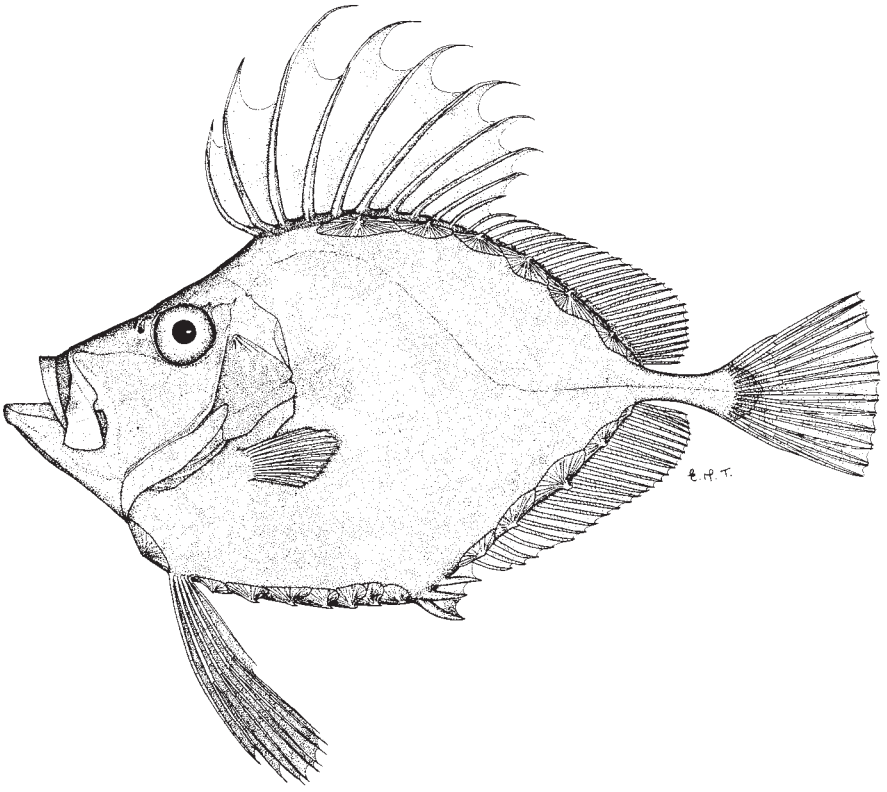
Distribution: Canada, South Carolina to Gulf of Mexico, Cuba, Costa Rica, Colombia, Venezuela, eastern Atlantic, France, Madeira, Mauritania to South Africa and western Indian Ocean north to India; Indo-West Pacific.



Zenopsis conchifer (Lowe, 1850) JOS

Frequent synonyms / misidentifications: *Zenopsis ocellata* (Storer, 1859) / None.

FAO names: En - Silver John dory (AFS: Buckler dory); **Fr** - Saint Pierre argenté; **Sp** - San Pedro plateado.

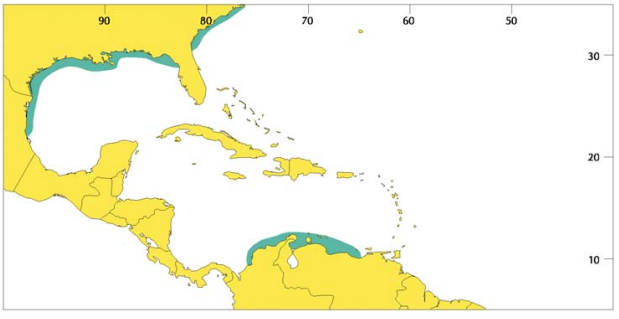


Diagnostic characters: Moderate-sized (to 90 cm) oval fishes, with **head and body greatly compressed; body depth greater than head length, contained 1.5 to 2.1 times in standard length; head bones thin and soft; mouth large, oblique, the upper jaw extremely protrusile; maxilla widely expanded posteriorly, and mostly exposed when mouth is closed; jaws with a few minute, conical teeth**. No spines or serrae on opercular bones. **Dorsal fin with 9 or 10 long flexible spines and 24 to 26 short, soft unbranched rays; anal fin with 3 spines and 24 to 26 unbranched rays; caudal fin convex, with 13 principal rays and 11 branched rays; pectoral fin with 12 soft rays, much shorter than head length or pelvic fins; pelvic fins with 1 slender spine and 5 soft rays. Scales absent; 7 large bony bucklers along base of dorsal fin and 5 or 6 bucklers along anal-fin base; 2 rows of 7 or 8 keeled scutes, each ending in a small spine, between pelvic and anal fins. Colour:** body silvery, with a dusky midlateral spot near head.

Size: Maximum to 90 cm, over 3 kg.

Habitat, biology, and fisheries: Buckler dory occur in depths of 100 to 400 m in a variety of habitats. Biology little known. Usually caught near the bottom with trawls. Although the flesh is excellent, this species is not taken in sufficient quantities to be of commercial importance.

Distribution: Gulf of Maine to Gulf of Mexico, Colombia, Venezuela, Brazil, eastern Atlantic, France, Madeira, Mauritiania to South Africa, and western Indian Ocean north to India.

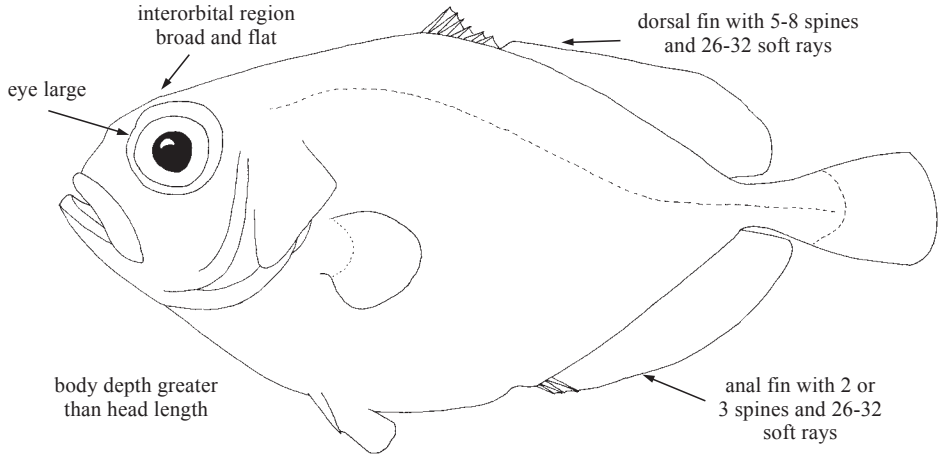


OREOSOMATIDAE

Oreos

by P.C. Heemstra, South African Institute for Aquatic Biodiversity, South Africa

Diagnostic characters: Moderate fishes (to 60 cm) with **deep, compressed body; depth distinctly greater than head length and 1.4 to 1.9 times in standard length. Head large, the interorbital region broad and flat, head length a third or more of standard length; eye large, the diameter 0.3 to 0.5 head length and 2 or 3 times more than depth of caudal peduncle**; upper jaw protrusile; 1or 2 rows of tiny teeth on jaws. Branchiostegals rays 7. Gill rakers on first arch 3 to 6 on upper limb and 17 to 26 on lower limb. **Dorsal fin with 5 to 8 spines and 28 to 35 rays; anal fin with 2 or 3 spines and 26 to 32 rays**; caudal fin small and rounded, branched rays 11; caudal peduncle narrow, the depth less than half eye diameter; pectoral-fin length about 1/3 head length; dorsal-, anal-, and pectoral-fin rays unbranched; pelvic fins with 1 spine and 5 or 6 branched rays. Body covered with minute scales; head with scales on cheeks; operculum with or without scales; lateral line continuous, with 84 to 110 tubed scales, not extending onto caudal fin. **Colour:** adults dusky silver; pelagic prejuvenile (*Oreosoma*) stage quite different in shape, with expanded belly, groups of enlarged transformed scales, and a spotted or marbled colour pattern.



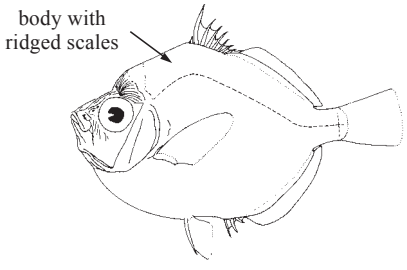
Habitat, biology, and fisheries: Adults benthopelagic on continental slope in 400 to 1 500 m. They feed on crustaceans, cephalopods, and fishes. Pelagic prejuveniles look very different from their respective adults and are rarely caught. Oreos have been caught in abundance off New Zealand, Australia, and Japan and are of commercial importance in the fisheries of these countries.

Remarks: The family comprises 4 genera, with a total of about 9 species.

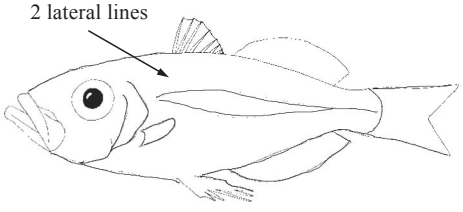
Similar families occurring in the area

Caproidae: body oval, the depth 0.8 to 1.6 times in standard length and 2 to 3 times head length; body with ridged scales; pectoral-fin length about equal to head length.

Parazenidae: body depth subequal to head length; 2 lateral lines; pelvic fins with 7 rays and no spine; caudal fin forked, with 11 branched rays.

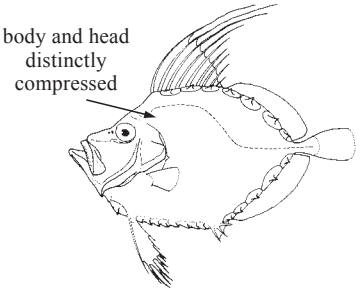


Caproidae

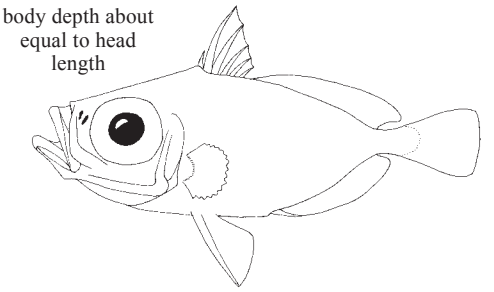


Parazenidae

Zeidae: body and head distinctly compressed; eye diameter less than snout or upper-jaw length.
Zeniontidae: body depth about equal to head length, 2.3 to 2.7 times in standard length.



Zeidae



Zeniontidae

Key to the species of Oreosomatidae occurring in the area

1a. Dorsal fin with 5 or 6 spines (first visible spine much longer than second) and 34 to 36 rays (Fig. 1); pelvic fin rays 5; anal fin with 2 or 3 spines and 31 to 34 rays; cheeks and operculum covered with weakly ctenoid adherent scales; midlateral body scales cycloid, deciduous; adults dark brown, fins darker. Prejuveniles (12 to 25 cm) with 3 small hillocks in a row on belly; body silvery, covered with dark spots of various sizes, becoming larger and fainter with age . . . . . ***Pseudocyttus maculatus***

1b. Dorsal fin with 5 to 8 spines and 28 to 33 rays; pelvic fin rays 6; anal fin with 2 or 3 spines and 26 to 31 rays (Fig. 2); operculum naked, covered with radiating bony ridges; scales strongly ctenoid and adherent; adults blackish violet. Prejuvenile (35 mm standard length) abdomen swollen, with 2 rows of enlarged, subrectangular plate-like scales on each side, less distinct with age but their remnants may still be seen on adults; prejuveniles silvery greenish dorsally, with dark grey blotches fading at about 12 cm; adults dark brown, blackish ventrally . . . . . ***Allocyttus verrucosus***

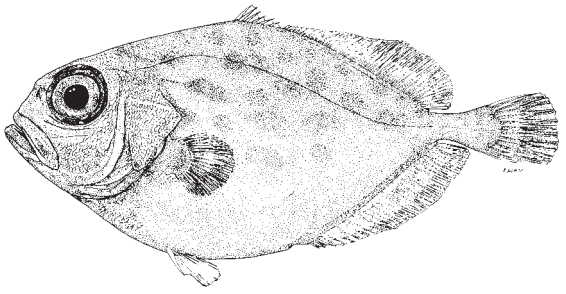


Fig. 1 ***Pseudocyttus maculatus***

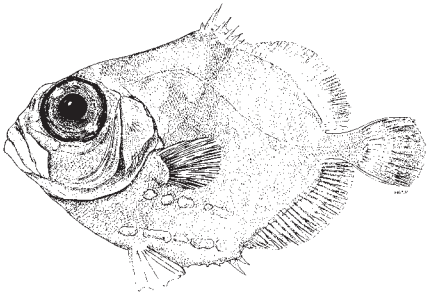


Fig. 2 ***Allocyttus verrucosus***

List of species occurring in the area

Allocyttus verrucosus (Gilchrist, 1906). Warty oreo. Maximum to at least 38 cm. Suriname, Argentina, Namibia, S Africa, W. Indian Ocean, Australia, and New Zealand.

Pseudocyttus maculatus Gilchrist, 1906. Smooth oreo. Maximum 52 cm. Suriname, Argentina, Falkland Islands, S Africa, Kerguelen Island, Australia and New Zealand.

References

Heemstra, P.C. 1990. Oreosomatidae (pp 226-228). In *Fishes of the Southern Ocean*, edited by O. Gon and P.C. Heemstra. Grahamstown, J.L.B. Smith Institute of Ichthyology, 462 p.

James, G.D., T. Inada, and I Nakamura. 1988. Revision of the oreosomatid fishes (Family Oreosomatidae) from the southern oceans, with a description of new species. New Zealand J. Zool., 15:291-326.

Karrer, C. 1986. Family No. 139: Oreosomatidae. In *Smiths' Sea Fishes*, edited by M.M. Smith and P.C. Heemstra. Johannesburg, Macmillan South Africa, pp. 438-440.

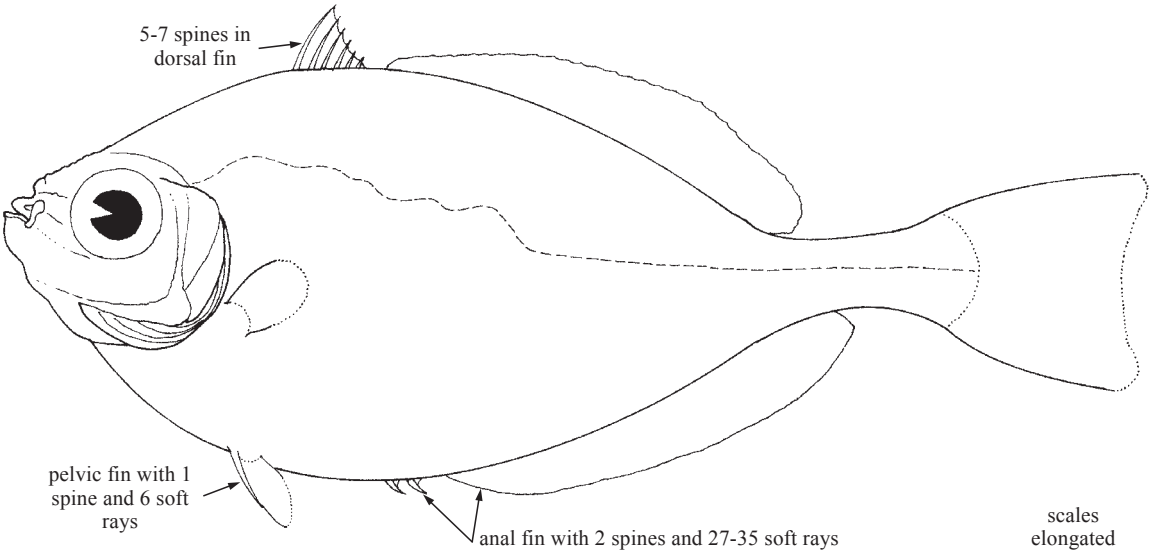
Shimizu, T. 1983. Oreosomatidae (pp 288-289). In *Fishes Trawled off Surinam and French Guiana*, edited by T. Uyeno, K. Matsuura, and E. Fuji. Tokyo, Japan Marine Fishery Resource Research Centre, pp. 288-289.

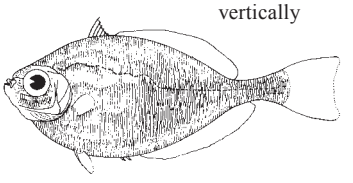
GRAMMICOLEPIDAE

Tinselfishes

by P.C. Heemstra, South African Institute for Aquatic Biodiversity, South Africa

Diagnostic characters: Moderate-sized (to 65 cm) **oblong or diamond-shaped fishes, the head and body greatly compressed; body depth much greater than head length, contained 0.8 to 2.3 times in standard length; head bones thin and soft; mouth minute, upper jaw length contained twice in eye diameter**; maxilla ridged, bound to ascending process of premaxilla and loosely connected to palatines; jaws with a few minute, conical teeth, none on vomer or palatines. **Scales much elongated vertically, covering body and most of head; a row of small spines on body along each side of dorsal- and anal-fin bases**. Branchiostegal rays 7, the membranes joined to the isthmus. **Dorsal fin with 5 to 7 spines and 27 to 34 soft rays; anal fin with 2 spines and 27 to 35 soft rays; dorsal-, anal-, and pectoral-fin soft rays unbranched; caudal fin with 13 branched rays; pectoral fin with 14 or 15 soft rays, much shorter than head length; pelvic fins with 1 slender spine and 6 soft rays**. Vertebrae 36 or 37 (*Xenolepidichthys*) or 43 to 46 (*Grammicolepis*). In young specimens, first anal-fin spine greatly elongated, reaching to or well beyond caudal fin,second dorsal-fin spine usually longer than head; these elongated spines become greatly shortened in adults. **Colour:** body silvery, young with irregular black spots or blotches.



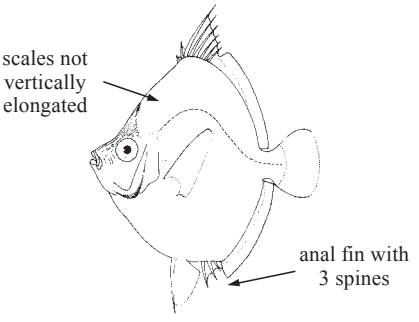


Habitat, biology, and fisheries: Grammicolepids occur in depths of 100 to 800 m in a variety of habitats. Nothing has been published on the biology of tinselfishes. They are usually caught near the bottom with trawls. Not common. Of no commercial interest.

Remarks: The family comprises 2 genera, each with a single species.

Similar families occurring in the area

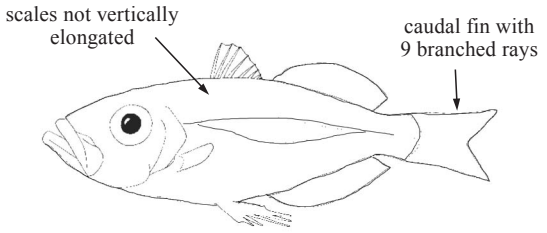
Caproidae: scales not vertically elongated; body with ridged scales; pectoral fins about equal to head length; anal fin with 3 spines.



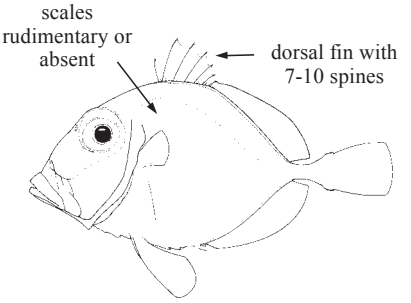
Caproidae

Parazenidae: scales not vertically elongated; mouth large; 2 lateral lines; body depth slightly less than head length, contained 2.6 to 2.8 times in standard length; caudal fin with 9 branched rays.

Zeidae: scales rudimentary or absent; mouth large, upper jaw length greater than eye diameter; dorsal fin with 7 to 10 spines; caudal fin with 11 branched rays.



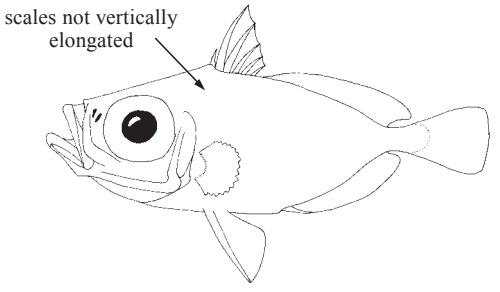
Parazenidae



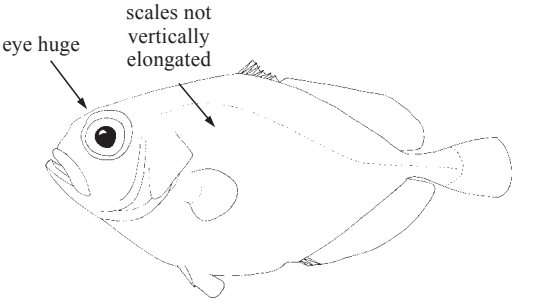
Zeidae

Zeniontidae: scales not vertically elongated; body depth about equal to head length, 2.3 to 2.7 times in standard length; distance from pectoral-fin base to pelvic-fin base less than eye diameter.

Oreosomatidae: scales not vertically elongated; head length half or more of body depth; eye huge, 2 or more times depth of caudal peduncle.



Zeniontidae



Oreosomatidae

Key to the species of Grammicolepidae occurring in the area

1a. Total dorsal-fin rays 32 to 35; no spiny scutes on body at any stage; 29 spinous protuberances along base of dorsal fin . . . . . ***Xenolepidichthys dalgleishi***

1b. Total dorsal-fin rays 39 to 41; young (less than 24 cm standard length) with 10 or 11 widely separated spiny scutes on sides of body and caudal peduncle which disappear with growth; 34 to 36 spinous protuberances along base of dorsal fin . . . ***Grammicolepis brachiusculus***

List of species occurring in the area

The symbol is given when species accounts are included.

Grammicolepis brachiusculus Poey, 1873
(= *Xenolepidichthys americanus* Nichols and Firth, 1939).

Xenolepidichthys dalgleishi Gilchrist, 1922.

References

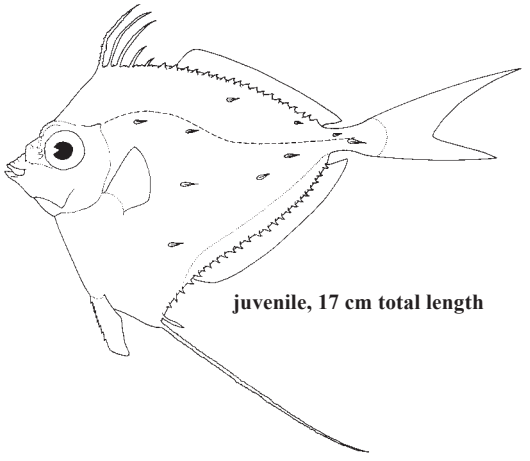
Karrer, C. and P.C. Heemstra. 1986. Grammicolepididae. In *Smith's Sea Fishes*, edited by M.M. Smith and P.C. Heemstra. Johannesburg, Macmillan South Africa, pp. 440-441.

Shimizu, T. 1983. Grammicolepididae. In *Fishes Trawled off Suriname and French Guiana*, edited by T. Uyeno, K. Matsuura, and E. Fuji. Tokyo, Japan Marine Fishery Resource Research Centre, 591 p.

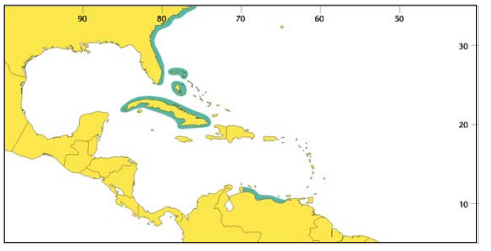
Grammicolepis brachiusculus Poey, 1873 GMG

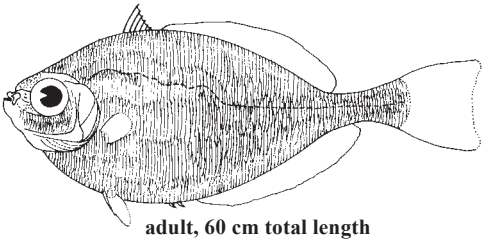
En - Thorny tinselfish.

Maximum size to 65 cm. Prejuveniles (less than 20 cm standard length) have body depth contained 1.4 to 1.6 (2.0 to 2.3 in adult) in standard length, head length 3.2 to 3.8 (4.2 to 4.4 in adult) times in standard length and conspicuous, horizontally flattened spiny scutes on body; body silvery with irregular black blotches on body, black spots on caudal fin and 4 or 5 black bars on anal fin. Metamorphosis from the prejuvenile stage occurs at about 25 to 30 cm standard length, at which time the body becomes more elongate, the spiny scutes are lost and the elongate fin spines are greatly shortened. Caught with trawls in depths of 300 to 900 m. East coast of USA from Georges Bank off Canada to Florida, Bahamas, Cuba, Venezuela, eastern Atlantic, Mediterranean, southern Africa, Japan, and Hawaii.



juvenile, 17 cm total length



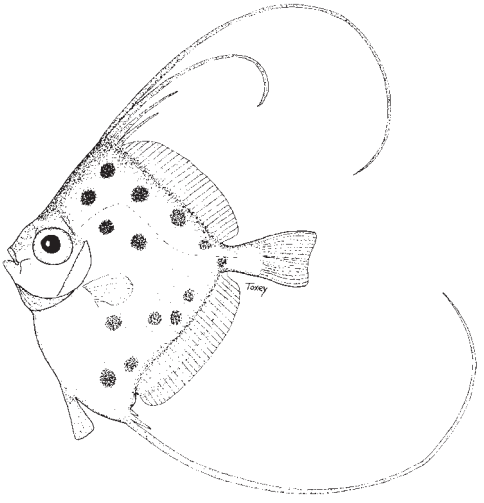


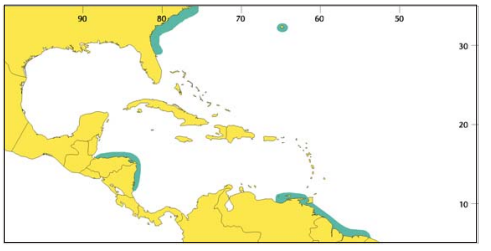
adult, 60 cm total length

Xenolepidichthys dalgleishi Gilchrist, 1922 XED

En - Tinselfish (AFS: Spotted tinselfish).

Maximum size to 15 cm. Body depth contained 0.8 to 1.2 times, head length 2.9 to 3.7 times in standard length; body silvery, with round black spots; anterior pelvic-fin rays and rear margin of caudal fin black. Caught with trawls in depths of 90 to 900 m. Emerald Bank Nova Scotia, Gulf of Maine to Florida, Bermuda, Nicaragua, Honduras, Venezuela, Suriname, southern Africa, and western Pacific.



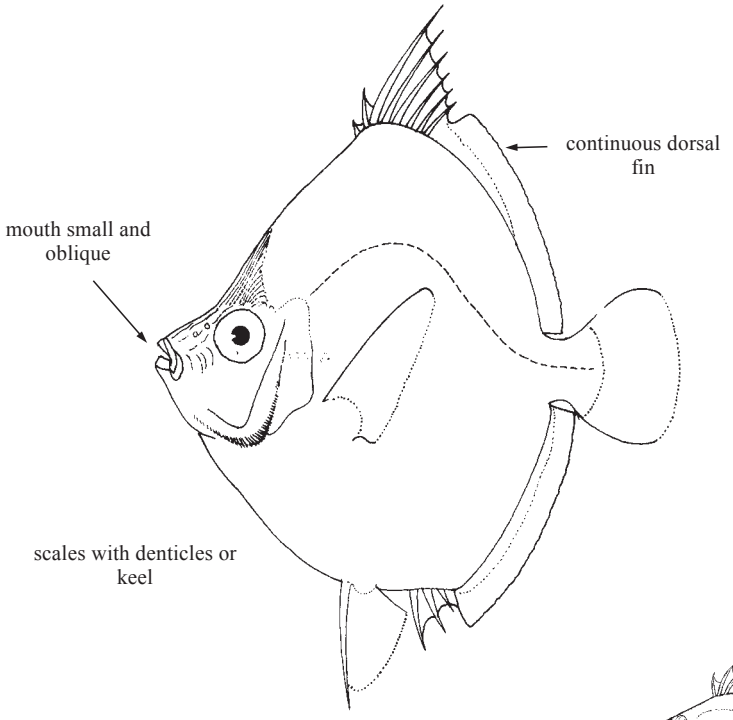


CAPROIDAE

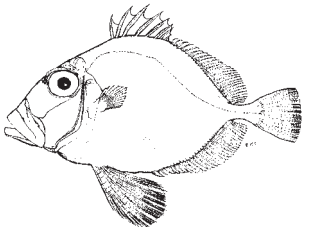
Boarfishes

by N.V. Parin, Shirshov Institute of Oceanology, Russia (after Berry, 1978)

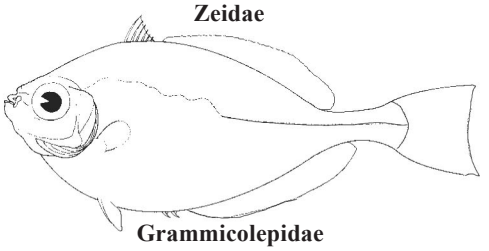
Diagnostic characters: Moderately-sized fishes (to 30 cm total length). Body moderately to extremely deep, compressed laterally, with convex dorsal and abdominal profiles. Head small, with radiating bony ridges. Eyes large. **Mouth small and oblique**. Upper jaw protrusible. Teeth small and conical in narrow bands in both jaws. Gill membranes free from isthmus. **Dorsal fin continuous**; its spinous portion short, **with 8 or 9 spines** (third the longest), separated from much longer soft-ray portion by a notch. Anal fin with 3 spines (first the longest) and long soft-ray portion similar to that of dorsal fin. Caudal fin truncate to rounded. Pectoral fins bluntly pointed, with 1 spine and 12 or 13 soft rays. **Pelvic fins with 1 spine and 5 soft rays. Scales** covering most of body, **with denticulated posterior ridge or keel and small denticles**. Scale rows 44 to 57. Both dorsal- and anal-fin bases with scaly sheaths. Vertebrae 22. **Colour:** fresh specimens red to pinkish on upper body and sides, blending into silver on lower side. Juveniles (about 60 mm standard length) mostly silver with a few red bars on body.



Habitat, biology, and fisheries: Benthopelagic, live near rocky bottom in depths of 65 to 600 m and occur in relatively small schools. Feed on plankton and benthic invertebrates. Edible but not fished commercially.



Zeidae



Grammicolepidae

Similar families occurring in the area

Zeidae: mouth large. Pelvic fins with 1 spine and 6 to 8 soft rays. Scales, when present, never keeled.

Grammicolepidae: gill membranes joined to isthmus. Dorsal-fin spines 5 to 7. Pelvic fins with 1 spine and 6 rays. Scales linear, vertically elongated, without keels.

Key to the species of Caproidae occurring in the area

1a. Dorsal-fin spines 8 (rarely 7 or 9), soft rays 31 to 37; pectoral fins with 13 (rarely 12) soft rays; body depth equal to or more than standard length (0.8 to 1.0 in standard length) . . . . . ***Antigonia capros***

1b. Dorsal-fin spines 9 (rarely 10), soft rays 26 to 30; pectoral fins with 12 (rarely 13) soft rays; body depth less than standard length (1.2 to 1.6 times in standard length) . . . . . ***Antigonia combatia***

List of species occurring in the area

The symbol is given when species accounts are included.

Antigonia capros Lowe, 1843.

Antigonia combatia Berry and Rathjen, 1959.

References

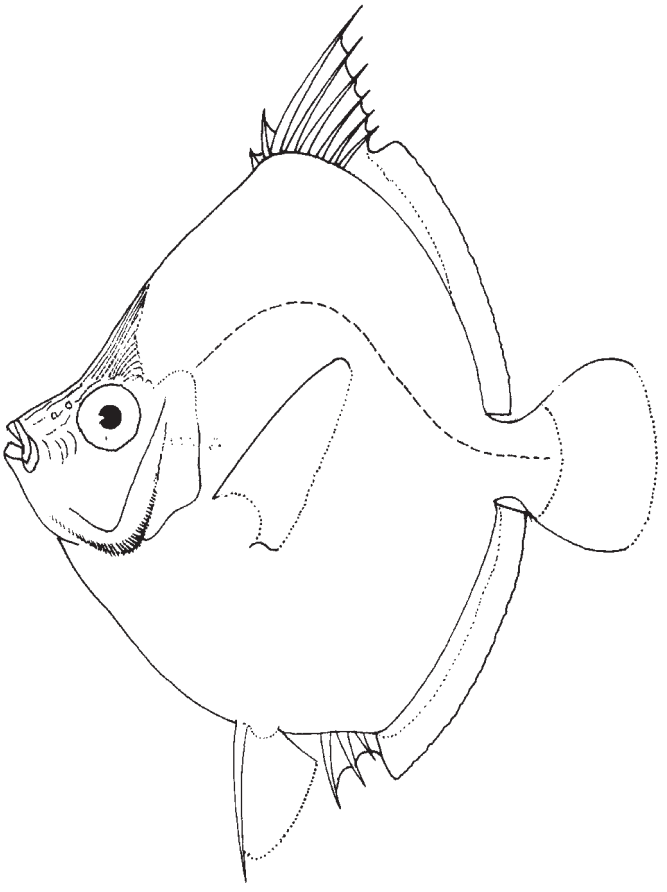
Berry, F.H.1959. Boarfishes of the genus *Antigonia* of the Western Atlantic. *Bull.Fla.State Mus*., 4(7):205-250.

Parin, N.V. and O.D. Borodulina.1986. Preliminary review of the benthopelagic fish genus *Antigonia* Lowe (Zeiformes, Caproidae). *Trudy Inst.Okeanol.*,131:141-172.

Antigonia capros Lowe, 1843 ZAC

Frequent synonyms / misidentifications: None / None.

FAO names: En - Deepbody boarfish.

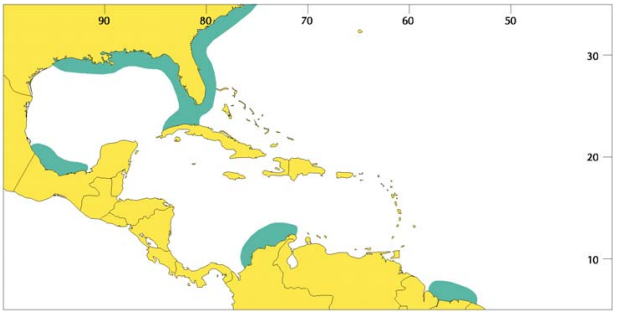


Diagnostic characters: Body very deep (depth 0.8 to 1.0 in standard length), almost rhomboid, strongly compressed. Head 2.5 to 3.0 in standard length, with upper profile steeply rising, concave over eye but convex behind it. Eye moderate, 2.0 to 2.6 in head length. Mouth subvertical. Gill rakers on first arch 19 to 22. **Dorsal fin with 8 strong spines (rarely 7 or 9) and 31 to 37 soft rays. Anal fin with** 3 strong spines and **29 to 34 soft rays**. Caudal-fin rounded. **Pectoral fins** bluntly rounded **with 1 spine** and **13 (rarely 12 or 14) soft rays**. Pelvic-fin spine reaching well beyond anal-fin origin. Scales rough, 47 to 54 in longitudinal row. **Colour:** body pink to reddish, vertical fins hyaline.

Size: Maximum 22 cm total length, typically 15 to 18 cm.

Habitat, biology, and fisheries: Benthopelagic at 65 to 600 m, mainly at 100 to 300 m; juveniles pelagic. Feeds on gastropods, cephalopods, and crustaceans. Of no importance to fisheries.

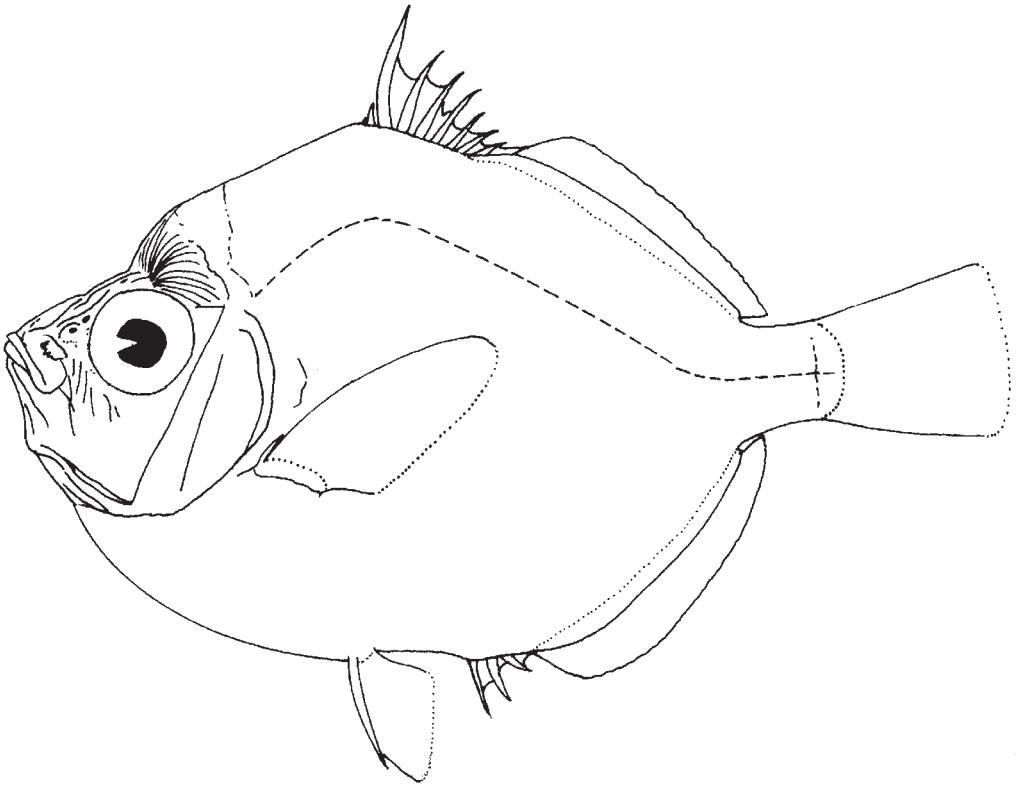
Distribution: Worldwide in subtropical and tropical oceans except the eastern Pacific. Within Area 31 from off southern Massachusetts to Rio de la Plata (Argentina), including the Gulf of Mexico and the Caribbean Sea.



Antigonia combatia Berry and Rathjen, 1959

Frequent synonyms / misidentifications: None / None.

FAO names: En - Shortspine boarfish.

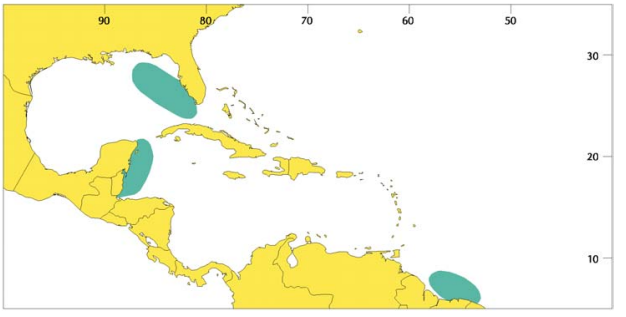


Diagnostic characters: Body moderately deep (depth 1.2 to 1.6 in standard length); nearly oval, strongly compressed. Head 2.4 to 2.7 in standard length, with upper profile not steeply rising, slightly concave over eye. Eye moderate, 2.3 to 2.4 in head length. Mouth oblique, not subvertical. Gill rakers on first arch18 to 20. **Dorsal fin with 9 strong spines (rarely 10) and 26 to 30 soft rays. Anal fin with** 3 strong spines and **23 to 27 soft rays**. Caudal fin truncated. **Pectoral fins** bluntly rounded **with 1 spine** and **12 (rarely 11 or 13) soft rays**. Pelvic-fin spine not or barely reaching anal-fin origin. Scales rough, 51 to 56 in longitudinal row. **Colour:** pink to reddish, silver ventrally.

Size: Maximum 12 cm standard length.

Habitat, biology, and fisheries: Benthopelagic at 115 to 580 m; juveniles pelagic. Feeds on small invertebrates. Of no importance to fisheries.

Distribution: Restricted by the Western Central Atlantic between 40° N and the equator, including the Gulf of Mexico and the Caribbean Sea.



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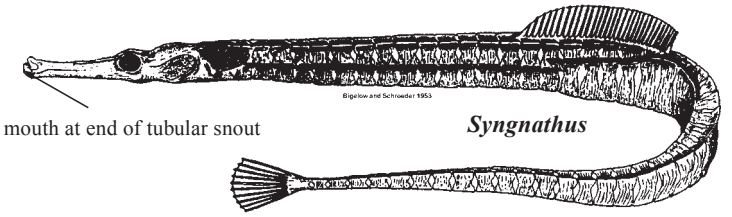
Order GASTEROSTEIFORMES

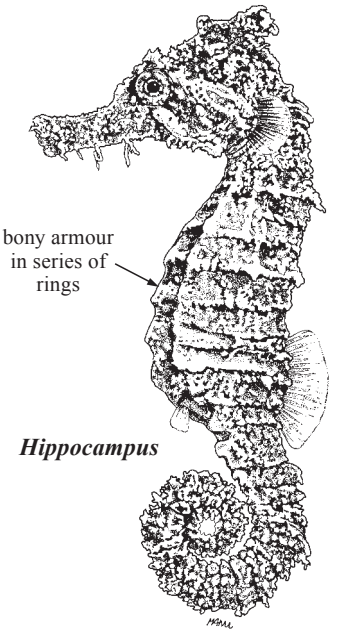
SYNGNATHIDAE

Pipefishes and seahorses

by R.A. Fritzsche, Humboldt State University, California, USA and A. Vincent, McGill University, Quebec, Canada

Diagnostic characters: Body elongate to extremely so; encased in bony armour arranged into series of rings. Maximum length near 300 mm, but most average 100 to 200 mm total length. **Mouth small, toothless, placed at end of tubular snout**. Gills tufted and lobe-like. Gill openings restricted to upper border of operculum. All fins except pelvic fins are usually present; fins sometimes absent. Dorsal fin relatively long, up to 60 soft rays. Anal fin minute with 0 to 6 soft rays. Caudal fin with 0 to 11 soft rays and pectoral fin with 0 to 23 soft rays. Tail may be prehensile in some (seahorses). Anterior 3 vertebrae are elongate. **Colour:** highly variable, however most species are mottled with shades of brown, green, and grey. Some may be quite pale.



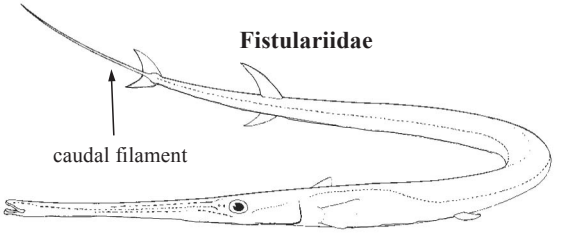


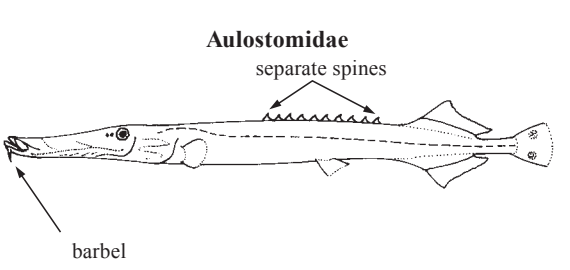
Habitat, biology, and fisheries: Found in all tropical and warm-temperate marine waters, and some even found in fresh water environments. Males brood the eggs and sometimes even the young. This is accomplished by means of a specialized area or even a pouch under the trunk or tail. Pipefishes and seahorses use the long snout and small mouth as pipette-like suction device for obtaining small crustaceans and other live and moving organisms. Locomotion is achieved by rapid undulations of the dorsal and pectoral fins. Most species are taken incidentally as bycatch and can be found in markets as curios or aquarium fishes. In addition, seahorses (*Hippocampus*) and several species of pipefishes are taken in large numbers for use in traditional medicines. Exploitation in western Atlantic largely unknown, but very high in other parts of the world. Available statistics: for live fishes landed for commercial purposes only: in 1994, 112 367 seahorses (*H. erectus, H. reidi, H. zosterae* numbers combined, no distinction between bycatch and target caught) were landed in Florida, USA. Preliminary statistics for 1998 (month of December incomplete) record over 16 000 seahorses (*H. erectus, H. reidi, H. zosterae* numbers combined) landed in Florida, USA, mostly for the aquarium trade, but also for curios. Seahorses as a group were the eighth most economically valuable species landed annually from 1990 through 1996. Pipefish landings only exceeded 2 000 in one year (1991) and the value peaked in 1996 at US$3 731 (when 1 400 were landed). (Florida Department of Environmental Protection's Marine Fisheries Information System, Information on Marine Life Finfishes).

Similar families occurring in the area

Fistulariidae: a distinct caudal filament present; body depressed; no armour rings.

Aulostomidae: barbel present; distinct separate spines anterior to soft dorsal fin; no armour rings.





Key to the species of *Hippocampus* occurring in the area

1a. Dorsal-fin soft rays 10 to 13; pectoral-fin soft rays 10 to 13 . . . . . ***Hippocampus zosterae***

1b. Dorsal-fin soft rays 16 to 20; pectoral-fin soft rays 14 to 17. . . . . → ***2***

2a. Head and body pigmentation in the form of distinct dark round spots of varying sizes, snout length 0.41 to 0.49 of head length . . . . . ***Hippocampus reidi***

2b. Head and body pigmentation in the form of blotches, streaks, and lines, snout length 0.33 to 0.46 of head length . . . . . ***Hippocampus erectus***

List of species occurring in the area

The symbol is given when species accounts are included.

Amphelikturus dendriticus (Barbour, 1905). To 81 mm. New Brunswick, Canada S to Pernambuco, Brazil.

Anarchopterus criniger (Bean and Dresel, 1884). To 94 mm. Bahamas, North carolina, SE Florida, and Gulf of Mexico.

Anarchopterus tectus (Dawson, 1978). To 114 mm. Bahamas, Florida Keys, Caribbean S to Venezuela.

Bryx dunckeri (Metzelaar, 1919). To 100 mm. North Carolina, Bermuda, Bahamas, Antilles, Florida to Brazil.

Bryx randalli (Herald, 1965). To 93 mm. Haiti, lesser Antilles, Belize, Providencia Islands, E Venezuela.

Cosmocampus albirostris (Kaup, 1856). To 208 mm. Bermuda, Bahamas, Antilles, Atlantic seaboard, and Gulf of Mexico.

Cosmocampus brachycephalus (Poey, 1868). To 97 mm. Bahamas, Antilles, Florida S to Venezuela.

Cosmocampus elucens (Poey, 1868). To 164 mm. New Jersey to Brazil, including Bahamas, Bermuda, and Antilles.

Cosmocampus hildebrandi (Herald, 1965). To 86 mm. North Carolina and SE and W Florida.

Cosmocampus profundus (Herald, 1965). To 197 mm. E Florida, Virgin Islands, and Yucatán Peninsula.

Hippocampus erectus Perry, 1810.

Hippocampus reidi Ginsburg, 1933.

Hippocampus zosterae Jordan and Gilbert, 1882.

Micrognathus crinitus (Jenyns, 1842). To 145.5 mm. Bermuda to Bahia, Brazil.

Micrognathus erugatus Herald and Dawson, 1974. To 64 mm. Bahia, Brazil.

Minyichthys inusitatus Dawson, 1983. To 29 mm. W Caribbean Sea.

Oostethus brachyurus lineatus (Kaup, 1856). To about 200 mm. New Jersey to Sao Paulo, Brazil and Panama Canal.

Penetopteryx nanus (Rosén, 1911). To 31.7 mm. Bahamas and Isla Providencia, Colombia.

Pseudophallus mindii (Meek and Hildebrand, 1923). To 159 mm. Virgin Islands, Greater Antilles, Belize S to Brazil.

Syngnathus affinus Günther, 1870. To 218 mm. Corpus Christi, Texas to Campecho, Mexico.

Syngnathus caribbaeus Dawson, 1979.To 225 mm. Antilles, Belize S to Venezuela.

Syngnathus dawsoni (Herald, 1969). To 175 mm. Puerto Rico and Martinique.

Syngnathus floridae (Jordan and Gilbert, 1882). To 258 mm. Atlantic and Gulf of Mexico coasts, Bermuda, and Bahamas.

Syngnathus folletti Herald, 1942. To 250 mm. Fortaleza, Brazil S to Uraguay and Argentina.

Syngnathus fuscus Storer, 1839. To 305 mm. Gulf of St. Lawrence S to Jupiter Inlet, Florida.

Syngnathus louisianae Günther, 1870. To 381 mm. New Jersey S to Dry Tortugas and Texas, and Mexico.

Syngnathus makaxi Herald and Dawson, 1972. To 70 mm. Quintana Roo, Mexico.

Syngnathus pelagicus Linnaeus, 1758. To 181 mm. Nova Scotia S to Colombia, including Gulf of Mexico and Caribbean.

Syngnathus scovelli (Evermann and Kendall, 1896). To 183 mm. Florida and Gulf of Mexico S to Brazil.

Syngnathus springeri Herald, 1942. To 345 mm. W Bahamas, Massachusetts S to Dry Tortugas.

References

Dawson, C.E. 1982. Family Syngnathidae. The pipefishes. In Fishes of the western North Atlantic. *Mem. Sears Found. Mar. Res.,* 1(8):1-172.

Lourie, S.A., A.C.J. Vincent and H.J. Hall. 1999. *Seahorses: An identification guide to the world's species and their conservation*. London, Project Seahorse, 214 p.

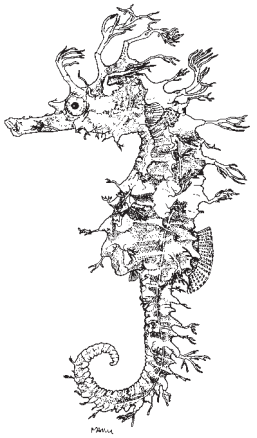
Robins, C.R. and G.C. Ray. 1986. *A field guide to the Atlantic Coast fishes of North America*. The Peterson Field Guide Series. Boston, Houghton Mifflin Company, 354 p.

Vari, R.P. 1982. The seahorses (subfamily Hippocampinae). In Fishes of the western North Atlantic. *Mem. Sears Found. Mar. Res.*, 1(8):173-189.

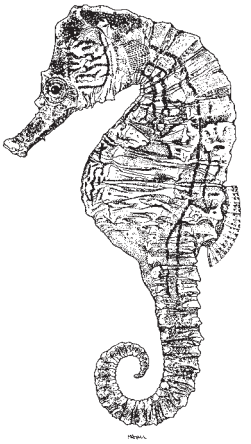
Hippocampus erectus Perry, 1810

En - Lined seahorse.

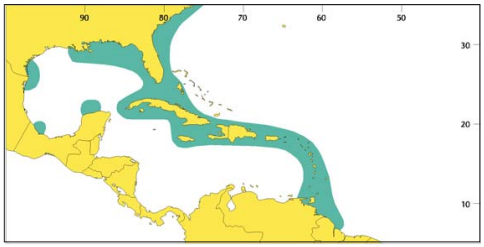
Maximum size: 18.5 cm. From Nova Scotia along western Atlantic coast, through Gulf of Mexico and Caribbean to Venezuela from shallow inshore areas to depths of over 70 m. (A southern form of *H. erectus*, possibly a new species, has been collected in Suriname and Brazil).



male 91 mm



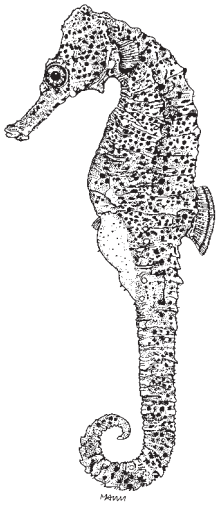
male 107 mm



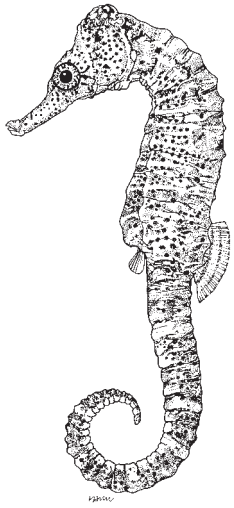
Hippocampus reidi Ginsburg, 1933

En - Longsnout seahorse.

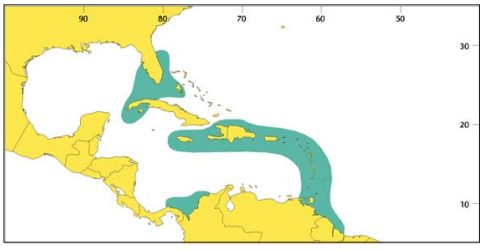
Maximum size: 17.5 cm. Throughout Gulf of Mexico and Caribbean (including northern coast of South America) north on west Atlantic coast to North Carolina, Brazil.



male



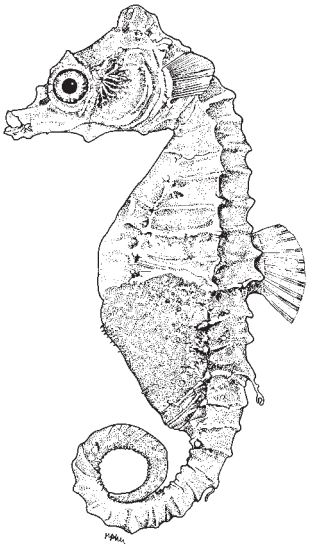
female



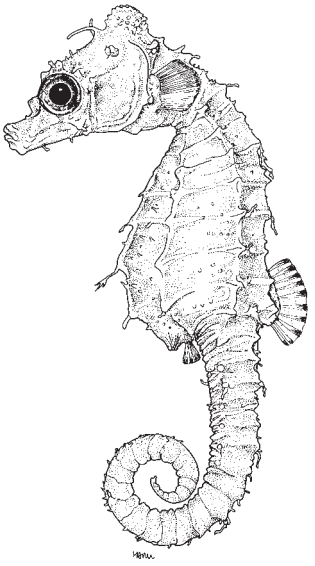
Hippocampus zosterae Jordan and Gilbert, 1882

En - Dwarf seahorse.

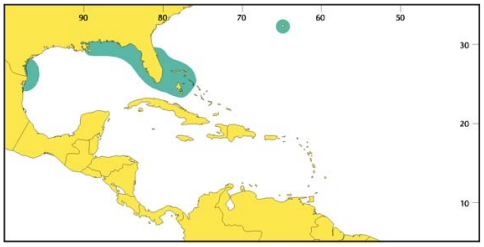
Maximum size: 3.8 cm. In shallow seagrass beds from the Gulf of Mexico east through the Bahamas and to Bermuda.



male



female



AULOSTOMIDAE

Trumpetfishes

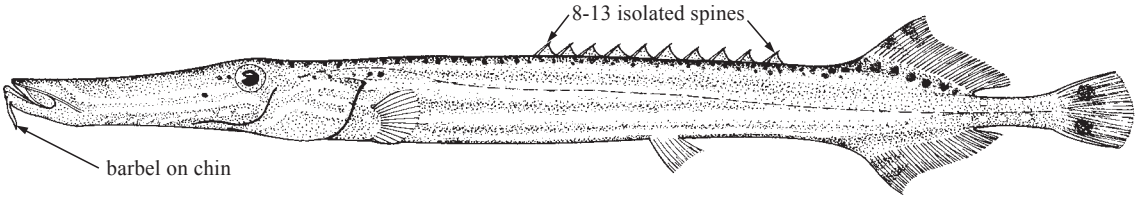
by R.A. Fritzsche, Humboldt State University, California, USA

A single species occurring in the area.

Aulostomus maculatus Valenciennes, 1837

Frequent synonyms / misidentifications: None / None.

FAO names: En - Trumpetfish; **Fr** - Trompéte tachetée; **Sp** - Trompeta pinctada.

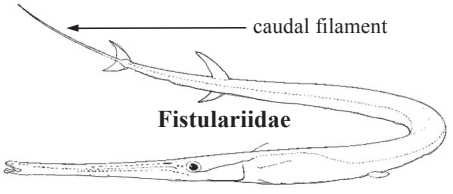


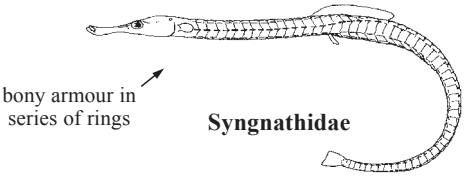
Diagnostic characters: Body elongate and compressed. Mouth at end of **elongate snout; single barbel on chin. Dorsal fin with 8 to 13 isolated spines**; second dorsal fin opposite anal fin and similarly shaped, both with 21 to 25 segmented soft rays; pelvic fins small, abdominal, with 6 soft rays. Lateral line continuous. Body covered with small ctenoid (rough) scales, except for the head and anterior part of the back, which are scaleless. Vertebrae 59 to 61; the first 4 elongate and fused. **Colour:** overall reddish or brown, irregularly marked with black or brown spots; silvery streaks along the head and sides of body; anterior rays of dorsal and anal fins with a black bar near their base, this bar may occasionally be reduced to a spot; caudal fin with 1 or 2 black spots.

Similar species occurring in the area

Fistulariidae: a distinct caudal filament present; body depressed rather than compressed; no spines before dorsal fin.

Syngnathidae: body covered with bony rings; no chin barbel; usually much smaller size.

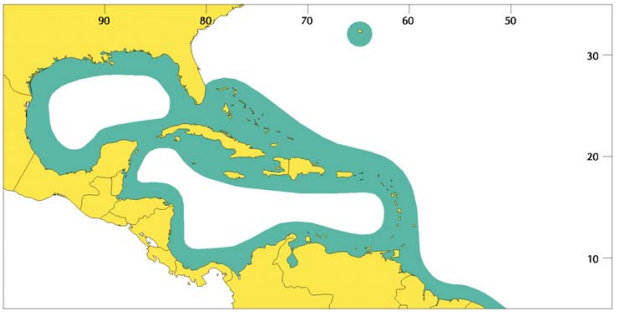




Size: Maximum: 75 cm; common to 50 cm.

Habitat, biology, and fisheries: A fairly common reef fish occurring in shallow, clear water. Most frequently observed to be hanging vertical in the water with the head down. Feeds on small fishes and shrimps. Caught incidentally throughout its range. Separate statistics are not reported for this species. Taken frequently in seines and traps. Marketed or consumed locally.

Distribution: From the Florida Keys and Bermuda south to Brazil.



References

Robins, C.R. and G.C. Ray. 1986. *A field guide to the Atlantic Coast fishes of North America*. The Peterson Field Guide Series. Boston, Houghton Mifflin Company, 354 p.

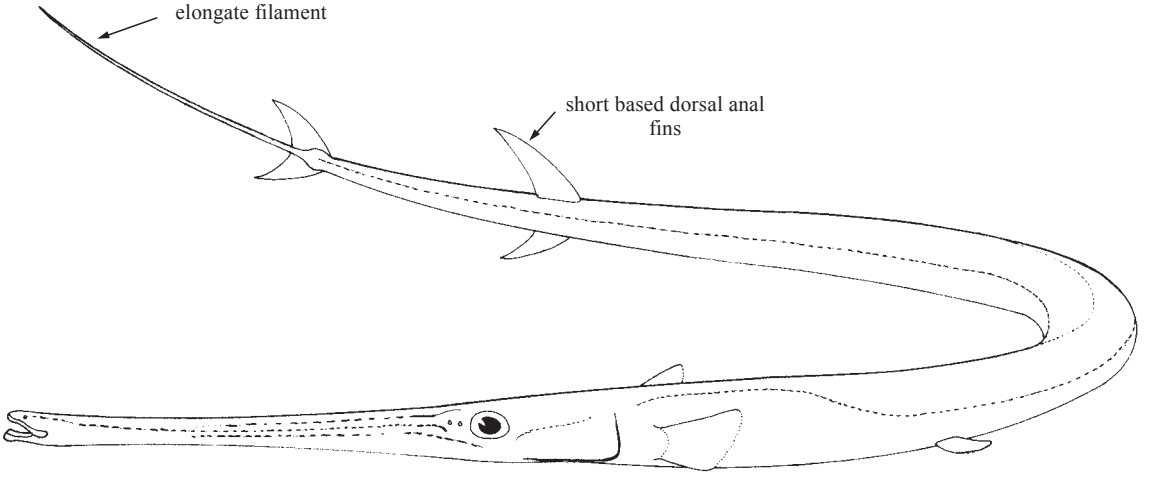
Wheeler, A. 1955. A preliminary revision of the fishes of the genus *Aulosomus*. *Ann. Mag. Nat. Hist.* 12(8)92:613-623.

FISTULARIIDAE

Cornetfishes (flutemouths)

by R.A. Fritzsche, Humboldt State University, California, USA

Diagnostic characters: Body elongate (to 2 m) and depressed. Mouth small at end of **elongate snout**; teeth on jaws small. **Dorsal and anal fins** short-based and opposite, **with 14 to 16 segmented (soft) rays**; pectoral fins with 15 to 17 rays; pelvic fins small and abdominal, with 6 rays. Lateral line arched anteriorly almost to middle of back, posteriorly continuing out onto **elongate filament produced by the middle 2 caudal-fin rays**; posterior lateral-line ossifications sometimes bearing sharp spines. Body of juveniles covered with rows of small spinules; only the adults of 1 western Atlantic species retain these spinules; a row of elongate bony plates may be present on midline just anterior to dorsal and/or anal fin. Total number of vertebrae 76 to 87, with the first 4 elongate and fused. **Colour:** variable with the species. *Fistularia petimba* is red to orange-brown above, silvery below; the fins may also have an orange cast; *Fistularia tabacaria* is brownish olive above, lighter below, with a series of pale blue spots from head to dorsal fin on midline of back, a row of blue spots lateral to the mid-dorsal row and 2 rows of blue spots on the snout.

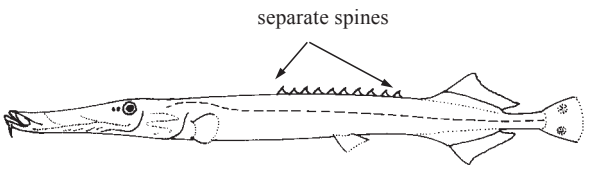


Habitat, biology, and fisheries: *Fistularia petimba* is typically found along coastal areas with soft bottoms, usually at depths over 10 m. *Fistularia tabacaria* is most often seen in seagrass beds and coral reefs. Cornetfishes feed on small fishes and shrimps. Although not important in commercial fisheries of the area, they are frequently taken in seines and traps and may occasionally appear in local fish markets.

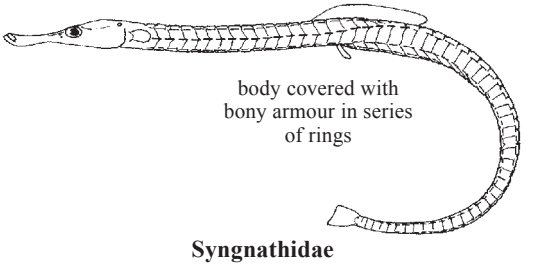
Similar families occurring in the area

Aulostomidae: no distinct caudal-fin filament; barbel present on lower jaw; body compressed rather than depressed; distinct separate spines anterior to soft dorsal fin.

Syngnathidae: smaller; body covered with armour; anal fin reduced or absent; caudal-fin filament absent.



Aulostomidae



Syngnathidae

Key to the species of Fistulariidae occurring in the area

1a. Elongate bony plates imbedded in skin along midline of back; posterior lateral-line ossifications ending in a sharp spine; immaculate red or brown above . . . . . ***Fistularia petimba***

1b. No elongate bony plates along midline of back; posterior lateral-line ossifications without a spine; rows of blue spots on back . . . . . ***Fistularia tabacaria***

List of species occurring in the area

Fistularia petimba Lacepède, 1803. To 200 cm total length. Circumtropical except in E Pacific; SE Florida to Central America.

Fistularia tabacaria Linnaeus, 1758. To 200 cm total length. Tropical Atlantic; Bermuda, Georges Bank, and S Canada to Brazil.

References

Fritzsche, R.A. 1976. A review of the cornetfishes, genus *Fistularia* (Fistulariidae), with a discussion of intrageneric relationships and zoogeography. *Bull. Mar. Sci*., 26(2):196-204.

Robins, C.R. and G.C. Ray. 1986. *A field guide to the Atlantic Coast fishes of North America. The Peterson Field Guide Series.* United States, Houghton Mifflin Company, 354 p.

MACRORAMPHOSIDAE

Snipefishes

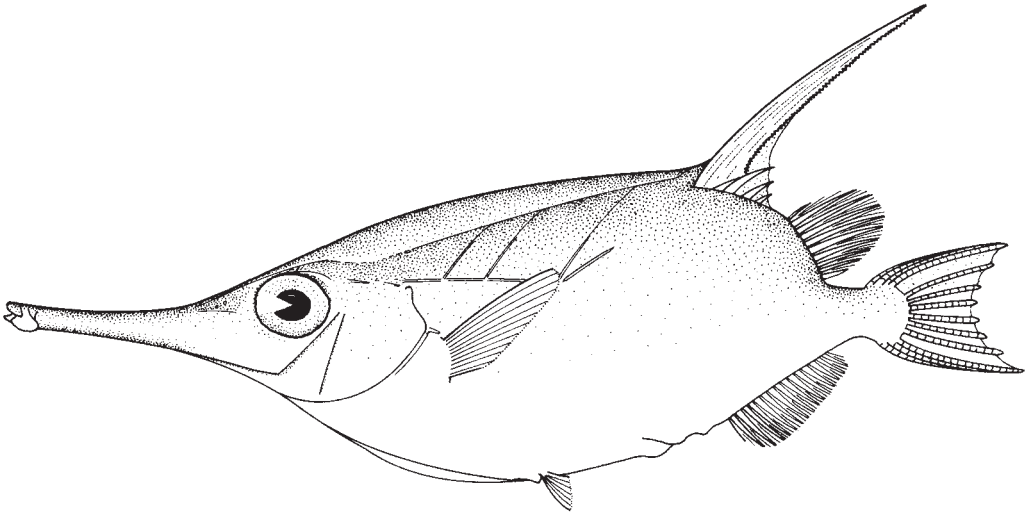
by R.A. Fritzsche, Humboldt State University, California, USA

A single species occurring in the area.

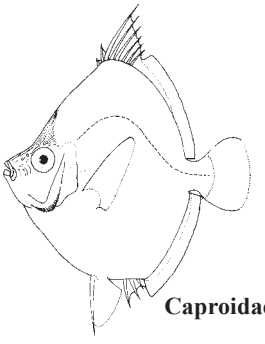
Macroramphosus scolopax (Linnaeus, 1758) SNS

Frequent synonyms / misidentifications: *Macroramphosus gracilis* (Lowe, 1839); *Macrorhamphosus velitaris* (Pallas, 1776) / None.

FAO names: En - Longspine snipefish; **Fr** - Bécasse de mer; **Sp** - Trompetero.



Diagnostic characters: Body elongate and compressed. Head elongate; the eyes lateral, large, their diameter contained about 4.5 times in snout; **snout produced as a slender tube; mouth small and terminal. First dorsal fin with second spine large and serrate on rear margin, other spines stout but short**; second dorsal and anal fins with short, slender rays. Scales small, finely toothed, giving the body a "sandpapery" feel. **Colour:** red on back, pale pink on sides and belly.



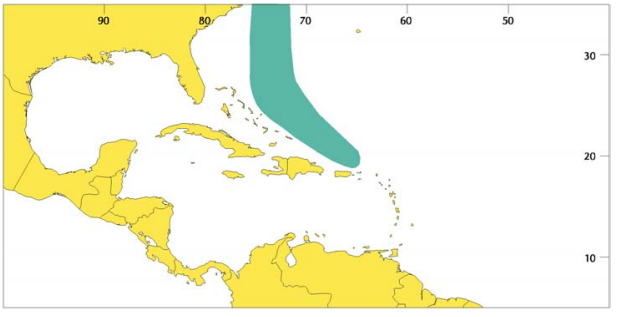
Caproidae

Similar families occurring in the area

Caproidae, Oreosomatidae, and Zeidae: all have deep, compressed bodies but large jaws and relatively short snouts.

Size: Maximum to about 15 cm.

Habitat, biology, and fisheries: Lives between the seabed and midwater on the lower continental shelf over sand (25 to 600 m depth). Feeds mainly on planktonic crustaceans. Taken incidentally over the lower parts of the continental shelf. Separate statistics are not reported. Taken mainly in bottom trawls. Not often seen in markets.



Distribution: Off the east coast of the USA and the Greater Antilles; also, widespread in eastern Atlantic and Mediterranean, and reported from the southern Atlantic, southwestern Indian Ocean, and western Pacific; probably worldwide.

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Order SCORPAENIFORMES
DACTYLOPTERIDAE
Flying gurnards

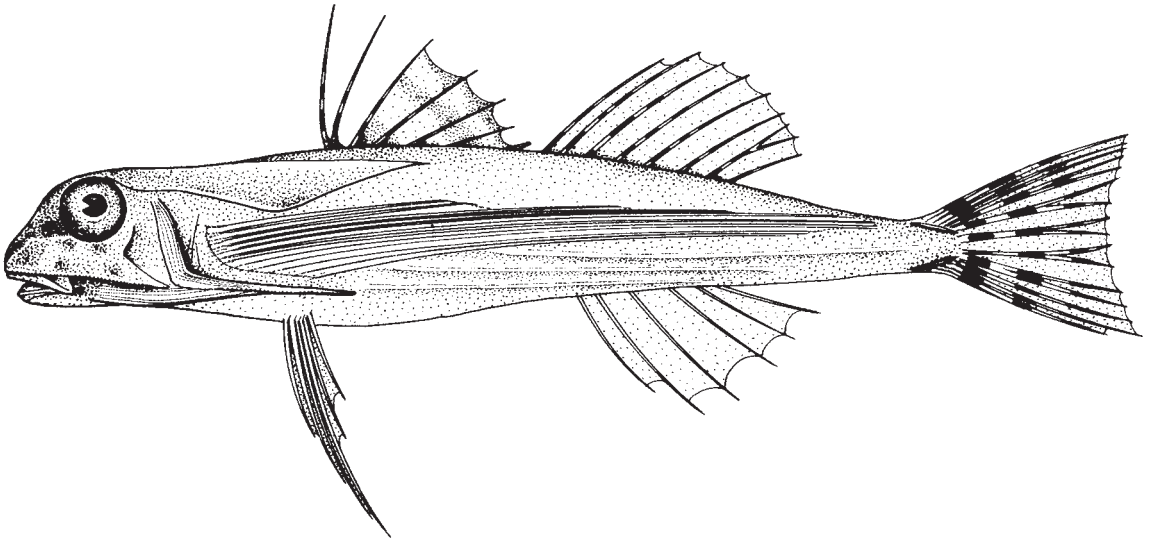
by W.F. Smith-Vaniz, US Geological Survey, Florida, USA

A single species occurring in the area.

Dactylopterus volitans (Linnaeus, 1758)

Frequent synonyms / misidentifications: None / None.

FAO names: En - Flying gurnard; **Fr** - Poule de mer; **Sp** - Alón.



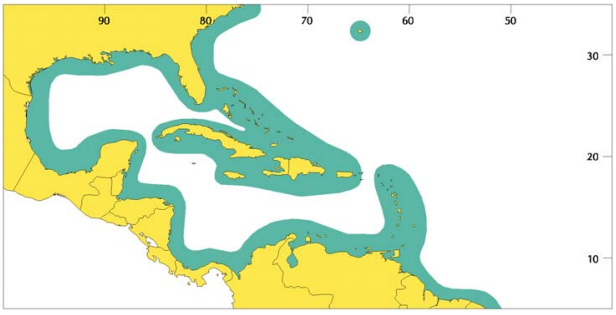
Diagnostic characters: A moderately elongate fish. **Head blunt, top and sides encased in a bony shield; a long, keeled spine extending posteriorly from the nape to below midbase of first dorsal fin; angle of preopercle also bearing a long spine**, with a serrate keel; jaws with a band of small nodular teeth. Spinous and soft dorsal fins separated by a deep notch; **anterior 2 dorsal-fin spines adjacent to each other, interconnected by a basal membrane, and not separated from remainder of spinous dorsal fin**; anal fin with only 6 soft rays; caudal fin emarginate, with 2 sharp keels on its base; bases of pectoral fins horizontal, the fins divided into 2 sections, an anterior short part of 6 soft rays and a posterior long part of 26 to 30 soft rays which reach the caudal-fin base in adults. Scales scute-like with sharp keels. **Colour:** variable with surroundings; often yellowish brown, with bright blue spots on pectoral fins.

Similar species occurring in the area

The bony head shield in combination with the long keeled spine on nape and the long serrated preopercular spine will readily distinguish this species from all others occurring in the area. The Triglidae, which are superficially similar in having large pectoral fins and the head encased in bony armour, differ additionally in having the spinous dorsal fin entire and all spines united by a fin membrane.

Size: Maximum: to at least 45 cm; common to 20 cm.

Habitat, biology, and fisheries: A benthic fish inhabiting sandy or muddy bottoms in coastal waters at depths to about 80 m; capable of "walking" on the bottom by alternately moving the pelvic fins while using the short pectoral-fin rays to scratch in the sand, probably in searching of food. Widely reported in the literature as capable of leaping free of the surface and gliding for short distances, hence the common name (but these reports are erroneous). When the fish is alarmed, the pectoral fins are spread laterally. Feeds primarily on benthic crustaceans, especially crabs, clams, and small fishes. Not fished commercially. Separate statistics are not reported for this species. Adults are occasionally taken with seines (mandingas, Venezuela); young of about 5 cm are commonly taken at night (attracted by light). Barely used for food.



Distribution: Throughout the area, including Bermuda; northward extending to Massachusetts and southward to Argentina.

References

Eschmeyer, W.N. 1997. A new species of Dactylopteridae (Pisces) from the Philippines and Australia, with a brief synopsis of the family. *Bull. Mar. Sci.*, 60(3):727-738.

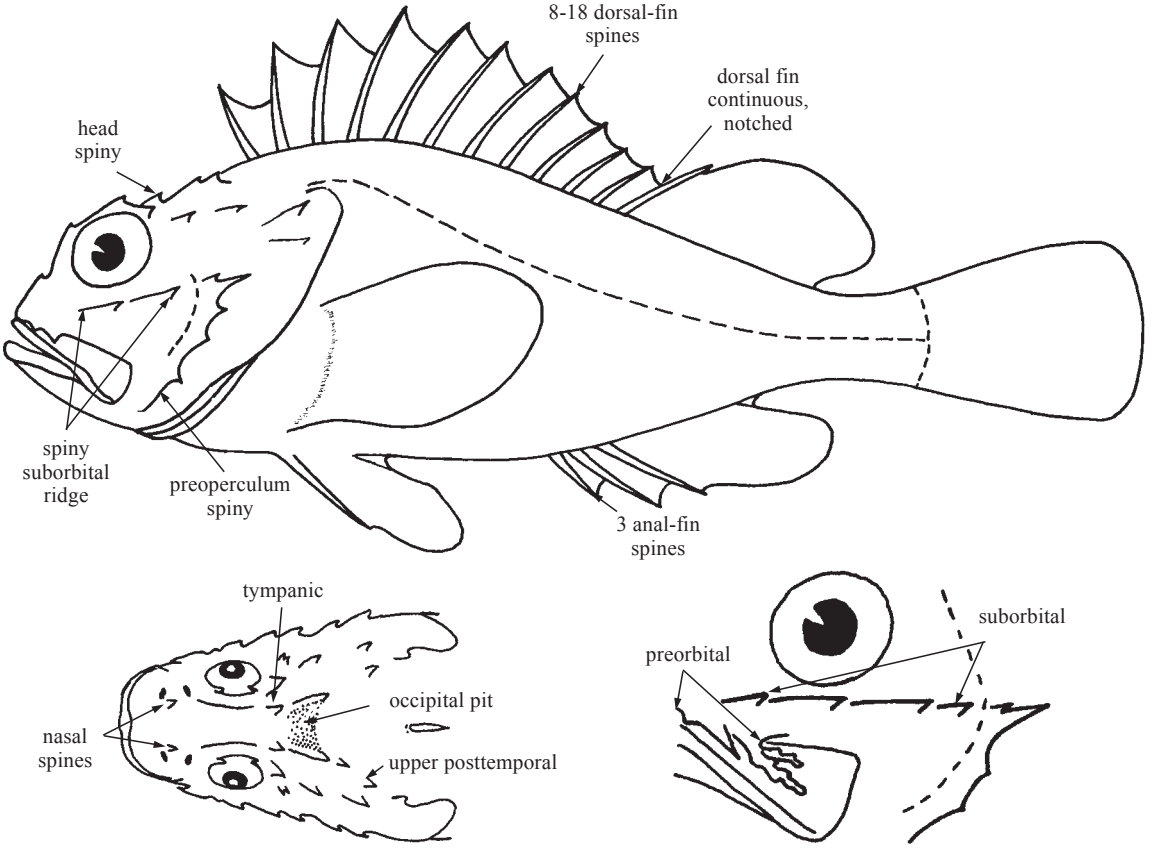
Eschmeyer, W.N. and L.J. Dempster. 1990. Dactylopteridae. Checklist of the fishes of the eastern tropical Atlantic (Clofeta), Vol. 2, edited by J.C. Hureau, C. Karrer, A. Post, and L. Saldanha. UNESCO Paris, pp 690-691.

SCORPAENIDAE

Scorpionfishes (also rosefishes, rockfishes, stingfishes)

by S.G. Poss, Ocean Springs, Mississippi, USA and W.N. Eschmeyer, California Academy of Sciences, USA

Diagnostic characters: Body usually weakly, rather than strongly, compressed; body depth 21 to 50% standard length. **Head moderate to large, 37 to 50% standard length**, often notably depressed and with cirri, particularly above eye. Eye small to relatively large, 4 to 14% of standard length. Snout short to long, often prominent, 6 to 20% of standard length. Mouth often large and upturned, upper jaw 9 to 23% standard length. Numerous small conical teeth present on upper and lower jaws, with those on vomer and palatine present or absent. Branchiostegal rays typically 7 (rarely 6). Gill rakers on first arch usually small or moderate, 1 to 9 in upper arch, 4 to 20 in lower arch. **All species with suborbital stay (or ridge), an extension of the third infraorbital bone (second suborbital) extending backward across cheek and usually firmly bound to preopercle. Most species with numerous head spines**, with those on lacrimal bone (first infraorbital bone), orbital margin and behind occiput most prominent. **Preopercular margin with 3 or more spines, usually 4 or 5; other spines scattered on head. Dorsal fin with strong venomous spinous part bearing 8 to 18 spines** connected to soft-rayed part posteriorly, with 7 1/2 to 13 1/2 soft rays, the last typically split to its base and counted as 1 1/2. **Anal-fin spines normally 3 in the area**. Caudal fin typically rounded or truncate, never forked, 15 to 40% standard length, usually about 27 to 35% standard lenth. Pectoral fins usually large, with 11 to 24 rays; with rays of larger individuals of most species branched. Pelvic fins thoracic in position, with 1 strong spine and 5 (or less often 4) branched rays. Scales in most species relatively small and either ctenoid (rough to touch) or cycloid (secondarily without ctenii and smooth to touch), entirely absent in others, or present only as deeply-embedded scale rudiments. Lateral-line present, with 12 to 54 pored or tubed scales (lateral-line scales trough-like in the subfamily Setrachinae). When present, scales above lateral line 4 to 8; scales below lateral line 10 to 19. **All species possess striated swimbladder musculature that is extrinsic in nearly all species**, with musculature present even in those lacking swimbladders. Pyloric caecae 1 to 16. Vertebrae 24 to 29. **Colour:** most species strongly camouflaged, red, reddish brown, or brown in colour, and usually have barred or mottled colour patterns that are typically darker dorsally than ventrally. Those caught below about 50 m are mostly red and white, often with spots of darker red, brown, or black.



Habitat, biology, and fisheries: Scorpionfishes and their near relatives are typically found on or near the bottom, which they often strongly resemble. Most species in the area are found on relatively nearshore hard bottoms and reefs, or associated with coral rubble, from the surface to a depth of 150 m. Some species in the area range into deeper waters (to 800 m) and onto softer bottoms, although outside the area, captures to 1 113 m have been reported. A few species, such as those of the genera *Setarches* and *Ectreposebastes* are pelagic or semipelagic, occurring offshore in depths of 200 to 800 m. Many species are relatively small, typically under 200 mm standard length and their biology poorly studied. Nonetheless, most are known to lead solitary lives, and evidently aggregate only for reproduction. The young of most species are planktonic, with many settling out of the plankton relatively quickly. Most feed primarily on arthropods and many feed on small fishes as they attain larger sizes. Most species are extremely well camouflaged and excellent ambush predators. Vividly (aposematically) coloured lionfishes or turkeyfishes found in the Indo-Pacific (but not in this area) are notable exceptions. Most scorpionfishes are ovoviviparous, producing between a few hundred and a few thousand eggs, although some are viviparous. Although all are edible, most species are small and relatively dangerous to handle, or occur on hard bottoms, and thus do not form the basis of large fisheries, despite being at times common in bycatch and their flesh generally of excellent quality for food. Because most species are too small, not abundant enough, or found on rocky bottoms, they are presently of little commercial importance in the Western Central Atlantic. However, larger species are often encountered in local fresh-fish markets and highly valued as food. A few shallow-water species are caught by sport fishermen on hook-and-line, some taken by the handline fishery, and others caught incidental to trawl fisheries. *Helicolenus dactylopterus* is commonly taken by trawlers working moderate depths (400 to 600 m) for shrimp. Some scorpionfishes are of considerable commercial importance outside Area 31, especially in cold water regions.

Remarks: Nearly all scorpionfishes possess well-developed venom glands associated with their fin-spines and should be handled with extreme caution, lest painful and potentially fatal wounds inflicted by their sharp fin and head spines. Wounds can result in intense pain and swelling (death has not resulted from stings of Atlantic species, as is the case for stings from certain Indo-Pacific species). Immerse wounded area in hot water to partially denature the protein toxin and to help relieve pain. See a physician for treatment of shock and for prevention of infection, if needed.

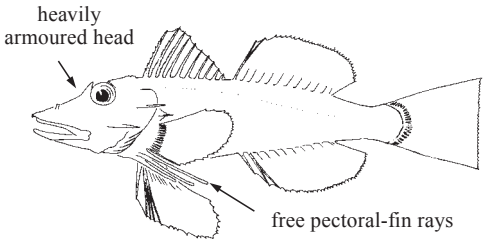
Similar families occurring in the area

Fishes of several other bony-fish families are superficially similar to scorpaenids in general appearance. Like their near relatives, the searobins (Triglidae), scorpaenids possess a bony suborbital stay below and behind the eye that attaches to the preopercle. In addition, most scorpionfishes bear numerous head spines not seen in species otherwise of similar colour or body shape.

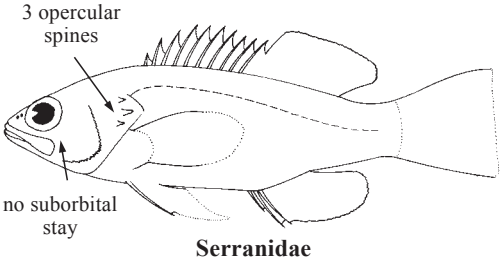
Triglidae (searobin family): possess a very broad suborbital stay; all species have heavily armoured heads and free, highly mobile, lowermost pectoral-fin rays (only few scorpaenids possess heavily armored heads or free pectoral-fin rays (none in the area), and none have these characteristics in combination as do searobins, except for the Apistinae (Indo-Pacific), which can be distinguished from triglids by their movable lacrimal bone).

Serranidae: similar to some scorpaenids in head and body shape, but often having concave, lunate, or forked caudal fins; no suborbital stay under eye that attaches to preopercle; often 3 opercular spines (typically only 2 in scorpaenoids); many species possess large canine teeth common in anterior end of upper and lower jaws (in contrast to the comparatively uniform small teeth of scorpaenoids).

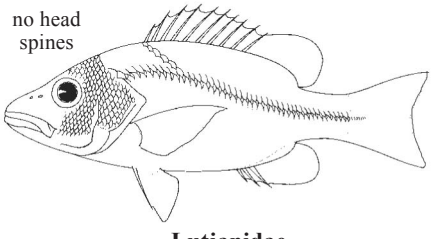
Lutjanidae and other perch-like families: Some red-coloured scorpionfishes resemble red snappers, but snappers and other bass-like families lack the characteristic head spines of scorpaenids.



Triglidae



Serranidae



Lutjanidae

Key to the species of Scorpaenidae occurring in the area

1a. Dorsal-fin spines almost always 13; palatine teeth absent . . . . . ***(Scorpaenodes)*** → ***2***

1b. Dorsal-fin spines almost always 12; palatine teeth present . . . . . → ***3***

2a. Pectoral-fin rays 18 to 20, usually 19; 1 or more small spines below main row of suborbital spines (Fig. 1) . . . . . ***Scorpaenodes carribaeus***

2b. Pectoral-fin rays 16 to 18, usually 17; suborbital ridge with a single row of spines, without spines below main row . . . . . ***Scorpaenodes tredecimspinosus***

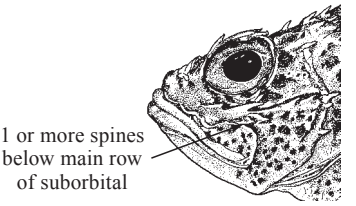


Fig. 1 ***Scorpaenodes carribaeus*** **head**

3a. Second preopercular spine longest (Fig. 2); soft dorsal fin rays 11 1/2 or more . . . . . ***Helicolenus dactylopterus***

3b. First preopercular spine longest, not counting accessory spine at base of first spine (Fig.3); soft dorsal fin rays 10 1/2 or fewer (usually 8 1/2 or 9 1/2) . . . . . → ***4***

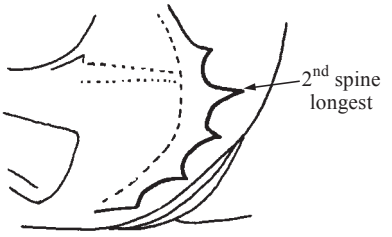


Fig. 2 ***Helicolenus***

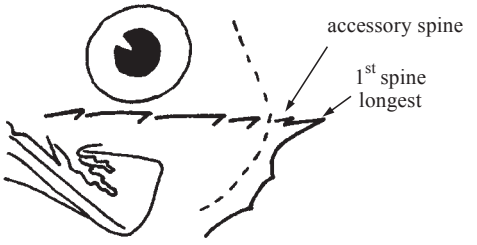


Fig. 3

4a. Lateral line incomplete, only anterior 4 or 5 scales present; black spots on caudal peduncle (Fig. 4) . . . . . ***Phenacoscorpius nebris***

4b. Lateral line complete, extending to caudal fin; pigment on caudal peduncle not strongly spotted . . . . . → ***5***

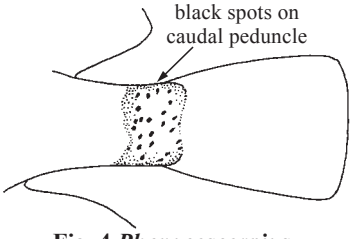


Fig. 4 ***Phenacoscorpius***

5a. Scales on body cycloid (smooth to touch) . . . . . → ***6***

5b. Scales on body ctenoid (rough to touch) . . . . . → ***8***

6a. Bones of head strong; a pit in occiput on top of head in most species (Fig. 5); scales relatively large, about 50 vertical rows above lateral lines on sides . . . . . ***(Scorpaena)*** → ***16***

6b. Bones of head weak, translucent, cavernous; no pit in occiput on top of head; scales tiny, not in definite rows, roughly equivalent to 100 vertical rows above lateral line . . . . . → ***7***

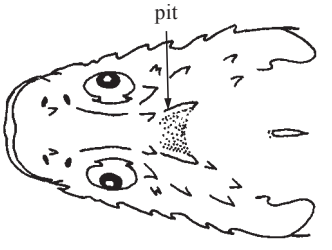


Fig. 5 ***Scorpaena***

7a. Pectoral-fin rays 18 to 20; soft anal-fin rays 6 1/2; orbit diameter contained about 2 times in interorbital width; anterior preorbital (lacrimal) spine much shorter than posterior 2 . . . . . ***Ectreposebastes imus***

7b. Pectoral-fin rays 21 to 25, soft anal-fin rays usually 5 1/2; orbit diameter about equal to interorbital width (7 to 9% standard length); anterior preorbital (lacrimal) spine as long as posterior 2 . . . . . ***Setarches guentheri***

8a. Pectoral fin square-cut and slightly bilobed in large specimens, longest rays near upper edge of fin (Fig. 6); pectoral-fin rays 21 to 24, rarely 20 . . . . . ***Trachyscorpia cristulata***

8b. Pectoral fin more or less wedge-shaped, longest rays at about middle of fin (Fig. 7); pectoral-fin rays usually 19 or fewer, rarely 20 . . . . . ***→ 9***

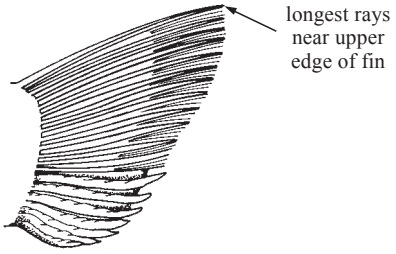


Fig. 6 pectoral fin

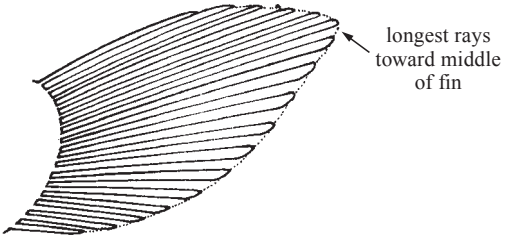


Fig. 7 pectoral fin

9a. All pectoral-fin rays unbranched . . . . . ***(Pontinus) → 12***

9b. Some upper pectoral-fin rays branched at tip, except in small juveniles . . . . . ***→ 10***

10a. Suborbital ridge with 7 or more spinous points; 9 1/2 soft dorsal-fin rays; third dorsal-fin spine not especially elongated . . . . . ***Idiastion kyphos***

10b. Suborbital ridge with 3 or 4 spinous points, not counting any on preoperculum; 10 1/2 soft dorsal-fin rays or if 9 1/2 then third dorsal-fin spine elongated . . . . . ***(Neomerinthe) → 11***

11a. Dorsal-fin soft rays usually 10 1/2, rarely 9 1/2; scales above lateral line in more than 55 vertical rows from supracleithral spine to base of hypural; snout length 1.1 to 1.7 times orbit diameter . . . . . ***Neomerinthe hemingwayi***

11b. Dorsal-fin soft rays usually 9 1/2, rarely 8 1/2 or 10 1/2; scales above lateral line in fewer than 50 vertical rows; snout length 0.7 to 1.3 times orbit diameter . . . . . ***Neomerinthe beanorum***

12a. Pectoral-fin rays 19 to 20 . . . . . ***Pontinus helena***

12b. Pectoral-fin rays 15 to 18 . . . . . ***→ 13***

13a. Snout relatively long, 1.3 to 2 times diameter of orbit . . . . . ***Pontinus castor***

13b. Snout relatively short, roughly equal to diameter of orbit . . . . . ***→ 14***

14a. Pectoral-fin rays 16, rarely 15 or 17; right and left hypohyals each with long ventrally-directed process at junction of anteriormost right and left branchiostegal rays (not readily visible when mouth is closed)(Fig. 8) . . . . . ***Pontinus nematophthalmus***

14b. Pectoral-fin rays 17 or 18, rarely 16; hypohyals without long descending process . . . . . ***→ 15***

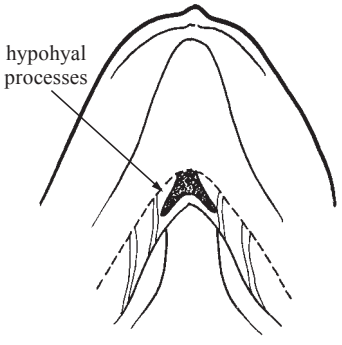


Fig. 8 ventral view of head

15a. Third dorsal-fin spine notably elongate in specimens larger than about 120 to 130 mm standard length; first (anterior) preorbital spine on ventral margin of lacrimal bone points forward as well as down . . . . . ***Pontinus longispinis***

15b. Third dorsal-fin spine not notably elongate; first (anterior) preorbital spine on ventral margin of lacrimal bone points back as well as down . ***Pontinus rathbuni***

16a. Three or 4 preorbital spines on ventral margin of lacrimal bone in all but juvenile specimens (less than about 50 to 60 mm standard length) (Fig. 9a, b) . . . . . → ***17***

16a. Two preorbital spines on ventral margin of lacrimal bone (Fig. 9c) . . . . . → ***18***



Fig. 9 preorbital spines

17a. Inside surface of pectoral fin and adjacent body with large white spots on a black background in specimens greater than 30 mm standard length (Fig. 10) . ***Scorpaena plumieri***

17b. Inside surface of pectoral fin pallid or sometimes with large dark blotches on fin . . . . . ***Scorpaena dispar***

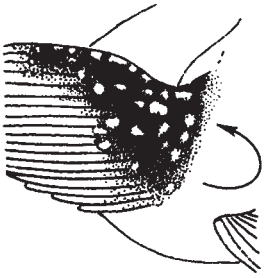


Fig. 10 pectoral fin (*Scorpaena*)

18a. No occipital pit at top of head; supplemental preopercular spine absent (absent in *S. melasma*, which has well-developed pit) . . . . . → ***19***

18b. Occipital pit on top of head (see figure in family account) in specimens greater than about 50 to 60 mm (shallow in *S. albifimbria, S. brachyptera, S. elachys*); supplemental spine present (absent *S. melasma*, small in *S. petricola* and *S. elachys*) . . . . . → ***20***

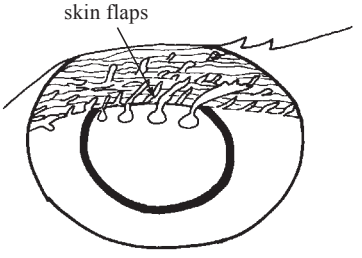


Fig. 11 lateral view of eye

19a. Mushroom-shaped skin flaps on dorsal part of eye (Fig. 11); predorsal length 40 to 47% of standard length; jaw length 24 to 26% standard length . . . . . ***Scorpaena inermis***

19b. No mushroom-shaped skin flaps on eye; predorsal length 34 to 40% of standard length; jaw length 19 to 23% standard length . . . . . ***Scorpaena calcarata***

20a. Supplemental preopercular spine absent . . . ***Scorpaena melasma***

20b. Supplemental preopercular spine present . . . . . → ***21***

21a. Distinct large spot on dorsal fin between spines 4 and 7 . . . . . → ***22***

21b. No large spot on dorsal fin between spines 4 and 7 . . . . . → ***23***

22a. Suborbital ridge with only a single spine at end of ridge (not counting preopercular spines); pectoral-fin rays 16 or 17; third anal-fin spine not longer than second anal-fin spine . ***Scorpaena bergii***

22b. Suborbital ridge prominent, but without spinous points; pectoral-fin rays 18 or 19 (rarely 17); third anal-fin spine longer than second anal-fin spine . . . . . ***Scorpaena isthmensis***

23a. Inside surface of pectoral fin and on body between pectoral and anal fins with distinct small brown spots (0.5 to 2 mm in diameter) on a pallid background (Fig. 12); 50 to 63 vertical scale rows above lateral line . . . . . ***Scorpaena brasilensis***

23b. Inside surface of pectoral fin without distinct brown spots; vertical scale rows usually less than 50 (except *Scorpaena petricola*) . . . . . → ***24***

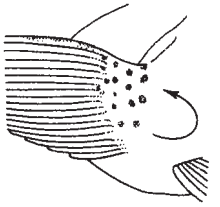


Fig. 12 pectoral fin

24a. Eye large, diameter of orbit 1.5 to 2.2 times snout length; pectoral fin in adults reaches past posterior end of anal-fin base . . . . . ***Scorpaena agassizii***

24b. Eye moderate, diameter of orbit 0.9 to 1.3 times snout length; pectoral fin in adults not reaching past third anal-fin spine . . . . . → ***25***

25a. Inside surface of pectoral fin with white specks less than 0.5 mm in diameter over a dusky background (Fig. 13); tympanic spine at front of occipital pit (see family figure) reduced or absent; supraoccular cirrus usually large and fleshy, with accessory flaps . . . . . ***Scorpaena grandicornis***

25b. Inside surface of pectoral fin usually pale-coloured, without white spots; tympanic spine well developed . . . . . → ***26***

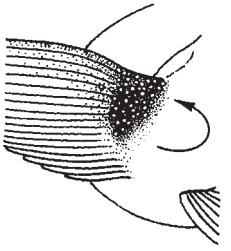


Fig. 13 pectoral fin

26a. Pectoral-fin rays 16 to 18; 1 or rarely 2 spines on suborbital ridge . . . . . → ***27***

26b. Pectoral-fin rays 19 to 20; usually 3 or infrequently 2 spines on suborbital ridge . . . . . → ***28***

27a. Pectoral-fin rays usually 18, sometimes 17; second anal-fin spine longer than third anal-fin spine; body depth 33 to 38% standard length . . . . . ***Scorpaena petricola***

27b. Pectoral-fin rays usually 16 or 17; second anal-fin spine less than or equal to third; body depth 38 to 41% standard length . . . . . ***Scorpaena elachys***

28a. Nasal spine present (see family figure); pectoral fin of moderate length, reaching past first anal-fin spine (greater than 29% standard length); 9 1/2 soft rays in dorsal fin . ***Scorpaena albifimbria***

28b. Nasal spine absent in adults (reduced in juveniles); pectoral fin short, not reaching to first anal-fin spine (less than 27% standard length); 8 1/2 soft rays in dorsal fin . . ***Scorpaena brachyptera***

List of species occurring in the area

The symbol is given when species accounts are included.

Ectreposebastes imus Garman, 1899.

Helicolenus dactylopterus (Delaroche, 1809).

Idiastion kyphos Eschmeyer, 1965.

Neomerinthe beanorum (Evermann and Marsh, 1900).

Neomerinthe hemingwayi Fowler, 1935.

Phenacoscorpius nebris Eschmeyer, 1965.

Pontinus castor Poey, 1860.
Pontinus corallinus Miranda-Ribeiro, 1903.S Brazil; may be a synonym of *Pontinus longispinis*; may be an extreme variant *P. longispinis*.
Pontinus helena Eschmeyer, 1965.
Pontinus longispinis Goode and Bean, 1896.
Pontinus nematophthalmus (Günther, 1860).
Pontinus rathbuni Goode and Bean, 1896.

Pterois volitans (Linneaeus, 1758). To 30 cm. Introduced from W Pacific; established in North Carolina, Georgia, and Florida.

Scorpaena agassizii Goode and Bean, 1896.
Scorpaena albifimbria Evermann and Marsh, 1900.
Scorpaena bergii Evermann and Marsh, 1900.
Scorpaena brachyptera Eschmeyer, 1965.
Scorpaena brasiliensis Cuvier, 1829.
Scorpaena calcarata Goode and Bean, 1882.
Scorpaena dispar Longley and Hildebrand, 1940.
Scorpaena elachys Eschmeyer, 1965.
Scorpaena grandicornis Cuvier, 1829.
Scorpaena inermis Cuvier, 1829.
Scorpaena isthmensis Meek and Hildebrand, 1928.
Scorpaena melasma Eschmeyer, 1965. From 1 to 2 S off the coast of Brazil, may be found in area.
Scorpaena petricola Eschmeyer, 1965. From 1 to 2 S off the coast of Brazil, may be found in area.
Scorpaena plumieri Bloch, 1789.

Scorpaenodes caribbaeus Meek and Hildebrand, 1928.
Scorpaenodes tredecimspinosus (Metzelaar, 1919).

Setarches guentheri Johnson, 1862.

Trachyscorpia cristulata (Goode and Bean, 1896).

References

Eschmeyer, W.N. 1965. Western Atlantic Scorpionfishes of the genus *Scorpaena*, including four new species. *Bull. Mar. Sci.*, 15(1):84-164.

Eschmeyer, W.N. 1969.A systematic review of the Scorpionfishes of the Atlantic Ocean (Pisces: Scorpaenidae). *Occ. Pap. Calif. Acad. Sci.*, 79:130 p.

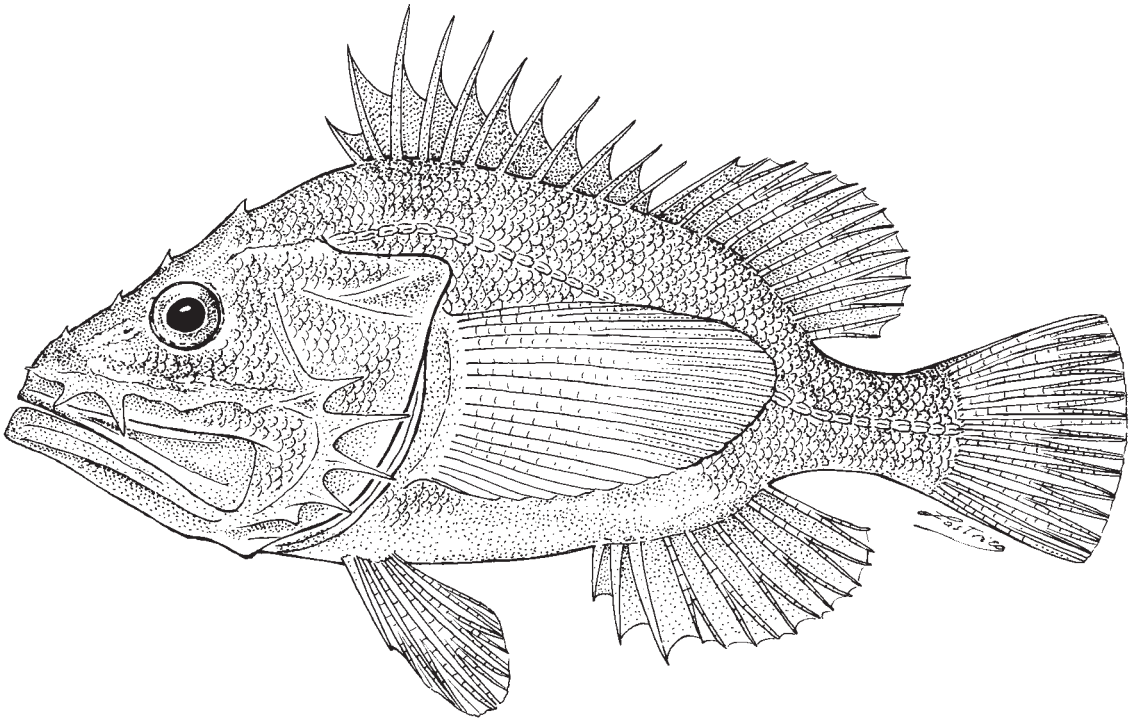
Ginsburg, I. 1953. Western Atlantic Scorpionfishes. *Smith. Misc. Coll.*, 121(8):103 p.

Robins, C.R. and G.C. Ray. 1986. *A field guide to Atlantic coast fishes of North America. The Petersn Gield Guide Series*. Boston, Houghton Mifflin Co., 354 p.

Ectreposebastes imus Garman, 1899 ERM

Frequent synonyms / misidentifications: None / None.

FAO names: En - Midwater scorpionfish; **Fr** - Rascasse profunde; **Sp** - Rascacio profundo.

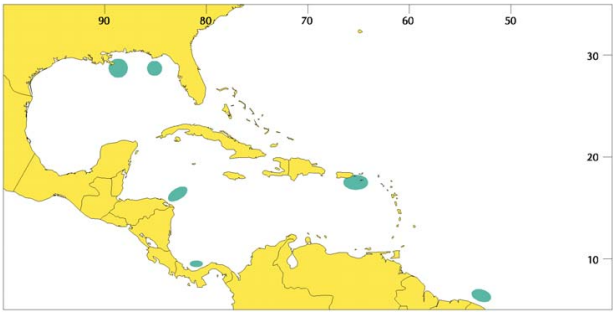


Diagnostic characters: Body relatively deep, 27 to 52% of standard length. Anteriormost preorbital spine minute relative to 2 more posterior spines. Dorsal surface of head scaled; anal fin with 3 spines and 5 to 6 1/2 soft rays, usually 6 1/2 (last split to base and counted as 1 1/2); pectoral-fin rays 18 to 20 . Pyloric caecae typically 5, cream coloured. Lateral-line scales trough-like. Swimbladder rudimentary or absent. **Colour: black, dark brown or maroon in adults**; buccal cavity black with orange and red patches; pharyngeal teeth red or orange.

Size: To 171 mm standard length.

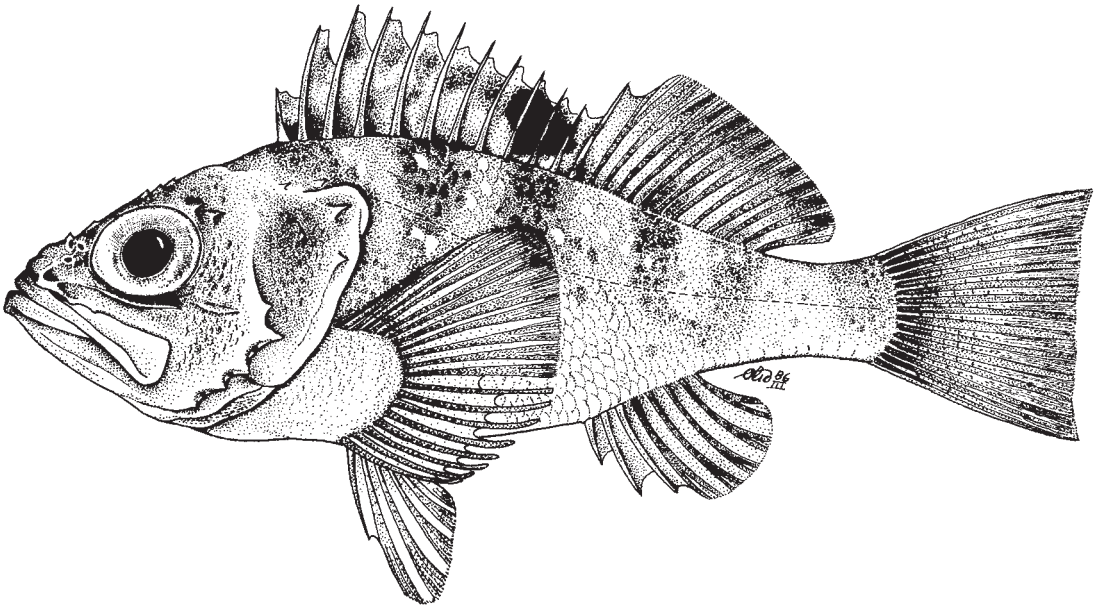
Habitat, biology, and fisheries: No fishery exists for this deep-water species. Has been taken by both trawls and midwater nets. Existing records suggest that the species is at least partially pelagic, particularly when young, and feeds on midwater shrimps of the genus *Sergestes*, as well as unidentified amphipods.

Distribution: One of the most widely distributed scorpionfishes, *E. imus* is found in warm waters worldwide along the upper continental shelf and off oceanic islands at depths of 150 to 800 m. It has been reported in the area from the north central Gulf of Mexico, off Honduras, in the Gulf of Darién in northwestern Colombia, off Suriname, and south of Puerto Rico. Outside the area it has been taken by midwater nets at depths of 150 to 2 000 m from Australia, New Caledonia, New Zealand, Indonesia, Taiwan Province of China, Japan, South Africa, South America, Hawaii, and the Galapagos. Some records from the southwest Pacific may represent another species, *Ectreposebastes niger*.



Helicolenus dactylopterus (Delaroche, 1809) BRF

Frequent synonyms / misidentifications: *Helicolenus maderensis* Goode and Bean, 1896.
FAO names: En - Blackbelly rosefish; **Fr** - Sébaste chèvre; **Sp** - Rascacio rubio.

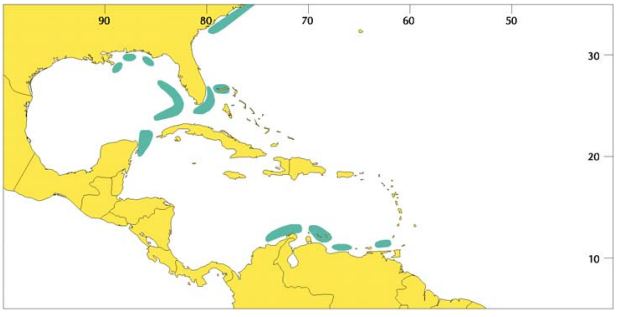


Diagnostic characters: A large-eyed, deep-living scorpionfish, with **characteristic spination on preopercular margin, the second spine from above the longest**. Low spines on head and no pit on top of head behind eyes. Usually 11 1/2 or 12 1/2 soft rays (last split to base and counted as 1 1/2) in dorsal fin; pectoral fins square-cut, tips of lower rays free from connecting membrane. Scales ctenoid (rough to touch). **Colour:** red above, pinkish white below; usually with darker red bars on side: 3 below anterior, middle, and posterior dorsal-fin spines, 1 v-shaped below soft dorsal fin, and 1 at base of caudal fin; bands less well marked in larger specimens; smaller specimens with black pigment near end of spinous dorsal fin.

Size: To about 400 mm standard length; commonly reaches 250 mm standard length.

Habitat, biology, and fisheries: Commonly taken on soft bottoms in shrimp trawls and sometimes by long lines off Florida, in the Gulf of Mexico, and over other shelf areas. It is only occasionally marketed fresh in small quantities.Found primarily between 200 and 650 m, but has been reported at depths as shallow as 84 m and as deep as 1000 m outside the fishing area. It feeds mainly on crustaceans and fish and is reported to be mildly venomous.

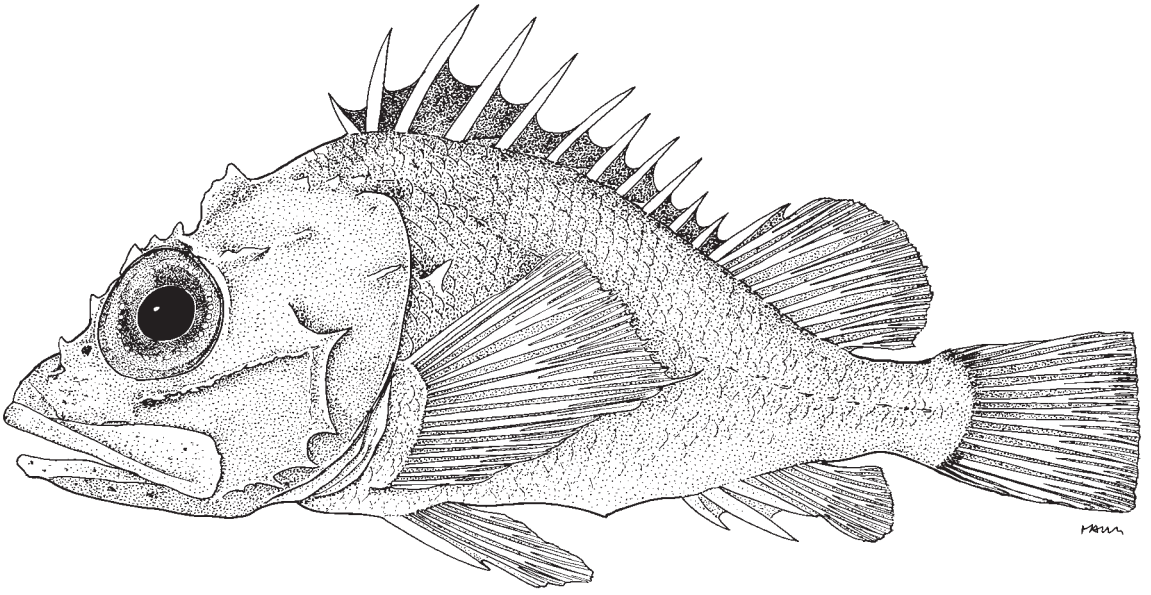
Distribution: Found off the Atlantic coast of the USA, Northeastern Gulf of Mexico, in the Yucatán Channel and off the coasts of Venezuela and Guyana. This species is absent from the Bahamas (except off Bimini and Grand Bahama Island) and the Antilles and rare or absent to the south of Guyana. However, it may occur along the Caribbean coast of Central America and, less probably, in the western Gulf of Mexico.



Idiastion kyphos Eschmeyer, 1965 IKY

Frequent synonyms / misidentifications: None / None.

FAO names: En - Sharpcheek scorpionfish.

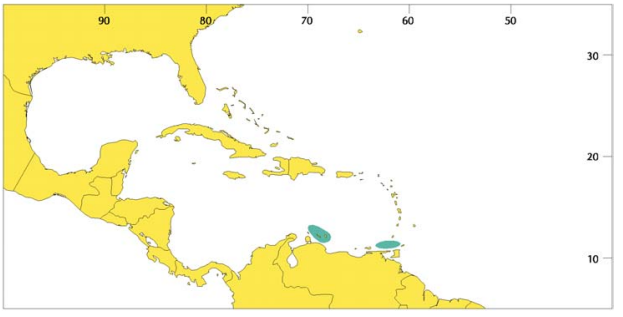


Diagnostic characters: Villiform teeth on premaxillae, dentary, vomer, palatine, and pharyngeal bones. Dorsal fin with 12 spines and 9 1/2 soft rays (last split to base and counted as 1 1/2). Pectoral fin with 17 or 18 rays. Swimbladder present. Interorbit with scales. **Head spines strongly developed, often with multiple points**. No occipital pit. Peritonium unpigmented. **Vertebrae 25**. All scales ctenoid (rough to touch), except on breast. Small slit behind fourth gill arch. **Colour:** colour in life unknown, but probably mostly red, with some dark markings on dorsum.

Size: Reaches 153 mm standard length.

Habitat, biology, and fisheries: Little is known of the biology of this rare deep water species, except that a few specimens have been collected on the bottom at depths of about 439 to 622 m.

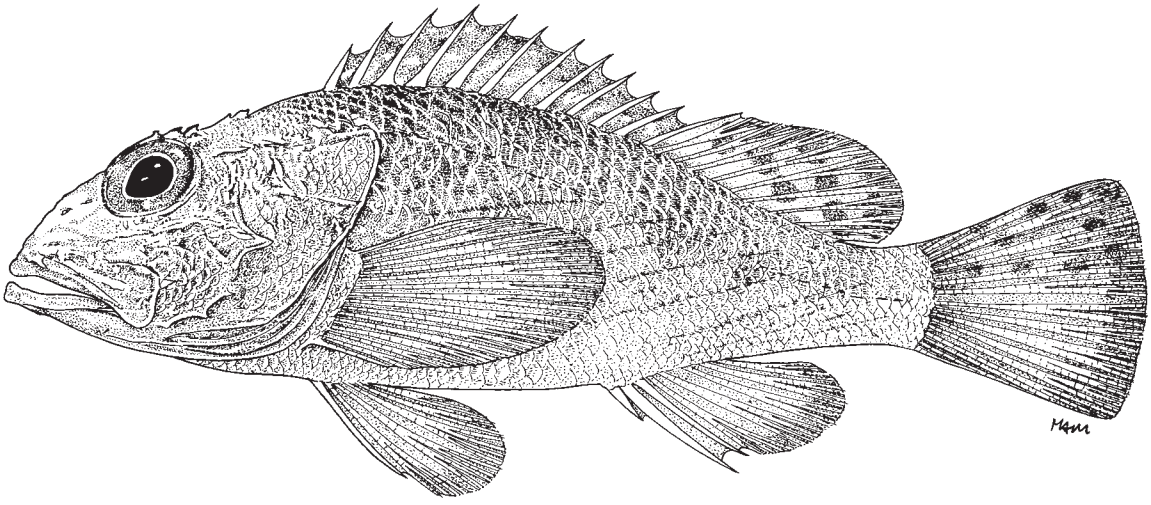
Distribution: This species is known from only a few scattered Atlantic localities, including off Venezuela.



Neomerinthe beanorum (Evermann and Marsh, 1900)

Frequent synonyms / misidentifications: None / None.

FAO names: En - Spotwing scorpionfish.

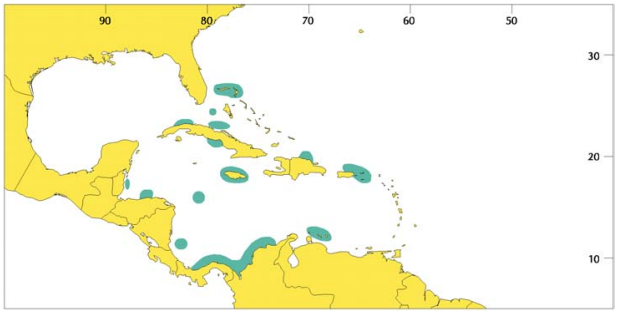


Diagnostic characters: Dorsal fin with 12 spines and 8 1/2 or 9 1/2 soft rays (last split to base and counted as 1 1/2). Pectoral fin with 16 to 18, but usually 17 rays, and with rays 3 to 9 from above branched in specimens larger than about 50 mm. Lacrimal bone with 2 downward-pointing preorbital spines on its ventral margin, with another smaller spine often present on its lateral face posteriorly. Infraorbital bones 2 and 3 (suborbital bones) with 1 and 2 spines respectively. Second preopercular spine much smaller than first or third. Scales ctenoid (rough to touch). **Vertical scale rows 40 to 45. Colour:** the colour of this species in life has not been reported, but is likely to be red, possibly with some yellow, with darker red marks and streaks scattered over dorsum, which appear brown in preserved specimens.

Size: Known to reach 155 mm standard length.

Habitat, biology, and fisheries: This species lives on hard bottoms at depths of between 90 and 375 m. Being infrequently taken, little else is known of its biology.

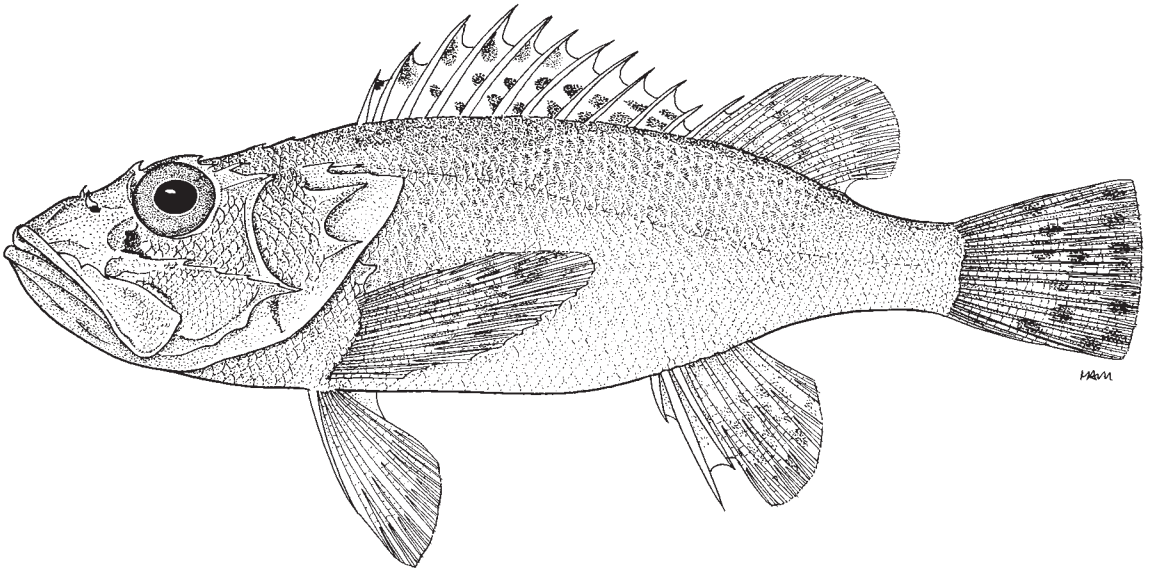
Distribution: This poorly known species has been taken off Puerto Rico and the Virgin Islands, Jamaica, Cuba, and the Bahaman side of Straits of Florida, and scattered offshore localities along the Central and South American mainland from Belize to Venezuela.



Neomerinthe hemingwayi Fowler, 1935

Frequent synonyms / misidentifications: *Neomerinthe tortugae* Hildebrand, 1940 / *Neomerinthe pollux* (Poey, 1860).

FAO names: En - Spinycheek scorpionfish.

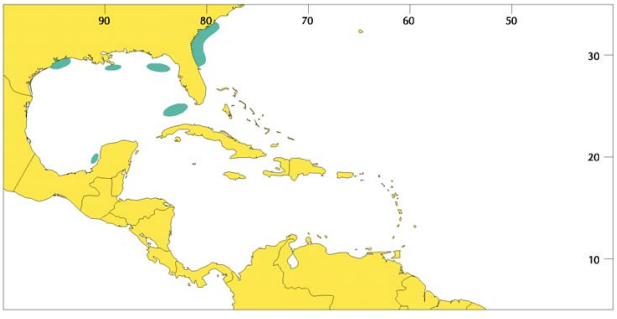


Diagnostic characters: Dorsal fin with 12 spines and 10 1/2 (rarely 9 1/2) soft rays (last split to base and counted as 1 1/2). Pectoral-fin rays 16 or 17, usually 17. Lacrimal bone with 2 downward-pointing preorbital spines on its ventral margin an another on its lateral face posteriorly. Infraorbital bones 2 and 3 (suborbital bones) with 1 and 2 spines respectively. Second preopercular spine absent, except in small juveniles. Scales ctenoid. **Vertical scale rows 60 to 70. Colour:** primarily red but mottled with brown; all fins, except pelvic, spotted; 3 dark spots near rear of lateral line.

Size: Reaches 315 mm standard length; common over 200 mm standard length.

Habitat, biology, and fisheries: This species is not commercially fished, although excellent eating specimens of good size are occasionally trawled over hard bottoms.

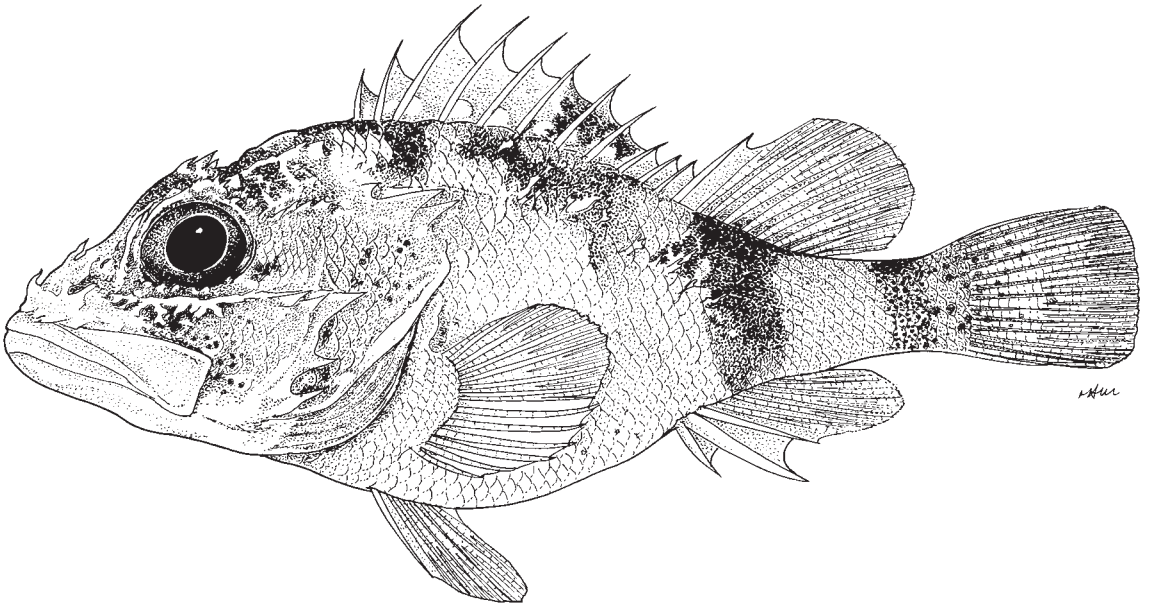
Distribution: This species is found in the northern part of the fishing area, from near Cape May, New Jersey, southward around the Florida peninsula to the Northern Gulf of Mexico to Texas. It has not been reported from the Bahamas, Cuba, or Caribbean islands. It is known from off Campeche, but has not yet been reported from other Mexican localities.



Phenacoscorpius nebris Eschmeyer, 1965

Frequent synonyms / misidentifications: None / None.

FAO names: En - Short-tube scorpionfish.

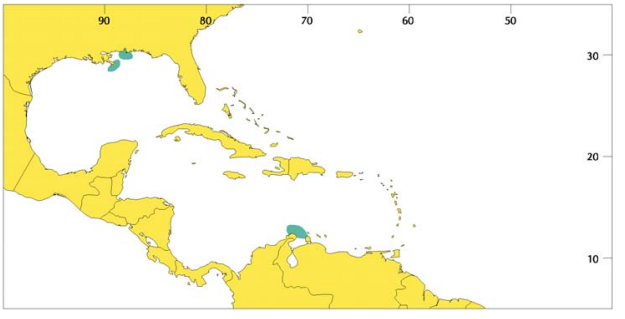


Diagnostic characters: Dorsal with 12 spines and 8 1/2 fin rays (last split to base and counted as 1 1/2). Pectoral-fin rays 15 to 17, some branched. No occipital pit. Lacrimal bone with 2 ventrally directed spines. Spines on suborbital ridge formed by infraorbital bones 2 and 3 with 5 or 6 spines. Second preopercular spine absent. Scales ctenoid (rough to touch). **Lateral line incomplete, with only 3 to 5 scales. Vertebrae 25. Colour:** head and body pinkish red; 2 dark saddles over dorsum, and another bar at base of soft dorsal-fin rays; caudal fin, pectoral fin, and soft rayed part of dorsal fin with dark red spots; **numerous small but distinct melanophores on caudal peduncle at base of caudal fin form a dark band or bar.**

Size: Reaches 84 mm.

Habitat, biology, and fisheries: Aside from the fact that *P. nebris* is taken in bottom trawls or traps at depths of 64 to 475 m, nothing is known about the biology of this species.

Distribution: This rare species has been reported from off the Peninsula de Guajira, Venezuela and in the north-central Gulf of Mexico.



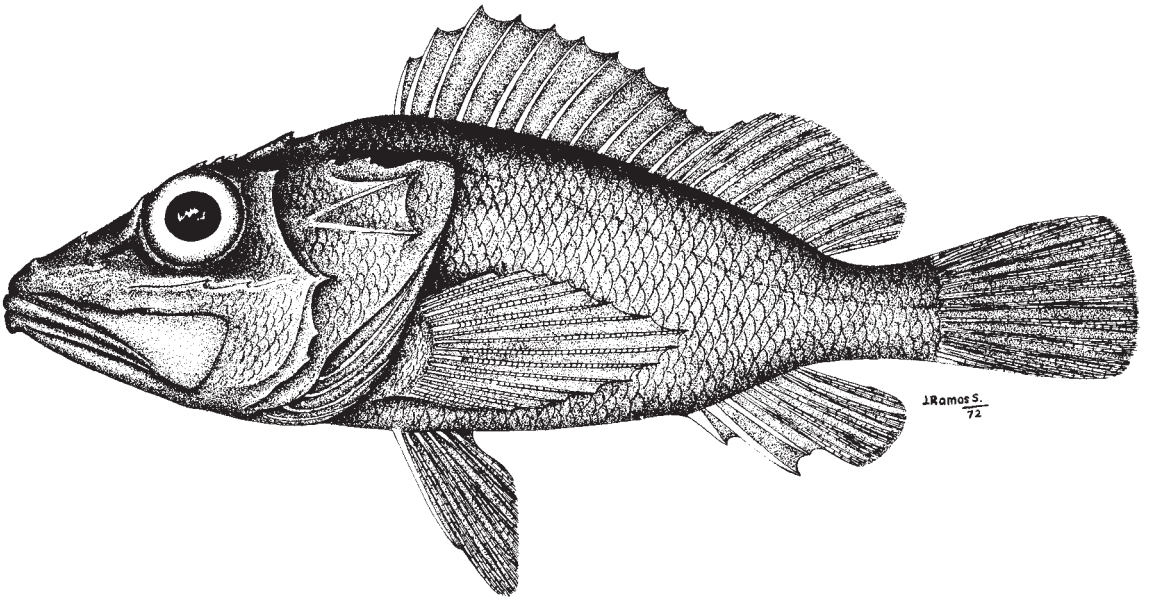
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Pontinus castor Poey, 1860

Frequent synonyms / misidentifications: *Pontinus pollux* Poey, 1860 / None.

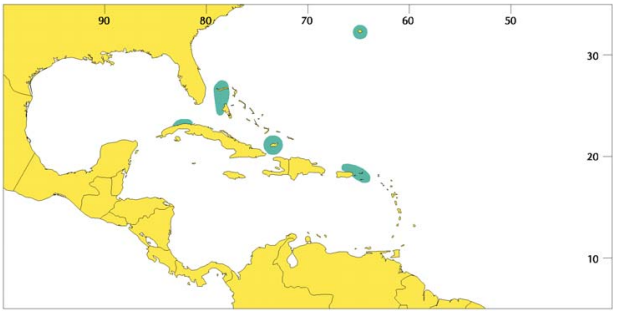
FAO names: En - Longsnout scorpionfish; **Fr** - Rascasse longnez; **Sp** - Rascacio de fondo.



Diagnostic characters: A snapper-like, spiny-headed scorpionfish with snout longer than eye diameter. Dorsal fin with 12 spines and 9 1/2 to 11 1/2, but usually 10 1/2 soft rays (last split to base and counted as 1 1/2). No dorsal-fin spines especially elongated. **Usually 17 pectoral-fin rays, all unbranched**. Second preopercular spine small or absent. Scales ctenoid (rough to touch). Vertical scale rows 45 to 55. **Colour:** red or reddish pink on a pale background; some scattered dusky specks on body and head; fins spotted with red.

Size: The largest reported specimen is 260 mm standard length.

Habitat, biology, and fisheries: Predatory and bottom-dwelling, in depths of about 45 to 400 m, probably on rocky or shell bottom. Not subjected to a special fishery; caught incidentally as part of artisanal fisheries throughout its range. Caught mainly with hook-and-line and traps. Marketed fresh.

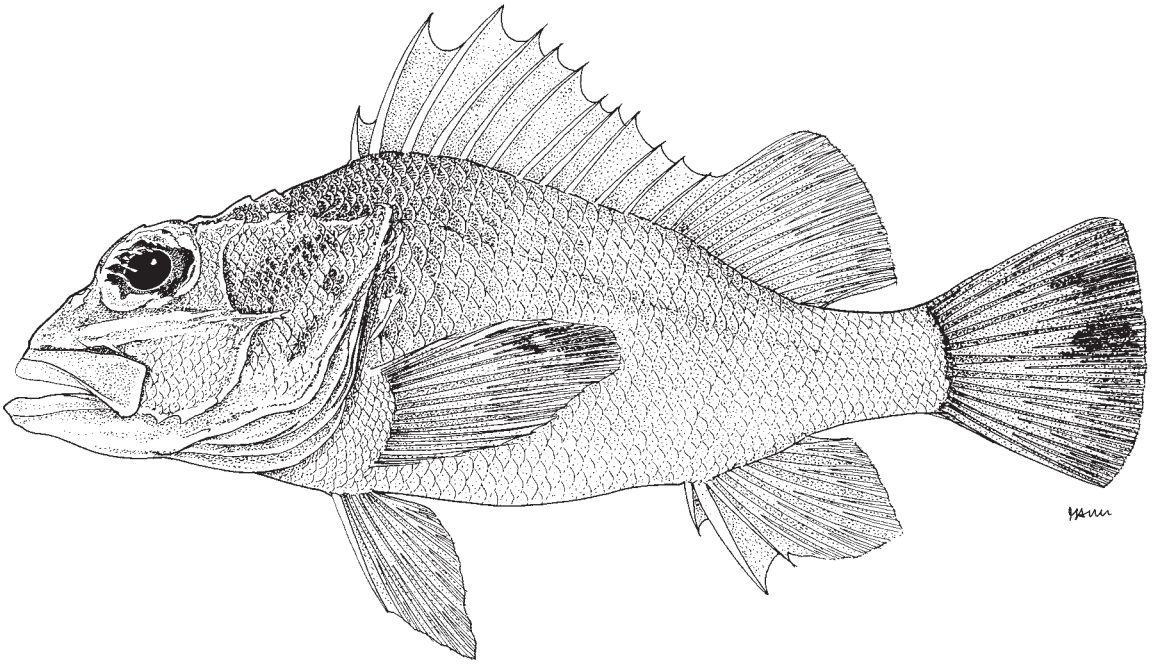


Distribution: This species has been reported from depths of 45 to 180 m from Bermuda, the Bahamas, Cuba, Puerto Rico, and the Virgin Islands. It has yet to be reported more widely in the Caribbean.

Pontinus helena Eschmeyer, 1965

Frequent synonyms / misidentifications: None / None.

FAO names: En - Helena scorpionfish.

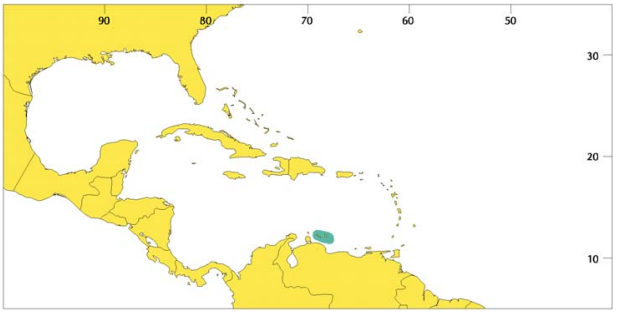


Diagnostic characters: Dorsal fin with 12 spines and 9 1/2 to 10 1/2 soft rays (last split to base and counted as 1 1/2). Dorsal fin without notably elongate spines. **Pectoral fin with 19 or 20 rays, all unbranched**. Lacrimal bone with 2 distinct ventrally directed spines. Spines on suborbital ridge 3 or 4. Second preopercular spine small or absent. Scales ctenoid (rough to touch). Vertical scale rows about 45. **Colour:** probably red or pink in life with a few dark specks or markings on dorsum.

Size: The largest specimen reported is 186 mm standard length.

Habitat, biology, and fisheries: This infrequently encountered species has been taken in trawls at depths of about 402 m.

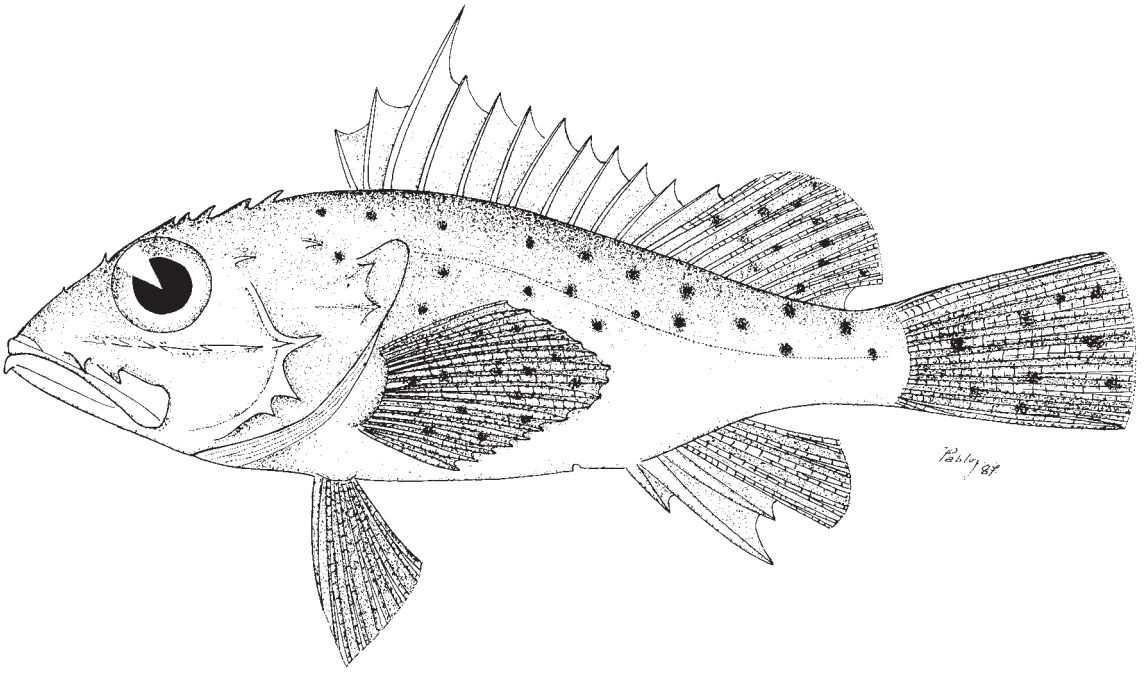
Distribution: This species remains known only from the '"Gulfo de Triste', off Venezuela.



Pontinus longispinis Goode and Bean, 1896

Frequent synonyms / misidentifications: None / None.

FAO names: En - Longspine scorpionfish, **Fr** - Rascasse épineux, **Sp** - Rascacio espinoso.

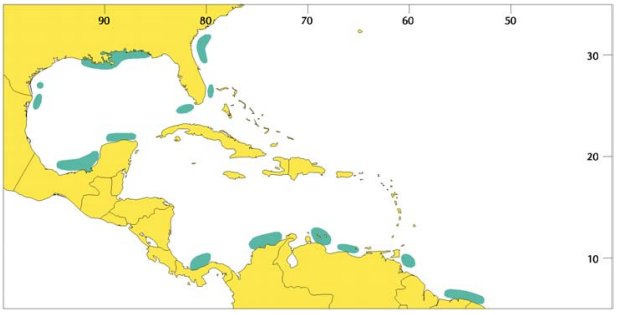


Diagnostic characters: Snout relatively short. Dorsal fin with 12 spines and 9 1/2 soft rays (last split to base and counted as 1 1/2). **Third dorsal-fin spine notably elongate in specimens greater than about 130 mm standard length**. Pectoral fin with 16 to 18 rays (northern populations with mostly 17 and southern populations with typically 17 or 18), all unbranched. Lacrimal bone with 2 ventrally directed spines and usually a small spine on lateral face posteriorly. Infraorbital bones 2 and 3 (suborbitals) with 1 and 3 spines respectively. Second preopercular spine small, but rarely absent. Scales ctenoid. Vertical scale rows 45 to 50. **Colour:** red or pink with dusky, darker red spots or blotches.

Size: Reaches 250 mm, common to 200 mm.

Habitat, biology, and fisheries: This species occurs over soft or semi-hard substrates; 80 to 440 m and is taken by hook-and-line, longlines, and in trawl fisheries, especially off Colombia and Venezuela, where it is locally abundant.

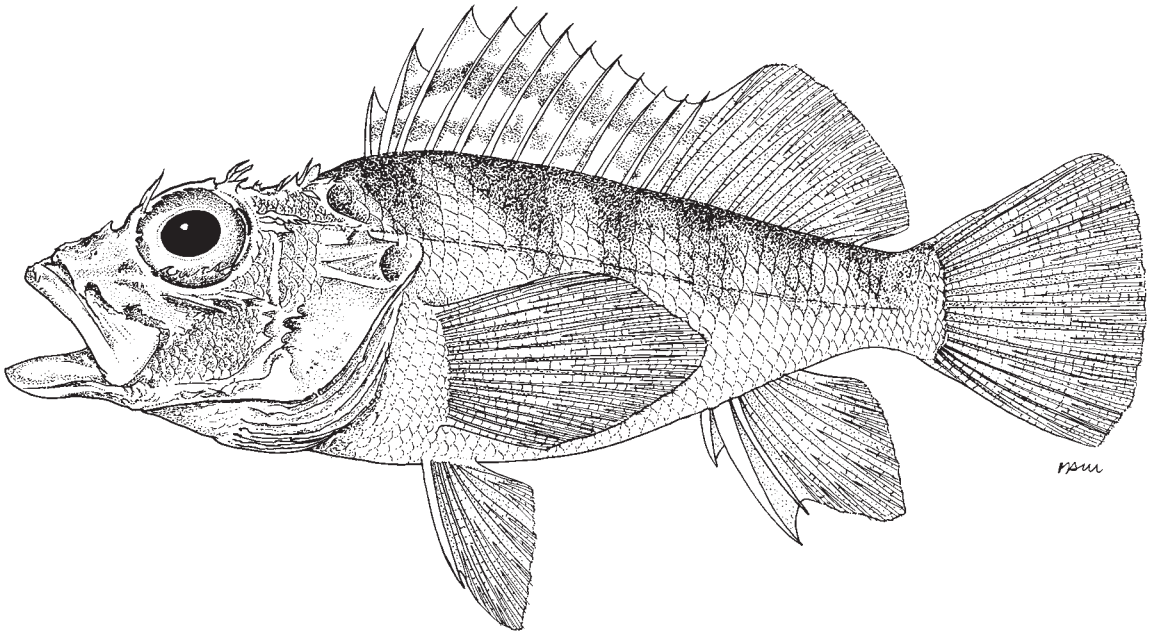
Distribution: First described from the Gulf of Mexico, 28°36'N, 85°33.5'W, in 203 m, this species appears to be separated into 2 populations, one that extends from South Carolina southward around the Florida Peninsula and the Tortugas into the Gulf of Mexico to the Mississippi River delta, and southward to off Brownsville, Bahia, Campeche, and Yucatán. A southern population occurs at scattered localities from Panama to Brazil. It has not been reported from the Bahamas or the Antilles.



Pontinus nematophthalmus (Günther, 1860)

Frequent synonyms / misidentifications: *Pontinus macrolepis* Good and Bean, 1896 / None.

FAO names: En - Spinythroat scorpionfish.

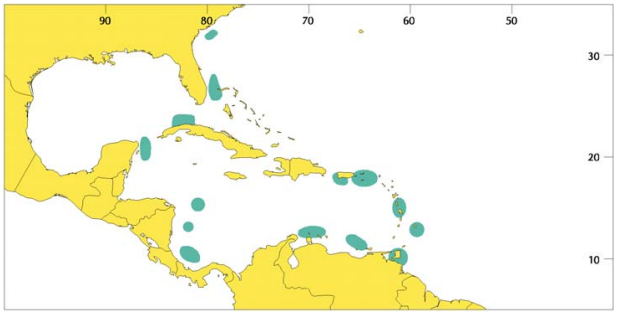


Diagnostic characters: Dorsal fin with 12 spines and 8 1/2 to 9 1/2 soft rays (last split to base and counted as 1 1/2). Pectoral fin with 15 to 17 rays, usually 16; all unbranched. Lacrimal bone with 2 spines on ventral margin bone, both pointing backward, and a smaller spine on later face of bone in some specimens. Infraorbital bones 2 and 3 (suborbital bones) with 1 and 2 spines respectively. **Processes often present on ventral margin of hypohyal bones, visible only when hyoid is depressed**. Supraocular cirrus when present long and slender, about twice orbit diameter. Second preopercular spine small, but seldom absent. Scales ctenoid (rough to touch), in 42 to 47 vertical rows. **Colour:** probably mostly red in life, with few darker or dusky red streaks, often arranged in 4 poorly defined saddle-shaped bars below dorsal fin.

Size: To 132 mm standard length.

Habitat, biology, and fisheries: Little is known about this infrequently captured species. Occasionally taken in trawls and traps from 86 to 402 m.

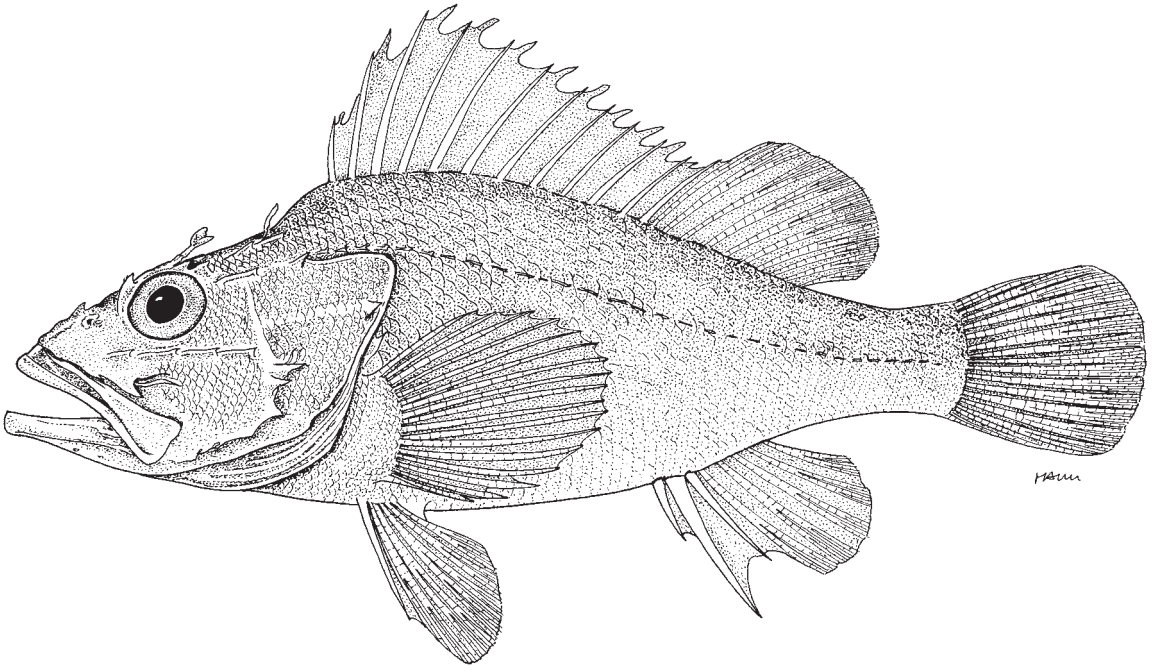
Distribution: This species ranges from the Atlantic coast of Florida, the Bahamas, Cuba, Puerto Rico, the Virgin Islands, the Lesser Antilles, and along the coast from the Yucatán Peninsula southward to Honduras, Nicaragua, Costa Rica, Panama, and Venezuela.



Pontinus rathbuni Goode and Bean, 1896

Frequent synonyms / misidentifications: None / None.

FAO names: En - Highfin scorpionfish.

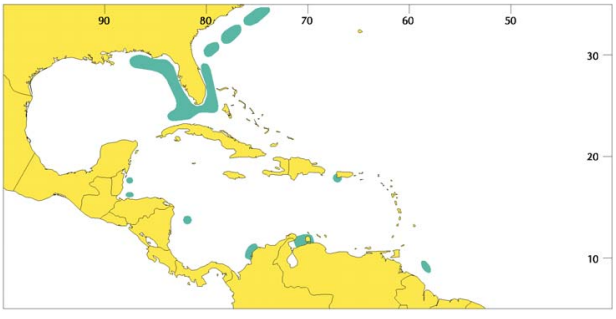


Diagnostic characters: Dorsal fin with 12 spines and 9 1/2 soft rays (last split to base and counted as 1 1/2). Pectoral fin with 16 to 18, but usually 17 rays, all unbranched. **Lacrimal bone with 2 posteroventrally pointing spines** and a small spine often present on its lateral face. Infraorbital bones 1 and 2 (suborbitals) with 1 and 2 spines respectively. Supraocular cirrus, when present, usually shorter than orbit diameter and splayed distally rather than tapered at tip. Scales ctenoid (rough to touch), in about 45 vertical rows. **Colour:** probably red in life with dark red or orange spots or dusky smudges on the pectoral and caudal fins; smaller specimens with dusky saddle-shaped bars along back, becoming more diffuse with growth.

Size: To 197 mm standard length.

Habitat, biology, and fisheries: Almost nothing is known about the biology of this species, except it appears to be confined to coastal areas in depths of 73 to 366 m.

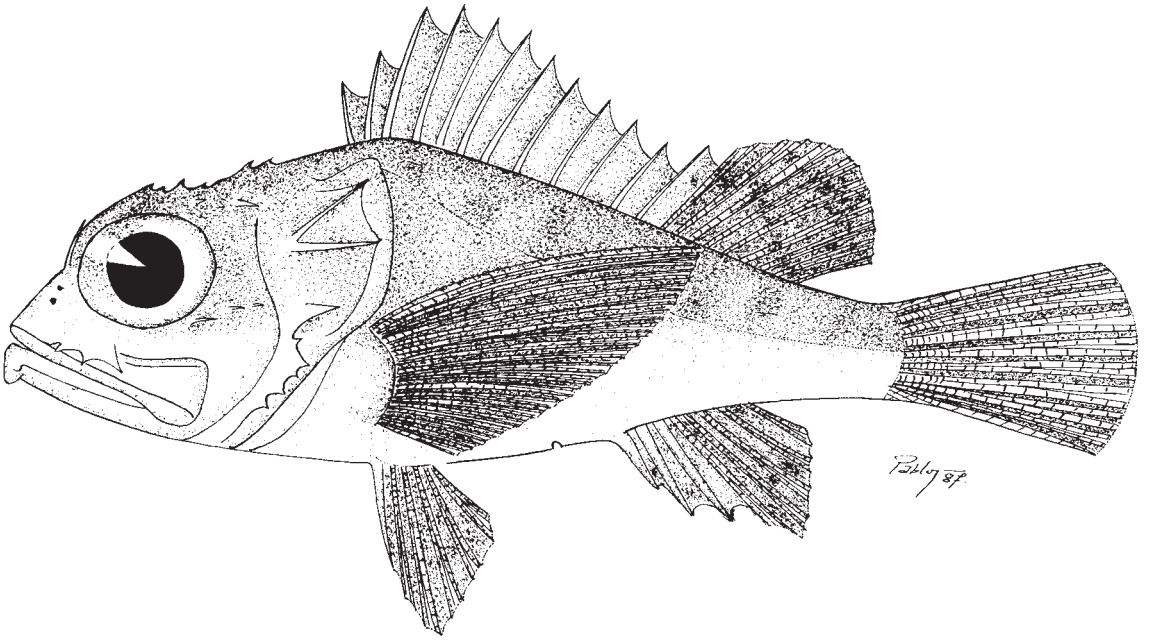
Distribution: This species can be found off Cape Hatteras, North Carolina, southward along the Florida peninsula to the northern Gulf of Mexico. It has also been reported off Belize, Nicaragua, Colombia, Venezuela, and the Guyanas.



Scorpaena agassizii Goode and Bean, 1896

Frequent synonyms / misidentifications: None / None.

FAO names: En - Longfin scorpionfish, **Fr** - Rascasse-aîle-longe, **Sp** - Rascacio chasnete de fondo.

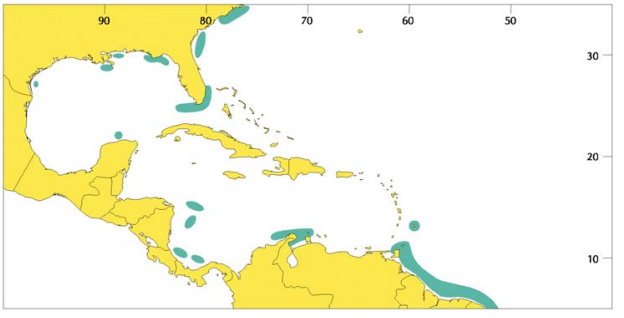


Diagnostic characters: Dorsal fin with 12 spines and 8 1/2 to 10 1/2 (usually 9 1/2) soft rays (last split to base and counted as 1 1/2). Pectoral with 18 to 20 rays, usually 19, some branched. Lacrimal bone with 2 spines over maxillary, both pointing forward, and sometimes 1 or 2 small spines on lateral surface of bone. Infraorbital bones 2 and 3 (suborbitals) with 1 and 2 spines respectively. Second preopercular spine small. Occipital pit absent or present only as a small depression before parietal spines. Scales cycloid (smooth to touch) in about 45 vertical rows. Vertebrae 24. **Colour:** bright red, with darker red or brownish spots over anterior lateral-line scales, base of dorsal-fin spines, and on and above pectoral fin.

Size: To 155 mm standard length.

Habitat, biology, and fisheries: This species is found on soft bottoms of the continental shelf between 50 and 275 m. Common in industrial shrimp and fin-fish trawl fisheries and abundant off coast of Guyana, but is not usually marketed.

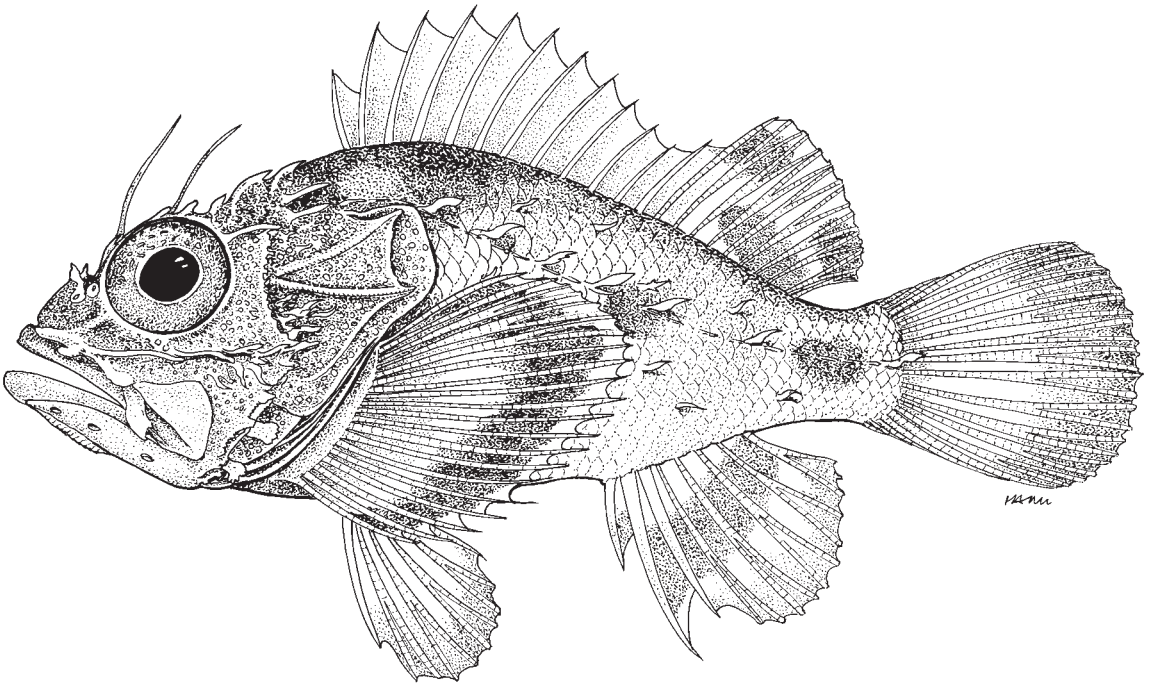
Distribution: This predominantly offshore species is found on the Atlantic and Gulf coasts of the USA, southward from North Carolina to the Yucatán Peninsula, Honduras, Nicaragua, Panama, Colombia, Venezuela, Guyana, Suriname, and Brazil. It has been reported from Bermuda, but this has not been subsequently confirmed.



Scorpaena albifimbria Evermann and Marsh, 1900

Frequent synonyms / misidentifications: None / None.

FAO names: En - Coral scorpionfish.

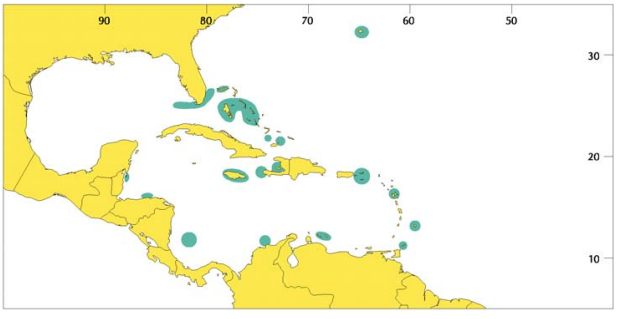


Diagnostic characters: Dorsal fin with 12 spines and 8 1/2 to 9 1/2 soft rays (last split to base and counted as 1 1/2). **Pectoral with 19 to 21 rays**, some branched. Lacrimal bone with 2 spines ventrally, both pointing forward. Infraorbital bones 1 and 2 (suborbitals) with 1 and 2 spines respectively. Second preopercular spine small. Occipital pit shallow. Scales cycloid (smooth to touch). Vertical scale rows about 40. Vertebrae 24. **Colour:** brightly coloured, pink to dark red on a pale background; darkly coloured behind head, on pectoral fin, and on body between soft dorsal and anal fins.

Size: Reaches 51 mm standard length.

Habitat, biology, and fisheries: Little is known of this small species other than it changes its coloration with age and that it is found inshore at shallow depths to about 31 m.

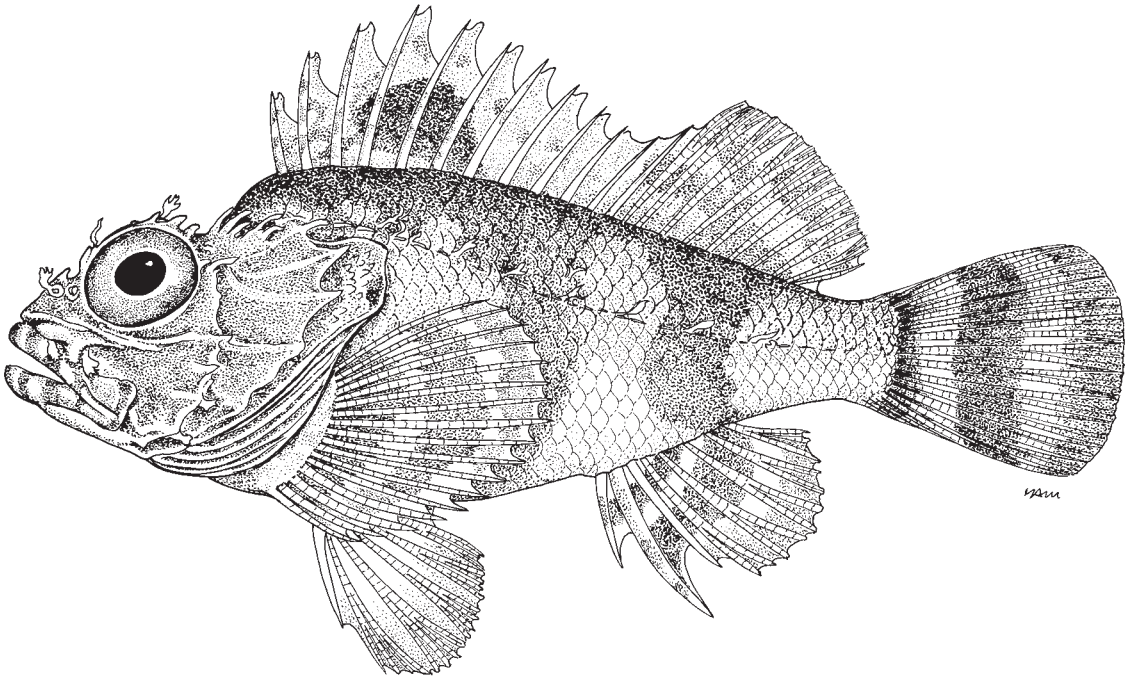
Distribution: This species has been reported from Florida, the Bahamas, Navassa, Haiti, the Dominican Republic, Puerto Rico, Virgin Islands, Curaçao, Saint Andrews Island, Barbados, Bermuda, and the north coast of Colombia at Punta de Betín.



Scorpaena bergii Evermann and Marsh, 1900

Frequent synonyms / misidentifications: None / None.

FAO names: En - Goosehead scorpionfish.

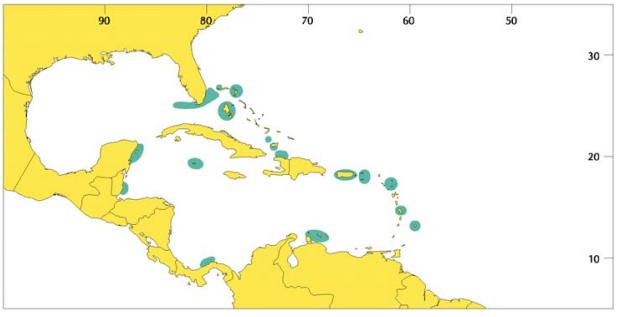


Diagnostic characters: Dorsal fin with 12 spines and 9 1/2 soft rays (last split to base and counted as 1 1/2). **Pectoral fin with 16 to 17 rays**, some branched. Occipital pit well developed. Lacrimal bone with 2 spines pointing forward from ventral margin. **A single spine at end of suborbital ridge** (on infraorbital bone 3). Scales cycloid (smooth to touch). Vertical scale rows 41 to 46. Vertebrae 24. **Colour:** a dark spot on spinous dorsal fin between spines 3, 4, or 5 to spines 7 or 8; pelvic fin clear but dusky at tip; caudal fin with 3 dark bars, 1 at base, 1 near middle, and 1 at distal margin.

Size: This species has been said to reach 100 mm standard length. However, the largest reported specimen is 68 mm.

Habitat, biology, and fisheries: Except that the proportions of this species change with size as does coloration, little else is known of the biology of this species, which is found in clear waters at shallow depths of 7 to 73 m.

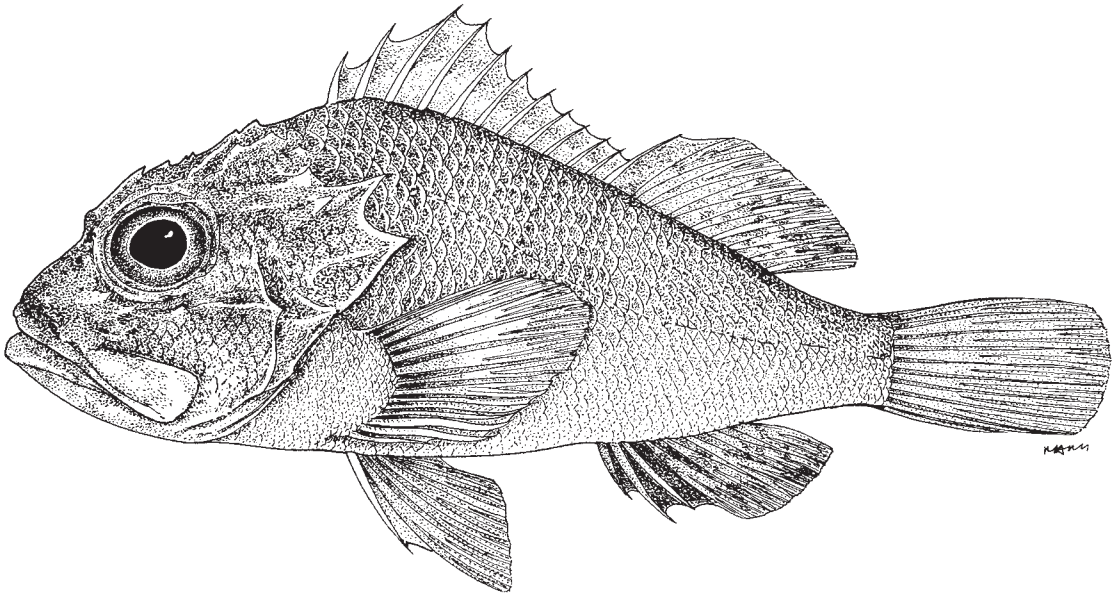
Distribution: Found from New York southward to Florida, the Bahamas, Puerto Rico, Haiti, Antigua, Curaçao, Aruba, Grand Cayman Island, the Yucatán Peninsula, Belize, Panama, the Antilles, Colombia, and Bahia, Brazil.



Scorpaena brachyptera Eschmeyer, 1965

Frequent synonyms / misidentifications: None / None.

FAO names: En - Shortfin scorpionfish.

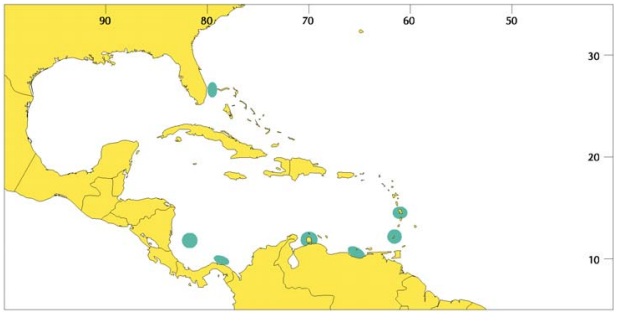


Diagnostic characters: Dorsal fin with 12 spines and 7 1/2 to 9 1/2 soft rays, usually 8 1/2 (last split to base and counted as 1 1/2). **Pectoral fin with 19 or 20 rays**, some branched. Lacrimal bone with 2 spines on ventral edge, with first small and arched, both pointing down and slightly forward. Infraorbital bones 1 and 2 (suborbitals) forming strong ridge, with 1 (rarely 2) and 2 spines respectively. **Nasal bones freely movable, but usually without spines**. Occiput pit present, but shallow. Scales cycloid (smooth to touch) in about 40 vertical rows. Vertebrae 24. **Colour:** head red with much dusky and some yellow pigment; iris yellowish red; medial surface of pectoral fin with upper half bright yellow; anal fin red, mottled, with deepest coloration on anterior half of fin.

Size: To 62 mm standard length.

Habitat, biology, and fisheries: No fishery exists for this rare species, which is found at depths of 46 to 155 m. Some specimens have been collected over rock-rubble bottoms and others in areas rich in sponges.

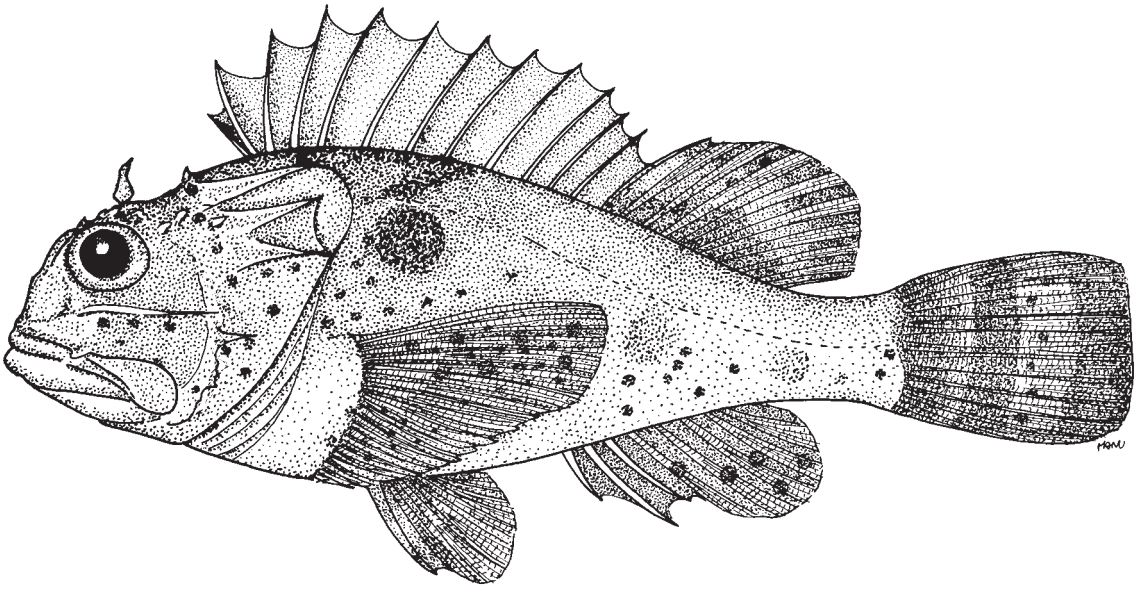
Distribution: This seldom encountered species is so far known from off Florida, the Lesser Antilles, and off the coasts of Nicaragua, Panama, Colombia, and Venezuela.



Scorpaena brasiliensis Cuvier, 1829 SBJ

Frequent synonyms / misidentifications: *Scorpaena stearnsii* Goode and Bean, 1882; *Scorpaena colesi* Nichols, 1914 / None.

FAO names: En - Barbfish; **Fr** - Rascasse brésilienne; **Sp** - Rascacio chasnete rojo.

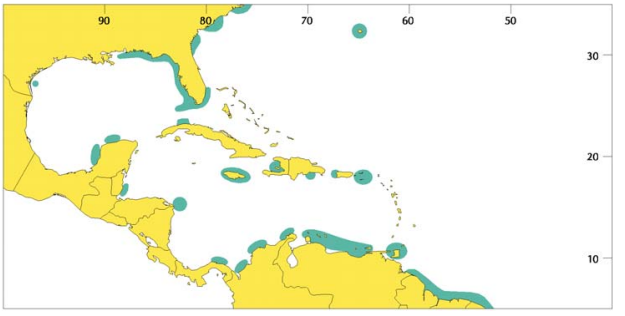


Diagnostic characters: Dorsal fin with 12 spines and 8 1/2 to 9 1/2 (usually 9 1/2) soft rays (last split to base and counted as 1 1/2). Pectoral fin with 16 to 20 rays, usually 19, some branched. Lacrimal bone with 2 spine on ventral margin, both point forward. Infaorbital bones 2 and 3 (suborbitals) with 1 and 2 often blunt spines respectively. Occipital pit present, deep, except in specimens less than 25 mm. Scales in 50 to 60 vertical rows. Vertebrae 24. **Colour:** body brown above, tan below, with 2 brown spots behind head; **small brown spots on medial surface of pectoral fin.**

Size: Reaches 250 mm, common to 200 mm

Habitat, biology, and fisheries: The most common scorpaenid along northern South American coast on shallow, soft bottoms, usually in less than 50 m, occasionally in coral reef areas. Its venom is potent. It supports an artisanal fishery primarily from use of beach nets and as bycatch of shrimp trawl fishery. It is usually not marketed, although the flesh is of good quality. This species is tolerant of low salinities and may be seasonal in Florida.

Distribution: This species is widely distributed in the fishing area. It can be found southward from Virginia, around the Florida peninsula to Texas in the Gulf of Mexico. It is also reported from the Yucatán Peninsula and commonly from Haiti; also from Cuba, Jamaica, the Virgin Islands, Panama, Colombia, Venezuela, the Dominican Republic, Trinidad, and Rio de Janeiro, Brazil. Its presence in the Bahamas is uncertain.



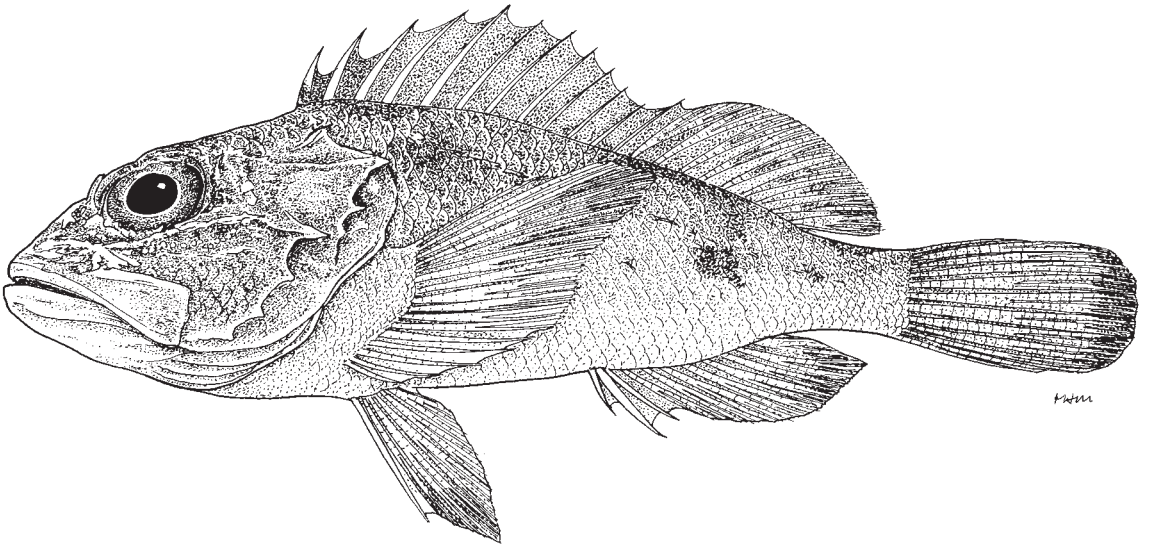
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Scorpaena calcarata Goode and Bean, 1882

Frequent synonyms / misidentifications: None / None.

FAO names: En - Smoothhead scorpionfish.

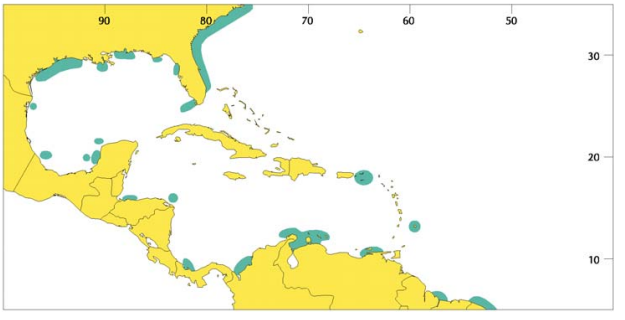


Diagnostic characters: Dorsal spine with 12 spines and 9 1/2 soft rays (last split to base and counted as 1 1/2). Pectoral fin with 18 to 21 rays, usually 20, some branched. Lacrimal bone with 2 spines ventrally, both pointing forward. Infraorbital bones 2 and 3 with 1 and 2 spines respectively. Supplemental preopercular spine at base of first absent. Interorbit narrow, 5 to 6% standard length. **Occipital pit absent**, except in smallest specimens. Vertical scale rows 42 to 49. **Colour:** colour variable, dark above, cream-coloured below; spot behind head on or below lateral line.

Size: The largest reported specimen is 119 mm standard length.

Habitat, biology, and fisheries: This species is found at depths of 14 to 73 m.

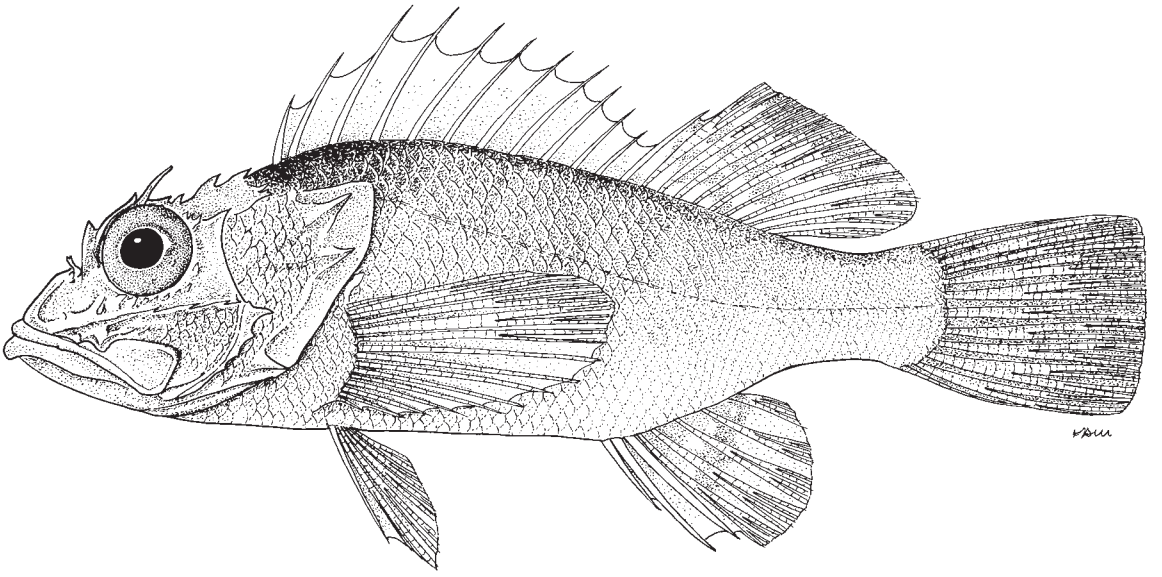
Distribution: Found from North Carolina southward to Florida, throughout the Gulf of Mexico, Mexico, Colombia, Venezuela, French Guiana, and Brazil. It is primarily a coastal species, however, it has been reported from Cuba, Jamaica, and the Virgin Islands.



Scorpaena dispar Longley and Hildebrand, 1940

Frequent synonyms / misidentifications: None / None.

FAO names: En - Hunchback scorpionfish.

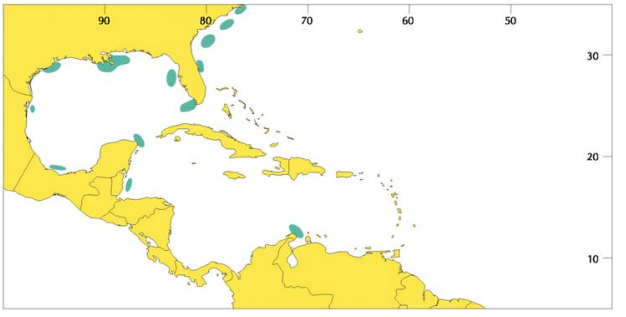


Diagnostic characters: Dorsal fin with 12 spines and 9 1/2 rays (last split to base and counted as 1 1/2). Pectoral fin with 14 (probably abnormal) to 20 rays, usually 17 to 19, with some branched. Lacrimal bone with 2 to 4 but usually 3 spines on ventral edge in specimens greater than about 50 mm. Infraorbital bones with 2 to 4 spines. Occipital pit well developed. First preopercular spine relatively short, extends less than half distance to posterior margin of operculum. Supplemental preopercular spine present. Scales cycloid (smooth to touch), in 42 to 47 vertical rows. Vertebrae 24. **Colour:** bright orange or red. One or 2 dark spots often present on body behind head.

Size: To at least 181 mm standard length.

Habitat, biology, and fisheries: Taken at depths of 37 to 119 mm.

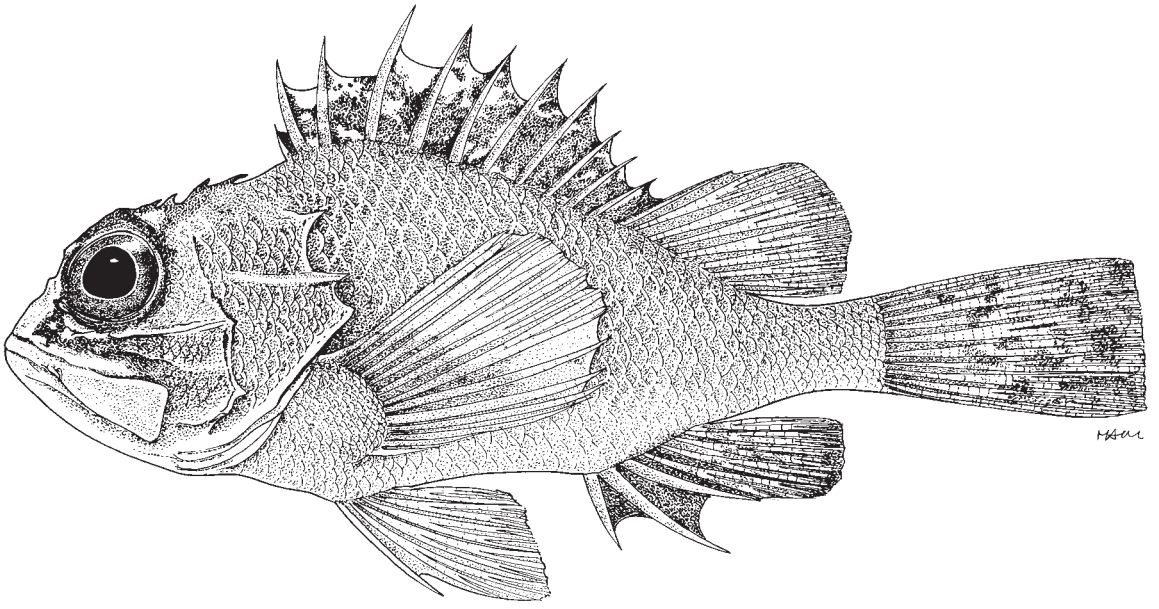
Distribution: Found from South Carolina, the Florida peninsula, the Gulf of Mexico, Yucatán, Venezuela, and Brazil.



Scorpaena elachys Eschmeyer, 1965

Frequent synonyms / misidentifications: None / None.

FAO names: En - Dwarf scorpionfish.

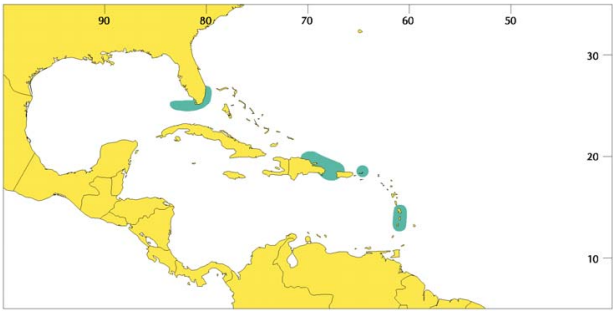


Diagnostic characters: Dorsal fin with 12 spines and 9 1/2 soft rays (last split to base and counted as 1 1/2). **Pectoral fin with 16 or 17 rays**. Lacrimal bone with 2 spinous point on ventral margin and another posteriorly on its lateral face. Suborbital ridge formed by infraorbital bones 2 and 3 smooth, except for spine at posterior end. Occipital pit shallow Scales cycloid, in 40 to 44 vertical scale rows. **Colour:** red, with medial surface of pectoral fin yellow; dusky on lateral surface of pectoral fin, below eye, and in interorbit; some yellow mixed with dark red specks on dorsal and caudal fins; anterior half of anal fin dark red, speckled in middle, and dark red distally.

Size: This is a small species that reaches 46 mm standard length.

Habitat, biology, and fisheries: This rare species, taken primarily by use of dredges operating in depth of 37 to 91 m, is of no commercial importance. Nothing is known of its biology.

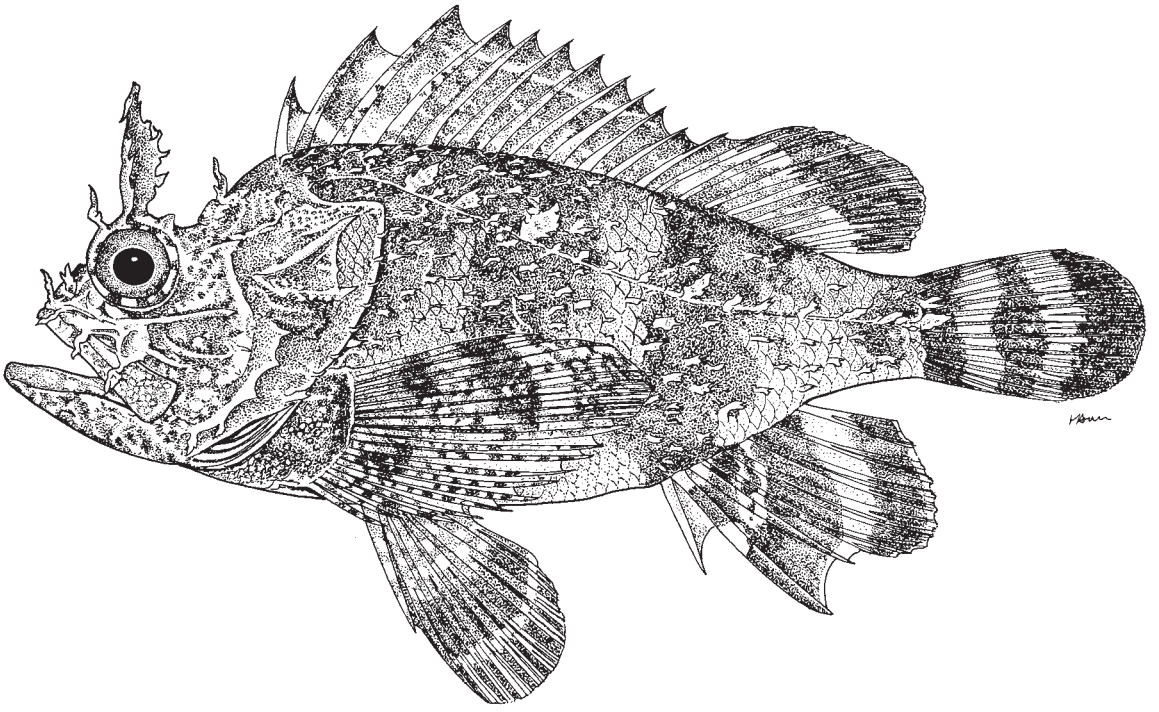
Distribution: Occurs off Florida, Puerto Rico, the Dominican Republic, Martinique, and Saint Lucia, Panama.



Scorpaena grandicornis Cuvier, 1829 SGN

Frequent synonyms / misidentifications: None / None.

FAO names: En - Plumed scorpionfish.

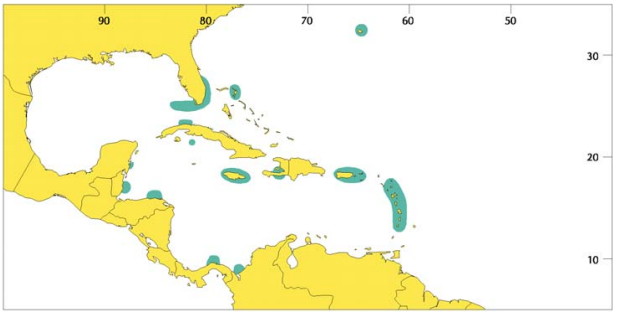


Diagnostic characters: Dorsal fin with 12 spines and 9 1/2 soft rays (last split to base and counted as 1 1/2). Pectoral fin with 18 or 19 rays, some branched. Lacrimal bone with 2 spines on ventral margin of bone. Suborbital ridge formed by infraorbial bones 2 and 3 with 2 or 3 spines. Spine on frontal absent in larger specimens, minute in small specimens. First preopercular spine relatively short, extending less than 1/2 distance to posterior margin of operculum. Occipital pit well developed. Scales cycloid (smooth to touch), in 42 to 47 vertical rows. Vertebrae 24. **Colour:** body and fins dark brown; caudal fin with 3 dark bars, 1 at base, 1 near middle, and 1 at distal margin; **upper part of pectoral axil with small white specks** each surrounded by darker pigment and typically less than 1/2 mm in diameter; white spots often extending onto medial surface of fin and on body adjacent to pectoral-fin axil.

Size: To at least 104 mm.

Habitat, biology, and fisheries: Relatively common in inshore *Thalassia* beds, in channels and bays. Reportedly eaten by sharks.

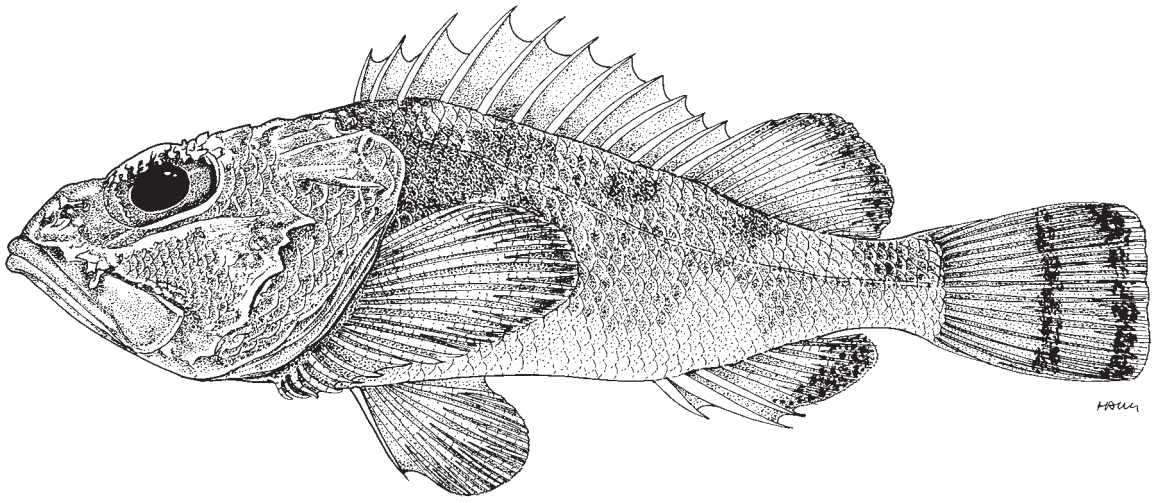
Distribution: Widespread in the West Indies, found from Florida to Bahia, Brazil, including Bermuda, the Bahamas, Cuba, Haiti, the Dominican Republic, Martinique, Jamaica, Antigua, St. Lucia, Guadeloupe, Curaçao, St. Croix, Honduras, Panama, Colombia, and Venezuela. It does not occur in the northern Gulf of Mexico. Outside the area it occurs at St. Helena and Ascension Island.



Scorpaena inermis Cuvier, 1829

Frequent synonyms / misidentifications: *Scorpaena occipitalis* Poey, 1860; *Scorpaena luckei* Fowler, 1941 / None.

FAO names: En - Mushroom scorpionfish.

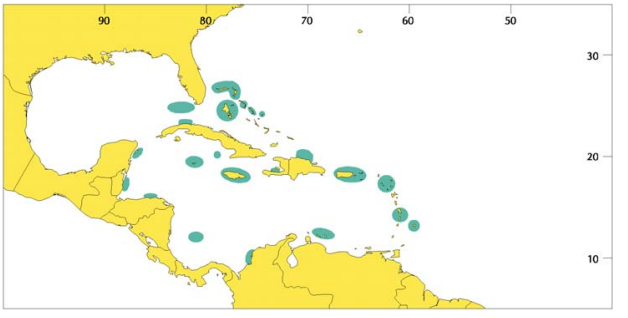


Diagnostic characters: Small, mushroom-shaped tabular cirri on eye. Dorsal fin with 12 spines and 7 1/2 to 8 1/2, usually 8 1/2, soft rays (last split to base and counted as 1 1/2). Pectoral fin with 19 to 21 rays, usually 20, with some branched. Lacrimal bone with 2 spines on ventral margine. Spinous ridge formed by infraorbital bones 2 and 3 (suborbitals) usually with 1 spine each, with that on infraorbital bone 2 sometimes absent. **Occipital pit nearly absent**. Interorbit narrow. First preopercular spine short, extending less than half way to posterior margin of operculum. Supplemental preopercular spine absent. Scales cycloid (with smooth margins), in 44 to 49 vertical rows. Vertebrae 24. **Colour:** brown on a pale tan background, with darkest pigment on dorsum, usually below the dorsal fin and over caudal peduncle; a dark brown spot often found behind head below lateral line; dorsal and anal fins with numerous dark brown specks; caudal fin with 2 dark, but poorly defined, vertical bars, one near middle of fin, the other at its distal margin.

Size: Reaches 77 mm standard length.

Habitat, biology, and fisheries: Most common in shrimp fisheries bycatch off southern Florida and the northern Gulf of Mexico in shallow depths from the shore to 73 m.

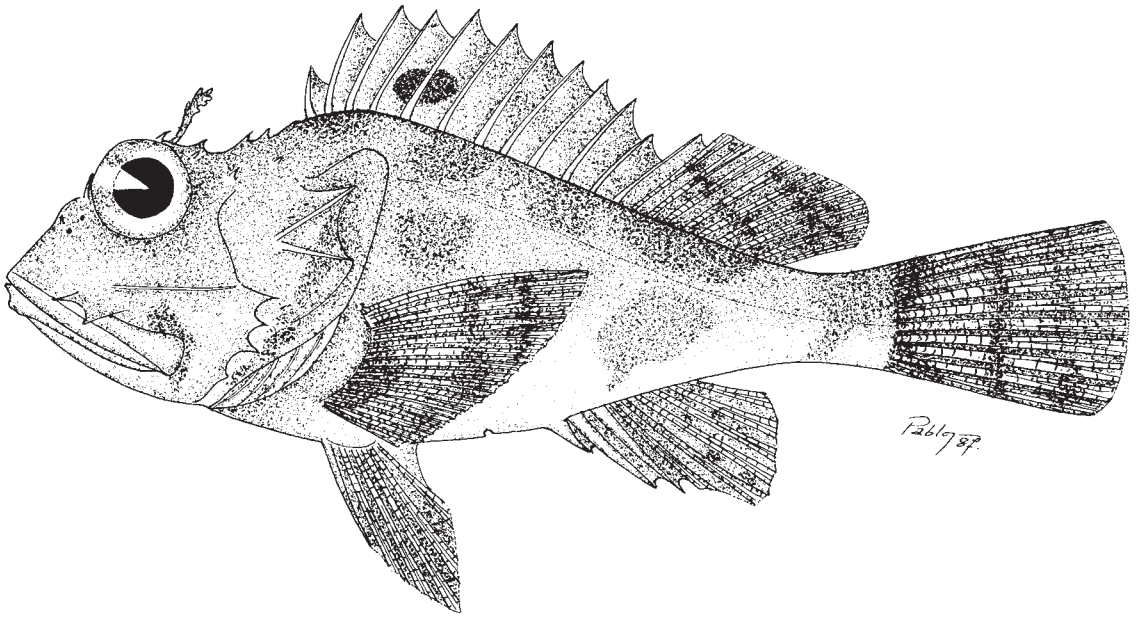
Distribution: Most common along continental margins from Georgia, Florida, the Gulf of Mexico, Colombia, and Venezuela. However, it has also been reported from more offshore localities such as the USA Virgin Islands, Martinique, Cayman Islands, Cuba, Jamaica, Curaçao, Aruba, and St. Eustatius.



Scorpaena isthmensis Meek and Hildebrand, 1928

Frequent synonyms / misidentifications: None / None.

FAO names: En - Smooth-cheek scorpionfish; **Sp** - Rascacio desarmado.

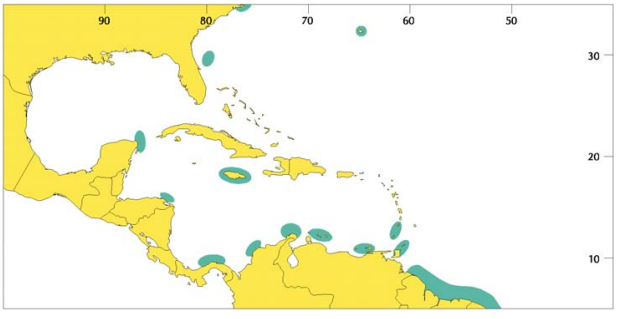


Diagnostic characters: Dorsal fin with 12 spines and 9 1/2 soft rays (last split to base and counted as 1 1/2). Pectoral fin with 17 to 19 rays, usually 18 or 19, some branched. **Lacrimal bone with 2 spines on ventral margin of bone. Infraorbital bones 2 and 3 (suborbitals) with prominent ridge, but lacking spines**. Occipital pit well developed. Scales cycloid (smooth to touch), in 44 to 47 vertical rows. Lateral-line scales 23 to 26, last at base of caudal fin. Vertebrae 24. **Colour:** body light tan with greenish bars; head brown, often with dark markings on opercular margin; yellow iris; **dorsal fin with a prominent olive green spot between spines 3 or 4 to 6 or 7**; distal half of pelvic fin dusky, proximal half faint pink; caudal fin with 3 dusky bars, one at base poorly defined, second at middle of fin, and third subterminally.

Size: The largest reported specimen is 139 mm standard length.

Habitat, biology, and fisheries: Relatively common offshore throughout the South American coast, but is occasionally found inshore. It has been taken in depths of 1.5 to 110 m.

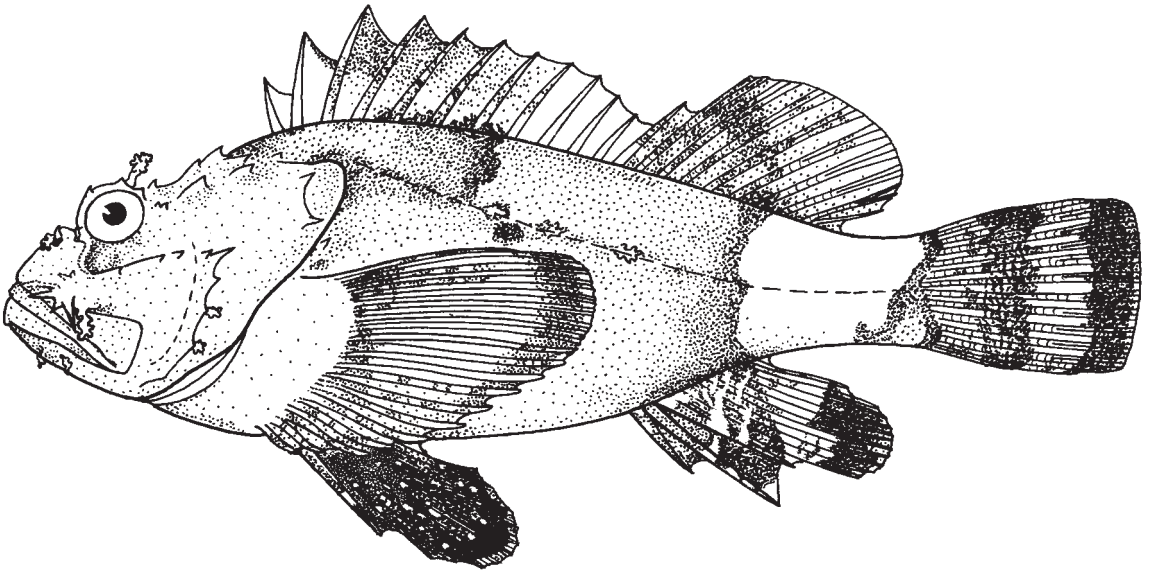
Distribution: Known from Panama eastward and south along the South American coast to Rio de Janeiro. It has also been reported off Curaçao.



Scorpaena plumieri Bloch, 1789 SMW

Frequent synonyms / misidentifications: None / None.

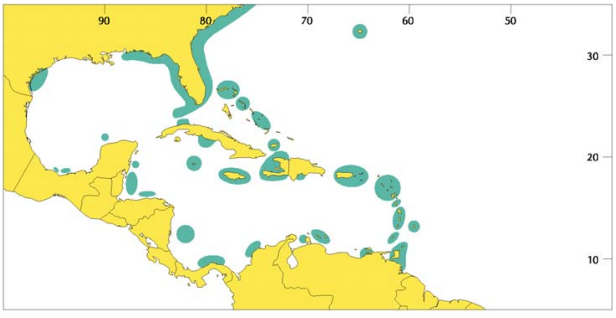
FAO names: En - Spotted scorpionfish; **Fr** - Rascasse noir; **Sp** - Rascacio negro.



Diagnostic characters: A spiny-headed, robust scorpionfish. Dorsal fin with 12 spines and 9 1/2 soft rays (last split to base and counted as 1 1/2). Pectoral fin with 18 to 21 fin rays, usually 19 or 20, some branched. Lacrimal bone with 3 or 4 spines on ventral margin of bone and a small spine on posterior lateral face. Suborbital ridge formed by infraorbital bones 2 and 3 with usually 1 and 2 spines respectively. **Occipital pit well developed**. Scales cycloid (smooth to touch), in 42 to 47 vertical rows. Lateral-line scales 23 to 27, last 1 or 2 on base of caudal fin. Vertebrae 24. **Colour:** variable, brown or black on a paler background; area before caudal fin abruptly paler; head mottled with dark markings; underparts often orangish or reddish; fins variously banded or blotched with dark on a pale background, often with patches of green; caudal fin with dark bars at base, middle, and near end; **inside of pectoral fins characteristically with large white spots or blotches on a black background.**

Size: Maximum size to about 430 mm; common to 300 mm.

Habitat, biology, and fisheries: Caught incidentally throughout its range. Caught mainly on hook-and-line, with traps, and incidentally in shallow-water trawl hauls. Marketed fresh. Mostly found in shallow coral reef and rocky areas, but ranges offshore to about 60 m. Probably territorial or home-based most of the time. Rolls and spreads pectoral fin when alarmed. Venom associated with fin spines potent. Feeds mostly on other fishes and crustaceans.

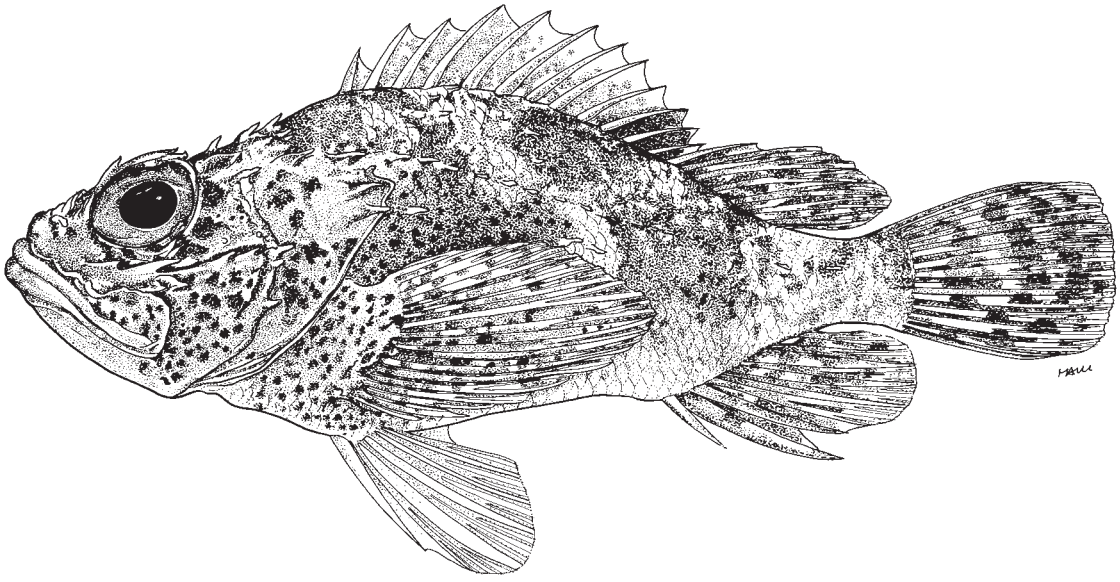


Distribution: Throughout most warm coastal waters of the area, from southeastern USA to Rio de Janeiro, including the Caribbean Sea and Bermuda. Overall range includes St. Helena and Ascension Island in the South Atlantic and warm waters of the eastern Pacific (separate subspecies). Frequent in tidepools.

Scorpaenodes caribbaeus Meek and Hildebrand, 1928

Frequent synonyms / misidentifications: None / *Scorpaenodes triacanthus* Parr, 1930.

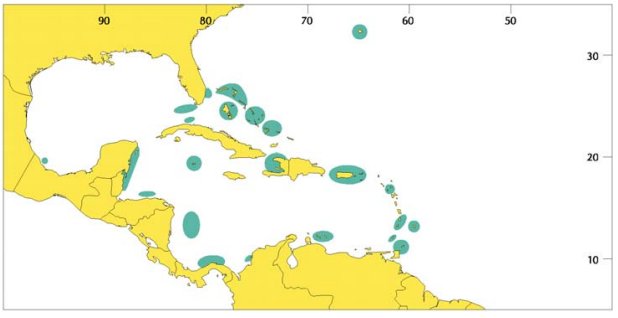
FAO names: En - Reef scorpionfish.



Diagnostic characters: Dorsal fin with 13 spines and 8 1/2 or more typically 9 1/2 soft rays (last split to base and counted as 1 1/2). **Pectoral fin with 18 to 20 rays, usually 19, some branched**. Lacrimal bone with 2 rounded lobes, but without definite spines on ventral margin and usually with a small spine on its posterolateral face. **Suborbital ridge formed by infraorbital bones 2 and 3 with 1 to 4, usually 3 spines, with a second row of 1 or 2 to 6 spines below main ridge**. Coronal spines usually present near ends of interorbital ridges. Occipital pit absent. A slit behind the last hemibranch. Scales ctenoid (rough to touch) in 40 to 45 rows. Lateral-line scales, 20 to 24, last on base of caudal fin. Vertebrae 24. **Colour:** highly variable coloration, but usually variously spotted and blotched with brown; a poorly defined dark blotch on posterior end of spinous dorsal fin; 1 to 3 brown bands on pectoral fins in juveniles, that become increasingly spotted with maturity; caudal peduncle pale in specimens less than about 30 mm standard length, but spotted in specimens larger than 30 mm.

Size: A small species, reaches about 85 mm standard length.

Habitat, biology, and fisheries: Clear water or coral habitats. Captured in shore to about 18 m. It is not infrequently taken as bycatch in seines and nets, where its venomous spines can pose a threat to fishermen, although the fish itself is not marketed.

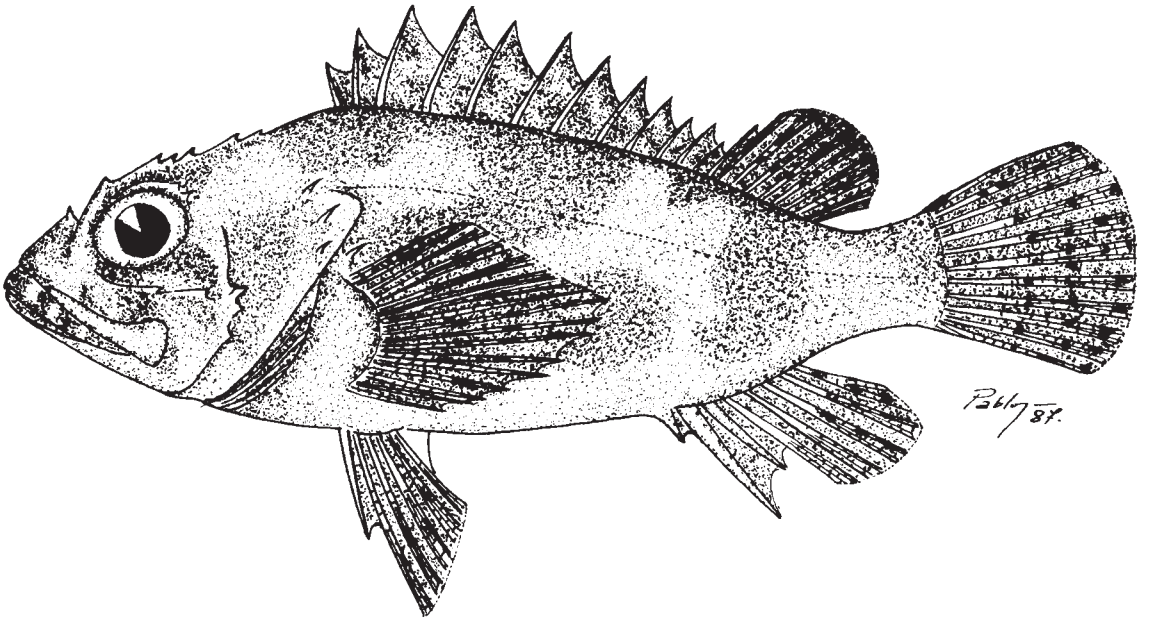


Distribution: Widespread through the western Atlantic. It has been collected from Florida, the Bahamas, Haiti, Jamaica, the Virgin Islands, Arcas Cay, Isla Lobos Mexico, Cozumel, Belize, Panama, Los Roques, Punta de Betín, Playa Brava, and Cabo de La Aguja off Venezuela.

Scorpaenodes tredecimspinosus (Metzelaar, 1919)

Frequent synonyms / misidentifications: *Scorpaenodes floridae* Hildebrand, 1940 / None.

FAO names: En - Deepreef scorpionfish.

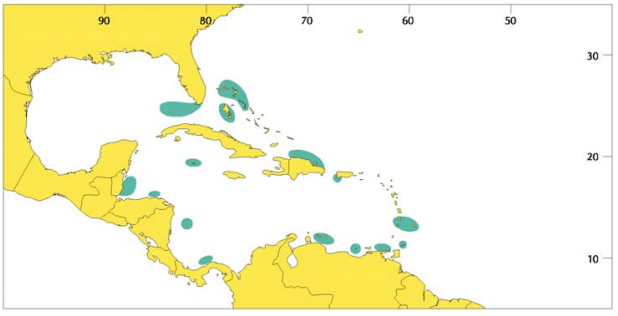


Diagnostic characters: Dorsal fin with 13 spines and 8 1/2 (rarely) or 9 1/2 soft rays (last split to base and counted as 1 1/2). **Pectoral fin with 16 to 18, usually 17 rays, some branched**. Lacrimal bone with 2 rounded lobes, but without spines, on ventral margin of bone. Often a small spine on the lateral face of the lacrimal bone at the anterior end of the suborbital ridge. **Suborbital ridge formed by infraorbital bones 2 and 3 with 1 to 3, usually 2 spines, with no spines below main ridge of spines**. Spines at end of interorbital ridges and coronal spines behind these usually present, but often lacking. Occipital pit absent. No slit behind last hemibranch. Scales cycloid (smooth), in 40 to 45 vertical rows. Lateral line with about 23 scales. Vertebrae 24. **Colour:** typically brown or reddish, with faint dusky pigment on a pallid background, usually more brownish in specimens from shallower depths. A black spot at end of spinous dorsal fin. Fins with faint brown spots or mostly transparent.

Size: Reaches only 45 mm standard length.

Habitat, biology, and fisheries: Occurs from about 8 to 78 m on coral and rock bottoms. Although widespread, it is less frequently seen than its inshore counterpart, *Scorpaenodes caribbaeus*.

Distribution: Widely distributed in the western Atlantic, being reported from Florida, the Bahamas, Dominica, Honduras, Panama, Venezuela, and the Dutch West Indies.

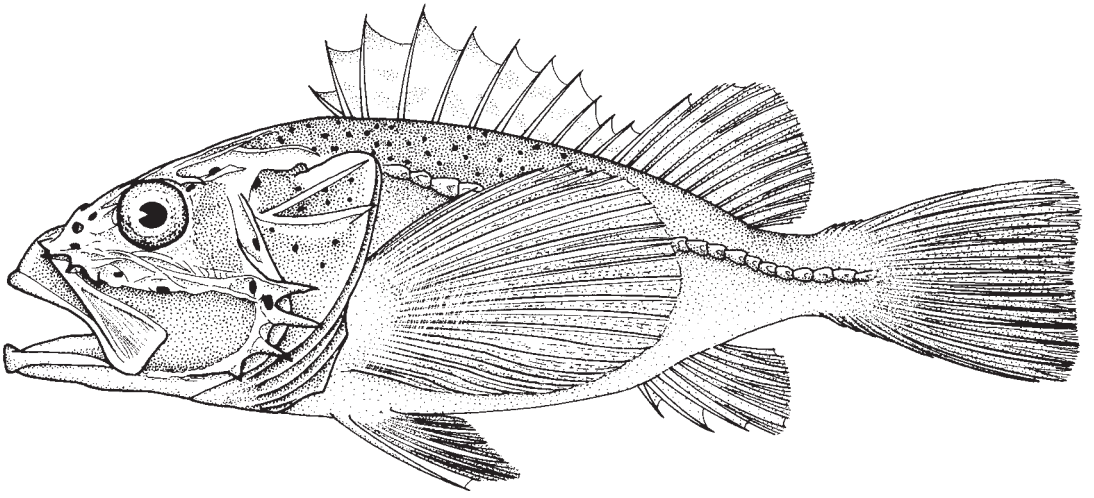


Setarches guentheri Johnson, 1862

SVG

Frequent synonyms / misidentifications: *Setarches fidjiensis* (Günther, 1878), *Setarches parmatus* (Goode, 1881) / None.

FAO names: En - Deepwater scorpionifish; **Fr** - Rascasse serran; **Sp** - Rascacio serrano.

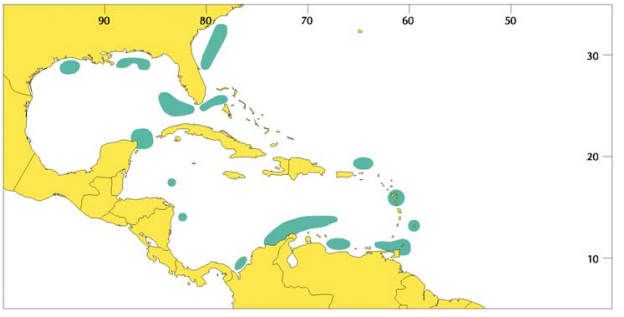


Diagnostic characters: Body depth 28 to 40% of standard length. **Second preopercular spine subequal to or longer than first or third preopercular spines**. Pectoral-fin rays 20 to 25, usually 23 (21 to 25) in fishing area. Interorbital width 7 to 9% standard length. Anteriormost preorbital spine on lacrimal bone nearly as long as posterior 2; anal fin with 3 spines and 5 1/2 soft rays (last split to base and counted as 1 1/2). Pyloric caecae 4, typically black or grey. Swimbladder well developed. **Colour:** adults are brick red or orange, with dark reddish or nearly black specks over the head and body, particularly dorsally. In smaller specimens the reds are mixed with grey, with black specks. Specimens about 40 mm have more dark pigment concentrated in a patch above the pectoral fin.

Size: Reaches 250 mm standard length; common to 150 mm.

Habitat, biology, and fisheries: In the area, reported from depths of between 200 and 700 m, with a preferred depth of about 400 m. Outside the area, reported depths of capture extend from about 150 to 850 m (one 30 m record from off New Caledonia is questionable). Although all collections have been made with bottom trawls operating over relatively soft bottoms, the presence of bathypelagic carideans of the genus *Oplophorus* and unidentified amphipods suggest that the species feeds in the water column. It is frequently taken in industrial fin-fish operations, but because of its small size and because of the small size of the catch, it is seldom marketed. It is also occasionally taken with bottom-set long lines at the continental margins and upper slope. Wounds inflicted by the spines of this deep-water species can be painful.

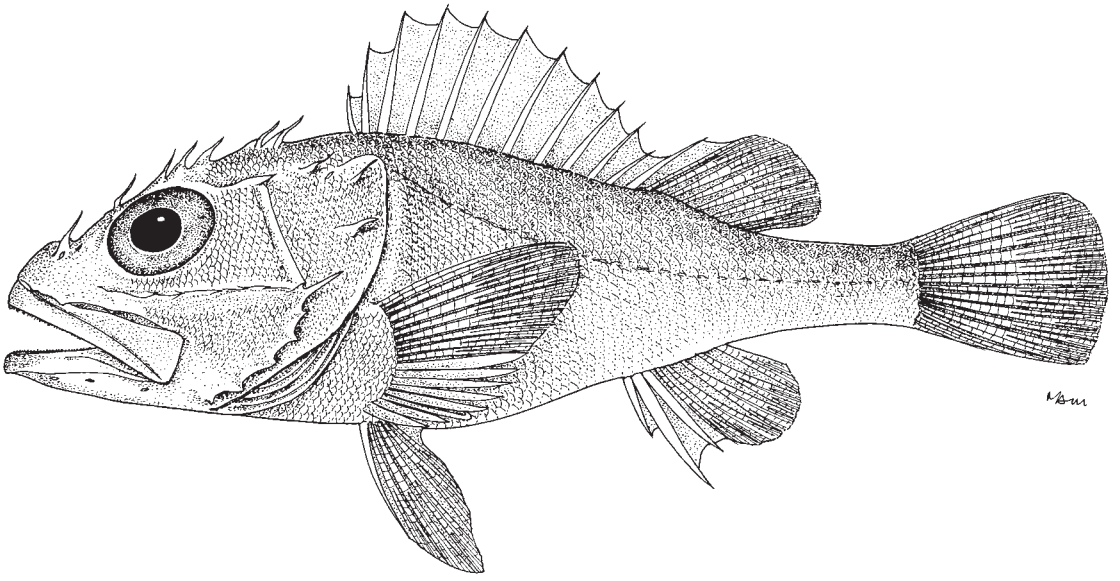
Distribution: This species is the most widely distributed scorpaenid. Within the fishing area it has been taken from North Carolina southward to Florida and the Tortugas and in the Gulf of Mexico. It is also reported from off Barbados, the Yucatán Channel, Honduras, Nicaragua, Colombia, and Venezuela. Outside of the area, the species has been reported from New Jersey in the Western Atlantic, and Madiera, Cape Verde Is. Spanish Sahara-Mauritania, Morocco, Ghana, Senegal, Gulf of Guinea, the Congo, and Angola in the eastern Atlantic, from Natal to Zanzibar in the Indian Ocean, from the northwest coast of Sumatra, Bali Sea, Macassar Strait, Molucca Strait, the Arafura Sea, near Kei Islands, the Philippines, Japan, Chesterfield Bank, the Coral Sea, New Caledonia, the Fiji Islands, and Hawaii in the Pacific Ocean. Interestingly, it has not been reported from the eastern Pacific.



Trachyscorpia cristulata (Goode and Bean, 1896) TJX

Frequent synonyms / misidentifications: None / None.

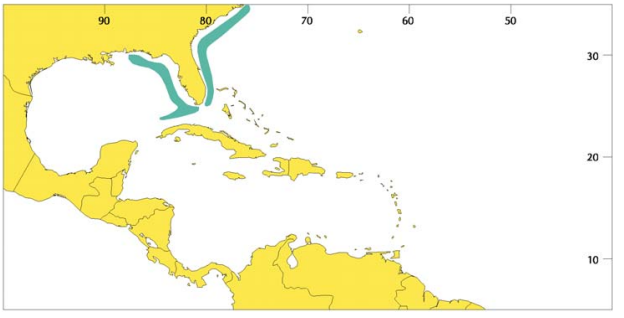
FAO names: En - Atlantic thornyhead.



Diagnostic characters: Dorsal fin with 12 spines and 8 1/2 (rarely) or 9 1/2 soft rays (last split to base and counted as 1 1/2). **Pectoral fin bilobed, with 21 to 24 rays, usually 23, lowermost fleshy in larger specimens**. Head large, 47 to 48 % standard length. Occiput flat, without pit, notably longer than wide. Scales ctenoid (rough to touch), in 57 to 67 vertical rows. **Vertebrae 25. Colour:** red.

Size: Reaches 400 mm standard length and possibly grows much larger.

Habitat, biology, and fisheries: Deep water benthic species, relatively large, is infrequently taken in trawls operating at depths of 120 to 740 m. Consequently, it is not of commercial importance and little is known of its biology. Two subspecies are recognized, *T. cristulata cristulata* from the western Atlantic and *T. cristulata echinata* from Ireland to Mauritania in the eastern Atlantic.



Distribution: The western subspecies, *T. cristulata cristulata* was first reported off Georgia (30°44'N., 79°26'W.), and is now known from Massachusetts to Florida and the Gulf of Mexico.

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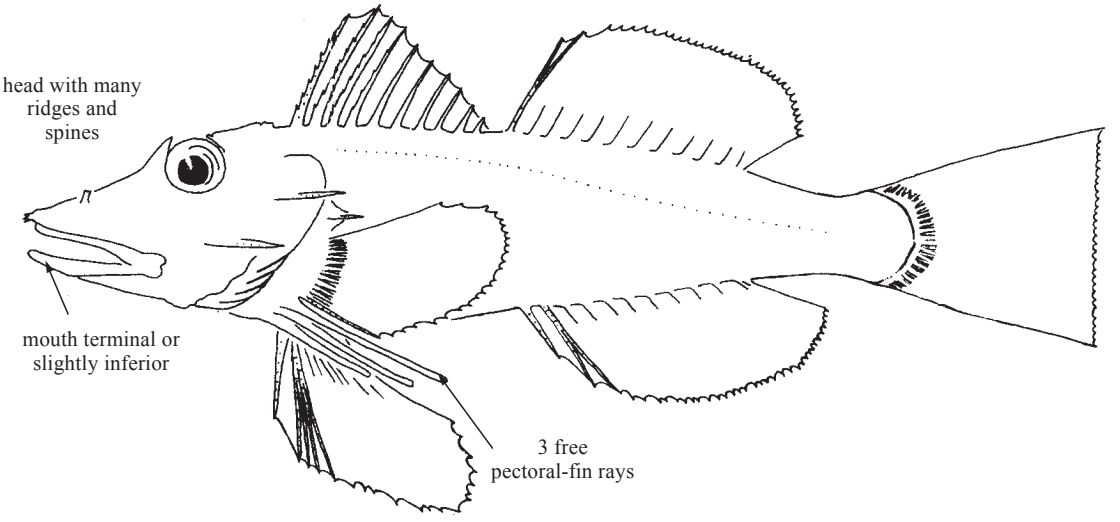
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TRIGLIDAE

Searobins

By W.J. Richards, National Marine Fisheries Service, USA and G.C. Miller (retired), St. Simons Island, Georgia, USA

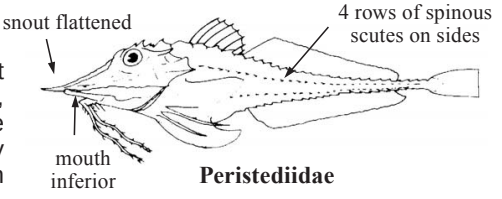
Diagnostic characters (diagnosis applies to Western Central Atlantic species only)**:** Body moderately elongate. **Head large, bony, with many ridges and spines**, but without barbels or large forward-pointing projections on snout; **mouth terminal to slightly inferior; villiform teeth present in both jaws and on roof of mouth**. Two separate dorsal fins, the first with 9 to 11 spines, the second with 11 to 14 segmented soft rays; anal fin with 10 to 13 soft rays; pectoral fins short to long, with **3 lowermost rays free** (detached from the remaining fin rays which are joined by a membrane). Body with ctenoid scales, but lacking bony scutes. Swimbladder bilobed. **Colour:** variable, silver or red to black or dusky, belly always pale; juveniles usually with dark saddles on body; first dorsal fin often with a black spot or blotch; pectoral fins usually with some bands, spots, or blotches; however, a black fin variation may be found in some species that are usually coloured.



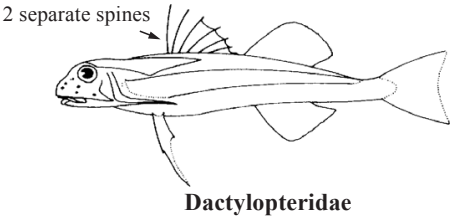
Habitat, biology, and fisheries: Searobins are medium-sized benthic fishes reaching to about 45 cm in total length inhabiting the continental and insular shelves of tropical and warm-temperate seas to depths of about 180 m (much deeper in other fishing areas). They occur on sandy or muddy substrates, rubble, or reef-type bottoms, using the free pectoral-fin rays for support and for search of food. Although most species are not the object of a special fishery, they often enter bottom-trawl catches, sometimes in moderately large quantities. The majority are considered as trashfish, but some of the larger species are used as food. One species (striped searobin) is considered a game fish with size records maintained. Their flesh is tasty and firm.

Similar families occurring in the area

Peristediidae: snout flattened, flanked laterally by a pair of short or long projections; mouth inferior, teeth absent; mandibular, lip, and chin barbels always present; only lowermost 2 rays of the pectoral fins free (lowermost 3 rays free in Triglidae); body scaleless but enclosed by 4 rows of spinous scutes on each side.



Dactylopteridae: anterior 2 dorsal-fin spines separated from remainder of fin; head very blunt without projecting snout; pectoral fin without free rays although some lower rays nearly separate with some independent movement.



Key to the genera of Triglidae occurring in the area

1a. Dorsal spines 10 (rarely 9 or 11), posterior spines short and may be difficult to find; soft dorsal fin with 12 or 13 rays; first and second dorsal spines never long and filamentous; opercular membrane partially scaled above opercular spine (Fig. 1) . . . . . ***Prionotus***

1b. Dorsal spines usually 11 (rarely 10 or 12); soft dorsal with 11 rays; first 1 or 2 dorsal spines often long and filamentous on males (with the exception of *B. brachychir*); opercular membrane without scales; individuals relatively small (less than 17 cm standard length) (Fig. 2) . . . ***Bellator***

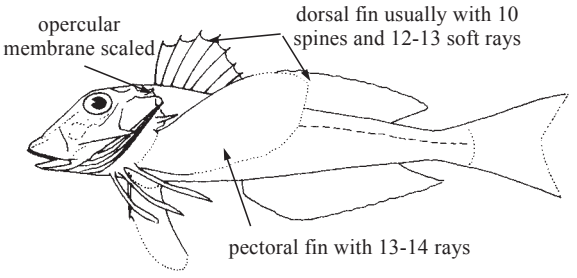


Fig. 1 ***Prionotus***

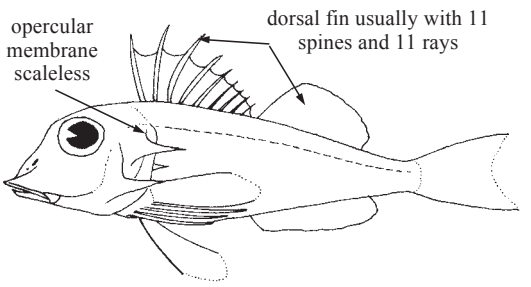


Fig. 2 ***Bellator***

Key to *Bellator* species occurring in the area

1a. Cleithral spine long, extending well beyond tip of opercular spine (Fig. 3); chest scaled; thin horn-like projections extending well beyond snout . . . . . → ***2***

1b. Cleithral spine short, not extending beyond tip of opercular spine (Fig. 4); chest naked; horn-like projections barely extend beyond snout, almost blunt . . . . . → ***3***

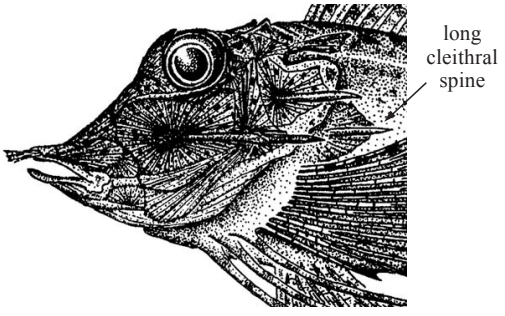


Fig. 3 lateral view of head (*Bellator militaris*)

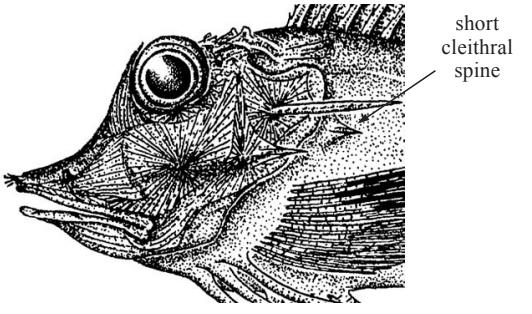


Fig. 4 lateral view of head (*Bellator brachychir*)

2a. Supplemental spine on preopercular present; longest pectoral-fin rays reaching distal end of anal fin base in specimens over 10 cm; dorsal-most pectoral fin rays prominently marked with black and white bands; without dark ventral marginal band on pectoral fin; coloration in life rosy with horizontal yellow lines extending to caudal fin . . . . . ***Bellator militaris***

2b. Supplemental spine on preopercular spine absent or rudimentary; longest pectoral fin rays not reaching beyond third anal-fin ray; dorsal-most pectoral-fin rays lack black and white banding; dark band on ventral edge of pectoral fin . . . . . ***Bellator ribeiroi***

3a. First free ray of pectoral fin shorter than pectoral-fin length; eyeball with tabs or tentacles on dorsoposterior portion; nasal spines present; mouth small, maxilllary not extending to anterior margin of eye; pectorals with alternating patches of light and dark pigment, appearing as brown patches on dorsal 1 to 2 pectoral-fin rays (often seen as bands) . . ***Bellator egretta***

3b. First free ray of pectoral fin considerably longer than pectoral-fin length; eyeball without tabs or tentacles; nasal spines absent; mouth large, maxillary extending beyond anterior margin of eye; pectoral fins dusky or with an elongate black spot dorsally, posterior margin white . . . . . ***Bellator brachychir***

Key to the *Prionotus* species occurring in the area

1a. Mouth terminal with lower jaw produced, with small ventral bony knob at symphysis of lower jaw; pectoral fins very short (less than head length and not extending beyond origin of anal fin), colour black (Fig. 5); body with distinct silvery coloration; lower preopercular spine short, reaching only to distal end of operculum or immediately anterior to it; body cavity extends posteriad of anal-fin origin . . . . . ***Prionotus stearnsi***

1b. Mouth subterminal, lower jaw not extending beyond upper jaw and without small ventral knob; pectoral fins moderate to long (equal to or greater than head length and extending to or beyond origin of anal fin), coloration variable, body coloration not silvery; preopercular spine not short, reaching past operculum; body cavity ends at anal-fin origin . . . . . → ***2***

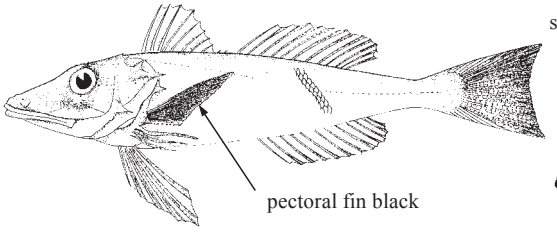


Fig. 5 ***Prionotus stearnsi***

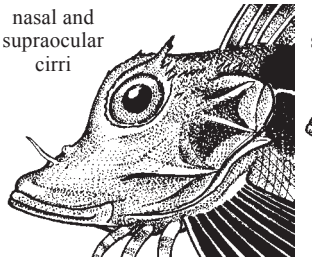


Fig. 6 ***Prionotus ophryas***

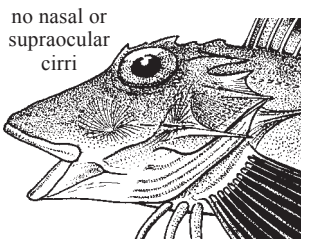


Fig. 7 ***Prionotus beanii***

2a. Nasal and supraocular cirri present (Fig. 6) . . . . . → ***3***

2b. Nasal and supraocualr cirri absent (Fig. 7) . . . . . → ***4***

3a. Pectoral fin rounded, upper 2 rays not extending to caudal-fin base as thread-like filament (Fig. 8) . . . . . ***Prionotus ophryas***

3b. Two uppermost rays of pectoral fin produced, extending to caudal-fin base as thread-like filaments (Fig. 9) . . . . . ***Prionotus murielae***

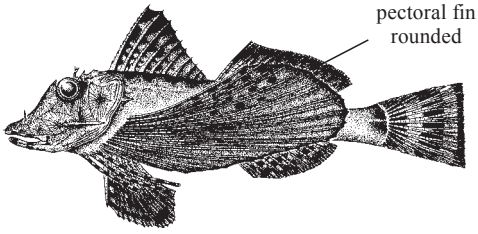


Fig. 8 ***Prionotus ophryas***

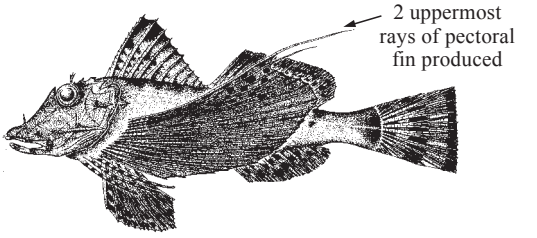


Fig. 9 ***Prionotus murielae***

4a. Spinous dorsal fin with 2 non-ocellated blotches, 1 between the first and second spines, the other between the fourth and fifth spines; branchiostegal membranes light, never dark or dusky . . . . . → ***5***

4b. Spinous dorsal fin without 2 non-ocellated spots; 1 spot may be ocellated or no distinct spots . . . . . → ***6***

5a. Throat (gular area) naked; joined pectoral-fin rays 12 to 14, modally 13; gill rakers on lower limb of first arch including angle usually 11, varying 10 to 13, branchiostegal rays white, not dusky or black . . . . . ***Prionotus scitulus***

5b. Throat (gular area) entirely scaled; joined pectoral rays 14 or 15, modally 14; gill rakers on lower limb of first arch including angle usually 9, varying 8 to 11, branchiostegal rays dusky or black . . . . . ***Prionotus martis***

6a. Spinous dorsal fin with black spot between the fourth and fifth spine, with spot surrounded by hyaline area which extends anteriorly towards and to the first dorsal-fin spine . . . . . → *7*

6b. Spinous dorsal fin without black spot surrounded by hyaline area extending anteriorly . . . . . → *8*

7a. Branchiostegal rays white, not dusky or black; pectoral fin with small light blue or light-coloured spots; no large white spot on dorsal caudal peduncle . . . . . *Prionotus longispinosus*

7b. Branchiostegal rays dusky or black; pectoral fin without small, numerous light-coloured blue spots; large white spot on dorsal caudal peduncle . . . . . *Prionotus carolinus*

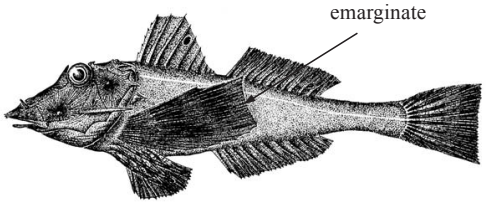


Fig. 10 ***Prionotus beanii***

8a. Pectoral fins emarginate (Fig. 10) . . . . . → *9*

8b. Pectoral fins elongated or round, not emarginate (Fig. 11, 12) . . . . . → *10*

9a. Preopercular spine short (mean=9% standard length), reaching just past operculum, does not reach or extend to the distal end of the cleithral spine; pectoral fin with 2 broad dark areas separated and surrounded by lighter areas, nasal spines present or absent . . . *Prionotus beanii*

9b. Preopercular spine long (mean=12% standard length), extending well beyond the operculum, and does reach or extend to distal end of the cleithral spine; pectoral fin with dark spots and some pink coloration scattered throughout, nasal spines absent . *Prionotus paralatus*

10a. Pectoral fins elongated, lower joined rays much longer than upper joined rays (Fig. 11) . . . . . → *11*

10b. Pectoral fins rounded, lower joined rays not longer than upper joined rays (Fig. 12) . . . . . → *12*

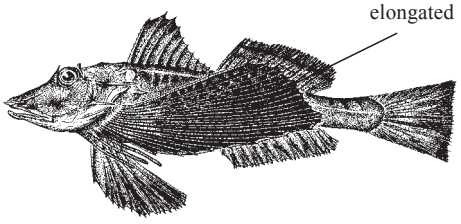


Fig. 11 ***Prionotus rubio***

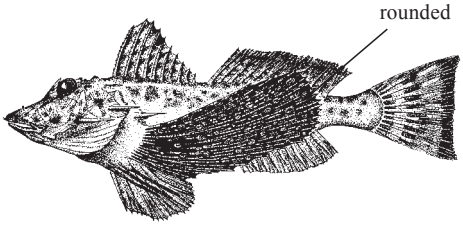


Fig. 12 ***Prionotus roseus***

11a. Pectoral fin elongate but only lower joined pectoral-fin rays elongated forming a concavity, reaching past posterior margin of anal fin and with black bands; nasal spines present, but may be small and difficult to discern (detection is best made by running finger downward toward snout on snout region) . . . . . *Prionotus alatus*

11b. Pectoral fin elongate but obliquely truncate, not concave with only lowermost joined rays longer, rays reach past posterior margin of anal fin, pectoral fins uniformly black with distinct blue margin on ventral edge, nasal spines absent . . . . . *Prionotus rubio*

12a. Dark bands or lines extending entirely across pectoral fin, 2 lateral stripes or spots (may be partial) from head to caudal fin . . . . . → *13*

12b. Dark bands or lines not extending entirely across pectoral fin, no lateral stripes on body . . . . → *14*

13a. Total gill rakers on first gill arch usually 17 to 24; dark narrow wavy vertical lines, placed close together on pectoral fin . . . . . ***Prionotus evolans***

13b. Total gill rakers on first arch usually 8 to 16; dark broad vertical bands on pectoral fin (bands may be narrow in Gulf of Mexico specimens) . . . . . ***Prionotus tribulus***

14a. Dorsal free ray of pectoral fin short, not reaching distal end of pelvic fin; pectoral fins with bright blue and/or dark ocellated spots throughout (spots on pectorals not ocellated on some variants), ventral edge dark or brown without blue margin . . . . . ***Prionotus roseus***

14b. Dorsal free ray of pectoral fin long, reaching distal end of pelvic fin; pectoral fin lacking numerous blue or ocellated spots, ventral edge with a blue margin . . . . . ***Prionotus punctatus***

List of species occurring in the area

The symbol is given when species accounts are included.

- *Bellator brachychir* (Regan, 1914).
- *Bellator egretta* (Goode and Bean, 1896).
- *Bellator militaris* (Goode and Bean, 1896).
- *Bellator ribeiroi* Miller, 1965.
- *Prionotus alatus* Goode and Bean, 1883.
- *Prionotus beanii* Goode, 1896.
- *Prionotus carolinus* (Linnaeus, 1771).
- *Prionotus evolans* (Linnaeus, 1766).
- *Prionotus longispinosus* Teague, 1951.
- *Prionotus martis* Ginsburg, 1950.
- *Prionotus murielae* Mowbray, 1928.
- *Prionotus ophryas* Jordan and Swain, 1885.
- *Prionotus paralatus* Ginsburg, 1950.
- *Prionotus punctatus* (Bloch, 1793).
- *Prionotus roseus* Jordan and Evermann, 1887.
- *Prionotus rubio* Jordan, 1886.
- *Prionotus scitulus* Jordan and Gilbert, 1882.
- *Prionotus stearnsi* Jordan and Swain, 1885.
- *Prionotus tribulus* Cuvier, 1829.

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Miller, G. C. and W. J. Richards. 1991b. Nomenclatural changes in the genus *Prionotus* (Pisces: Triglidae). *Bull. Mar. Sci.*, 48:757-762.

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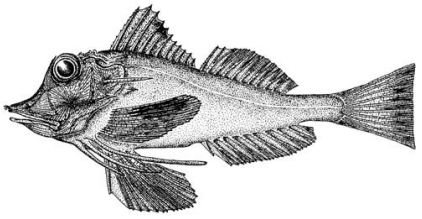
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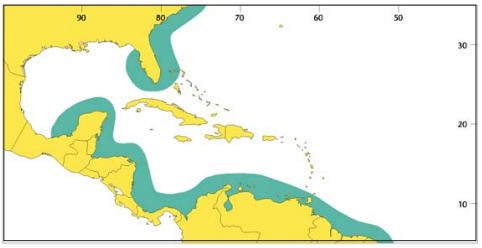
Teague, G. W. 1951. The sea-robins of America. A revision of the triglid fishes of the genus *Prionotus. Commun. Zool. Mus. Hist. Nat. Montevideo,* 3(61):59 p.

Bellator brachychir (Regan, 1914) BLY

En - Shortfin searobin.

Small, generally less than 11 cm, maximum size to 16 cm. Little known. Usually in depths of 137 to 275 m, ranging from 27 to 366 m. Not fished commercially. North Carolina south to Uruguay.

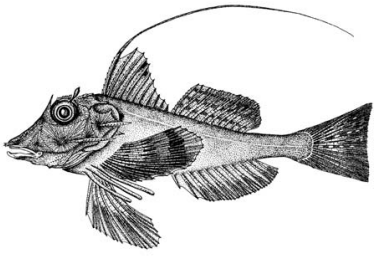


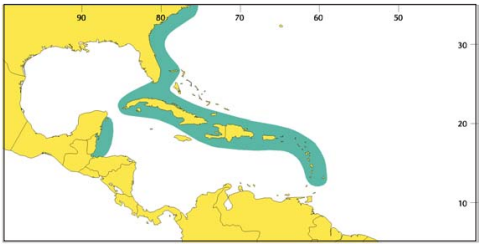


Bellator egretta (Goode and Bean 1896)

En - Streamer searobin.

Small size, less than 100 mm standard length, maximum to 150 mm standard length with elongated first dorsal-fin spine. Head very spiny with sharp spine in front of eye, long spines on opercle and preopercle. Differs from all other *Bellator* species except *B. brachychir* by the opercular spine extending posterior to the cleithral spine. Differs from *B. brachychir* by the presence of papillae on eye, by the first free pectoral-fin ray shorter than pectoral fin, by smaller orbital width (mean = 9.3% standard length compared to 13.7% standard length), and by longer rostrum (mean = 18.5% compared to 14.4% standard length). Little known. Mature males sexually dimorphic. Depth ranges from 40 to 230 m, commonly 64 to 183 m. No commercial fisheries. North Carolina south to Barbados. Frequent synonyms are *Prionotus egretta* Goode and Bean 1896 and *Prionotus opercularis* Fowler 1952.

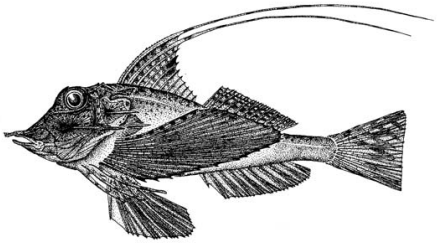


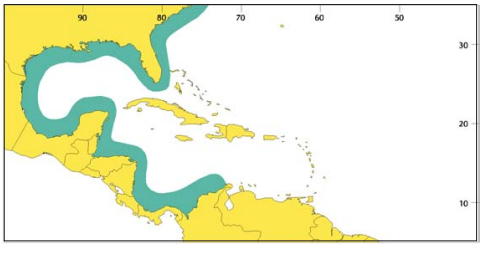


Bellator militaris (Goode and Bean, 1896)

En - Horned searobin.

Small, usually less than 11 cm standard length, maximum size to 16 cm. Little known with males sexually dimorphic. Depth usually 27 to 73 m, ranging from 20 to 216 m. No commercial fisheries. North Carolina south to Colombia along the coast.

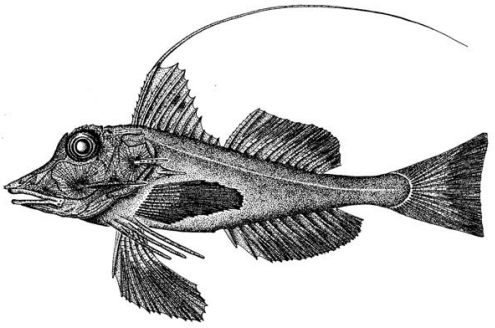


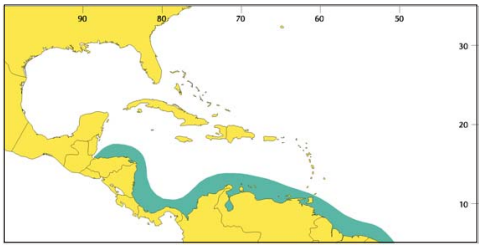


Bellator ribeiroi Miller, 1965

En - Caribbean searobin.

Small, usually less than 11 cm, maximum size to 16 cm. Little known. Mature males sexually dimorphic. Depth ranging from 40 to 79 m. Honduras to Brazil along continental margin of Central and South America.



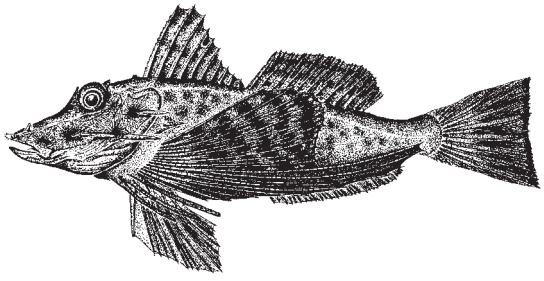


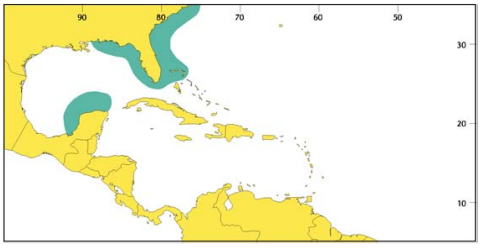
Prionotus alatus Goode and Bean, 1883

PQA

En - Spiny searobin.

Small, with maximum size to 20 cm. Found in depths from 55 to 457 m, usually ranging from 55 to 128 m. Too small for commercial importance, but flesh is edible. Virginia to south Florida and Bahamas, eastern Gulf of Mexico to Mississippi River Delta, and Campeche Bank.

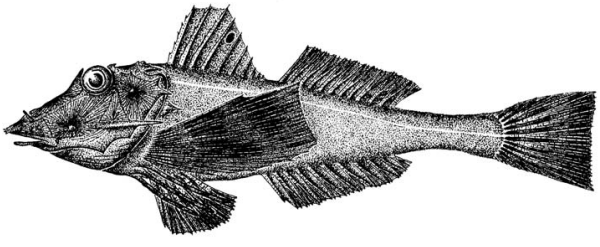


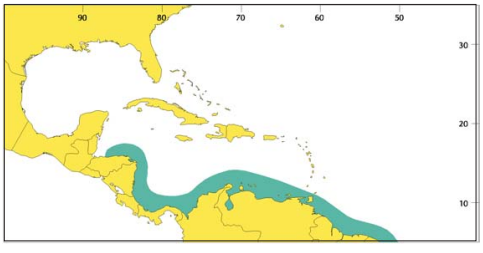


Prionotus beanii Goode, 1896

En - Bean's searobin; **Fr** - Grondin de Bean; **Sp** - Gallinita.

Small, with maximum size to 15 cm total length. Usually found in depths from 55 to 128 m, ranging from 46 to 274 m. Coastal species from Honduras to Brazil.

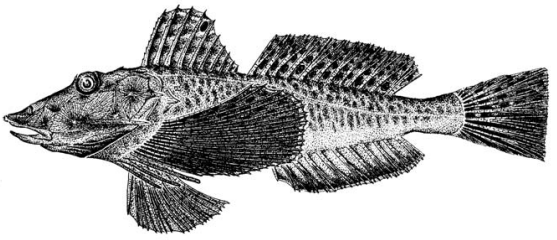


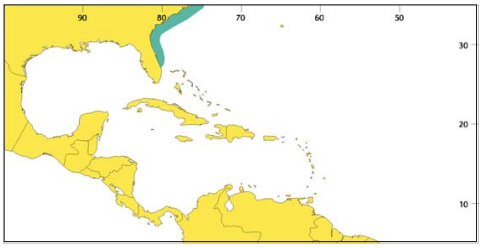


Prionotus carolinus (Linnaeus, 1771) PQC

En - Northern searobin; **Fr** - Grondin carolin; **Sp** - Rubio carolino.

Small, maximum size to 38 cm. Usually in depths of 18 to 55 m, range from 9 to 170 m. Taken in commercial catches as bycatch, flesh edible. Nova Scotia to eastern Florida.

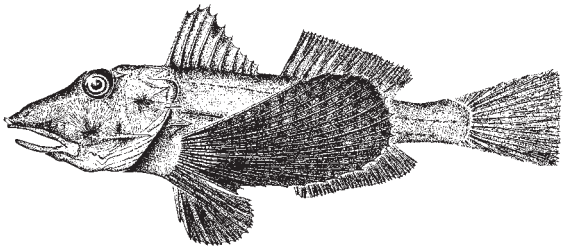


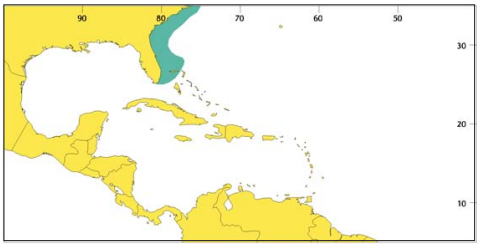


Prionotus evolans (Linnaeus 1766)

En - Striped searobin.

Maximum size to 45 cm. Pectoral fin rounded, of variable length from eighth anal-fin ray to distal of anal-fin base with brown coloration with very narrow vertical wavy brown lines and inner side blackish; lateral line darkened and parallel dark stripe below resulting in 2 distinct dark stripes on trunk to caudal peduncle; chest and interpelvic area scaled; nasal spines absent. Total gill rakers on first gill arch usually 17 to 24. Depth range 9 to 146 m, usually 18 to 64 m. Commercial bycatch and considered a gamefish and fished recreationally with all tackle record weight of 1.55 kg. From Nova Scotia south to northern Florida, rare north of Cape Cod. Possibly Little Bahama Bank. Frequent synonyms are *Trigla evolans* Linnaeus 1766, *Trigla lineata* Mitchill 1815, and *Prionotus sarritor* Jordan and Gilbert 1883.

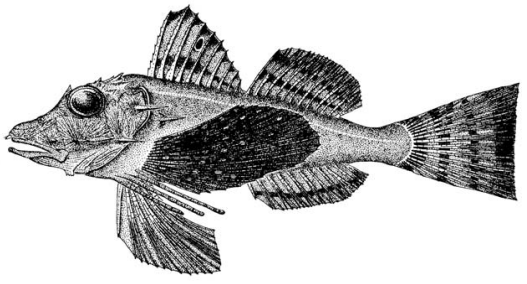


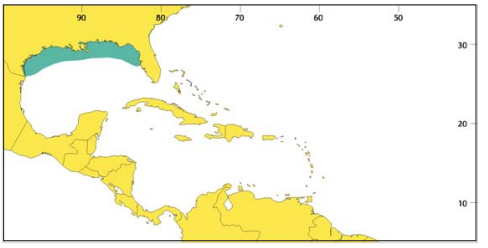


Prionotus longispinosus Teague, 1951

En - Bigeye searobin.

Small, maximum size to 35 cm. Found in inshore bays and from shallow depths to 219 m, usually between 9 and 91 m. Northern Gulf of Mexico, absent from the Caribbean Sea.





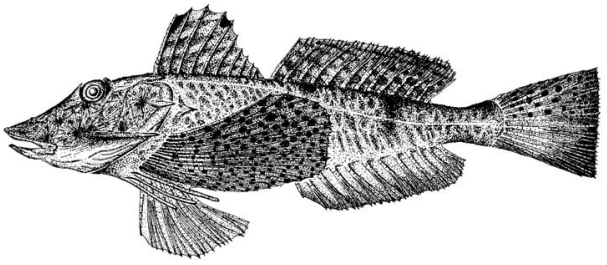
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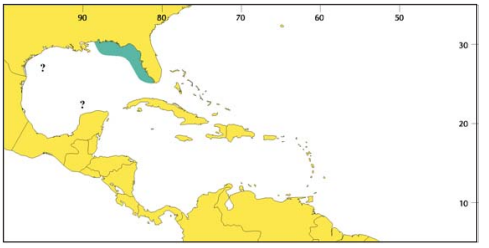
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Prionotus martis Ginsburg, 1950

En - Barred searobin.

Small, maximum size to 18 cm. Depth between 11 and 46 m, usually between 18 and 37 m. Too small for commercial use, flesh edible. Gulf of Mexico from west coast of Florida to Mobile Bay, Alabama and perhaps to Texas and Campeche.

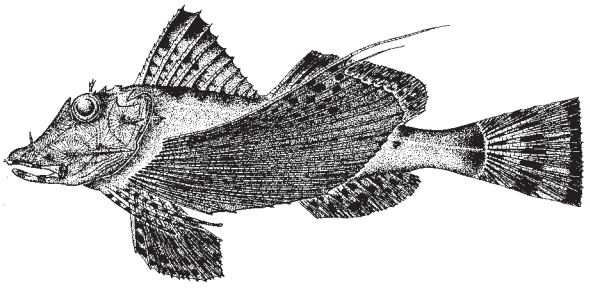


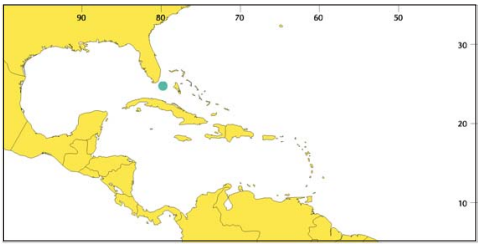


Prionotus murielae Mowbray, 1928

En - Cay Sal searobin.

Small, maximum size to 20 cm. Known only from 1 specimen collected at Cay Sal Bank, Bahamas.

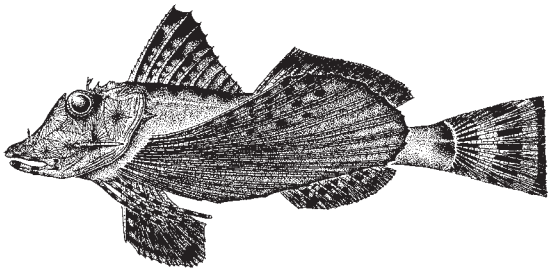


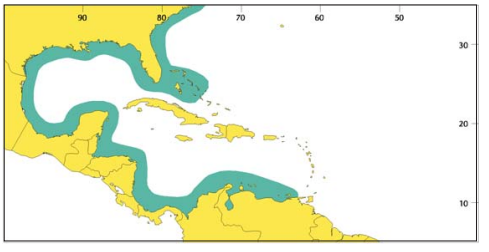


Prionotus ophryas Jordan and Swain, 1885

En - Bandtail searobin; **Fr** - Gronlin fil; **Sp** - Gallina cornúa.

Small, maximum size to 20 cm. Depth ranges from 7 to 110 m, usually 18 to 64 m. Cape Hatteras south to Florida and Bahamas, throughout Gulf of Mexico south to Venezuela.

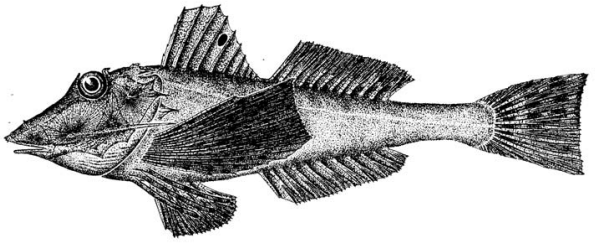


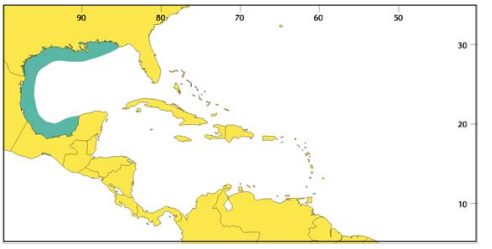


Prionotus paralatus Ginsburg, 1950 PQP

En - Mexican searobin.

Small, maximum size to 18 cm. Usually found between 27 and 146 m, ranging from 9 to 274 m. Of no commercial importance because of size, but flesh is edible. Western Gulf of Mexico from Mississippi River Delta to Campeche.

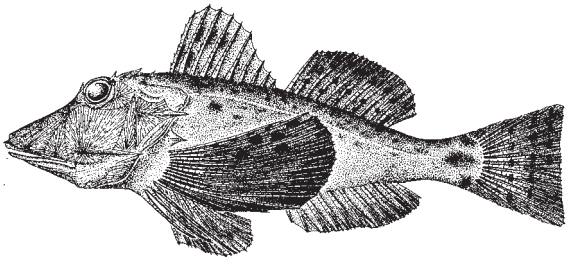


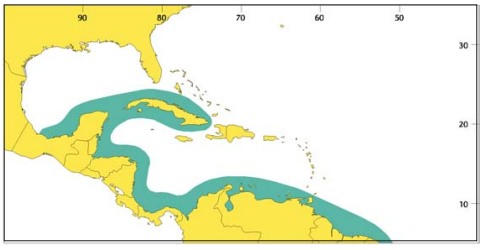


Prionotus punctatus (Bloch, 1793) PQT

En - Bluewing searobin; **Fr** - Grondin poule; **Sp** - Gallina pintada (= Testolín azul).

Small, maximum size to 20 cm. Depth between 7 and 115 m, usually around 29 m. Campeche Bank and Cuba south to Argentina.

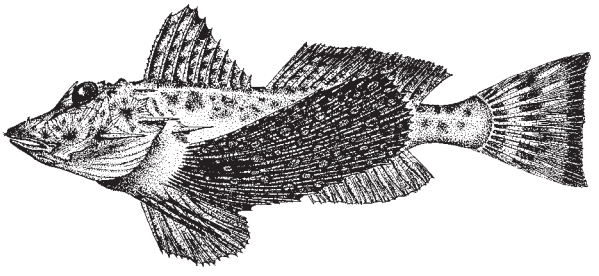


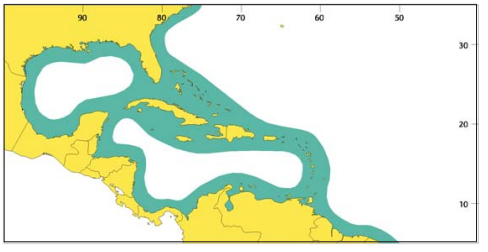


Prionotus roseus Jordan and Evermann, 1887

En - Bluespotted searobin; **Fr** - Grondin de lagune; **Sp** - Gallina de charco.

Small, maximum size to 20 cm. Depth range from 9 to 183 m, usually 27 to 91 m. North Carolina to Brazil including Gulf of Mexico and Caribbean Sea.

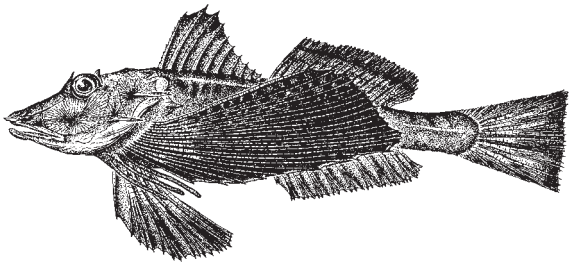


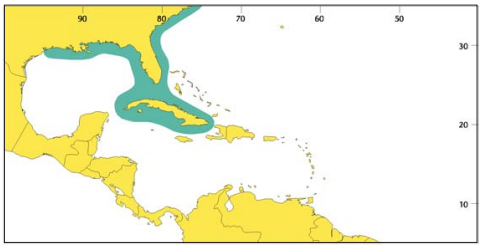


Prionotus rubio Jordan, 1886

En - Blackwing searobin.

Small, maximum size to 23 cm. Found in inshore bays from shallow depths to 212 m, usually between 9 and 55 m. North Carolina to Cuba, and in the Gulf of Mexico from Florida to Texas.

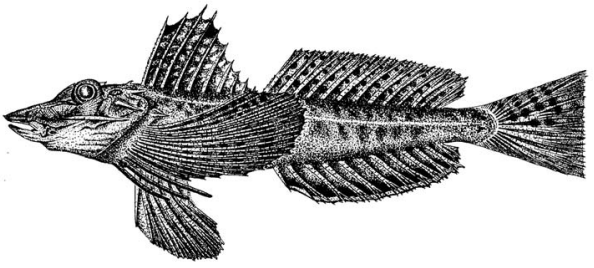


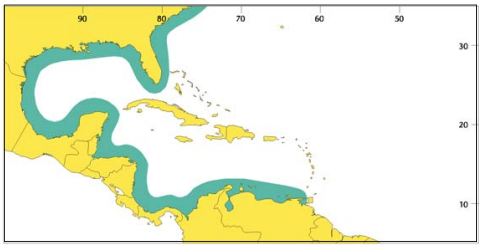


Prionotus scitulus Jordan and Gilbert, 1882

En - Leopard searobin.

Small, maximum size to 25 cm. Depth range from 5 to 91 m, usually in shallow bays to 46 m. Virginia to Venezuela and throughout the Gulf of Mexico.

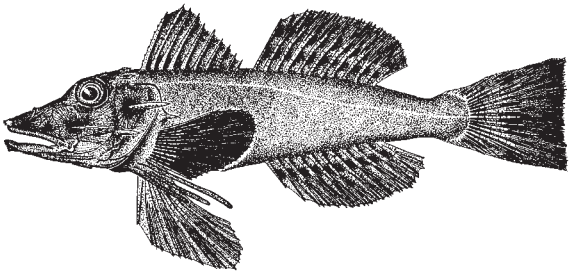


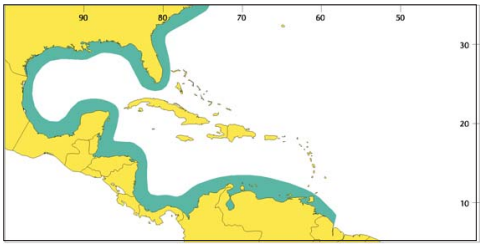


Prionotus stearnsi Jordan and Swain, 1885

En - Shortwing searobin; **Fr** - Grondin aîle-courte; **Sp** - Gallina aleta corta.

Small, maximum size to 18 cm. Found offshore in depths from 11 to 549 m, usually 37 to 110 m. Too small for commercial interest. North Carolina to French Guiana.

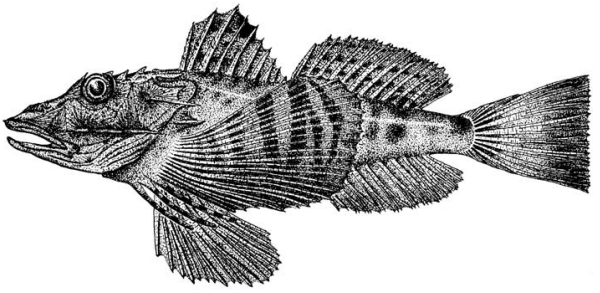


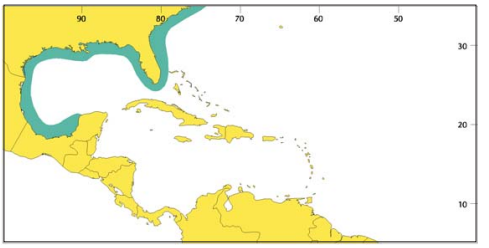


Prionotus tribulus Cuvier, 1829

En - Bighead searobin.

Small, maximum size to 35 cm. Found inshore to 183 m, usually between 9 and 64 m. New York south including Chesapeake Bay to Florida, and west around Gulf of Mexico to Bay of Campeche.





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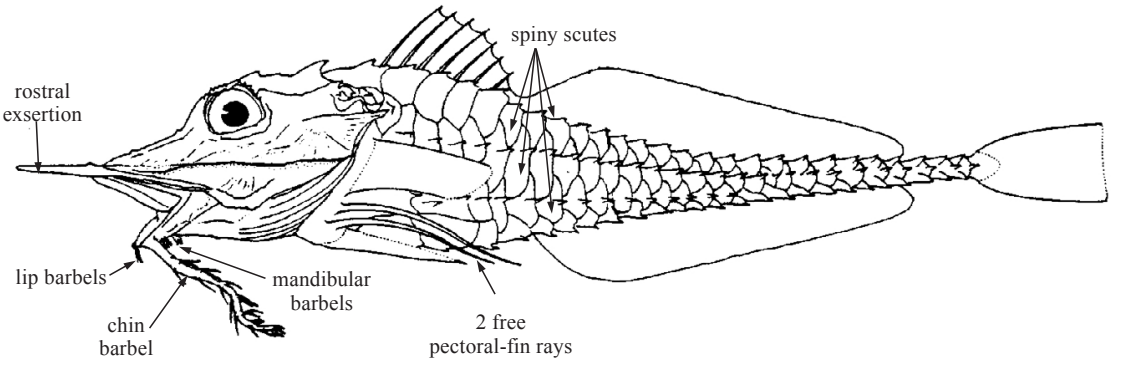
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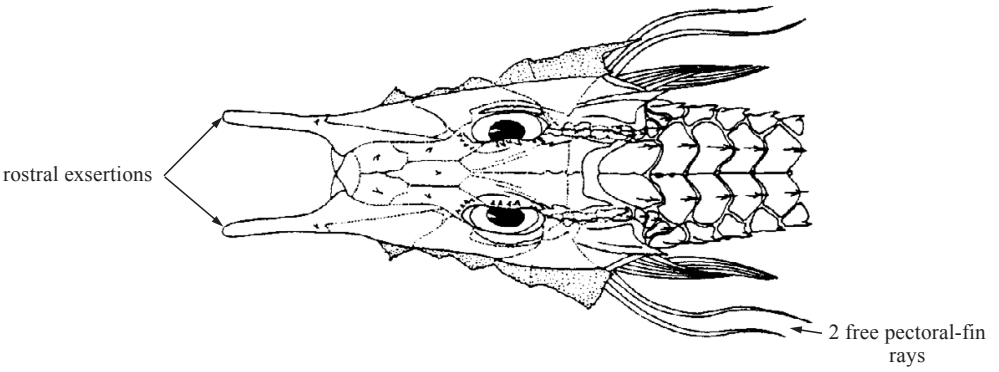
PERISTEDIIDAE

Armoured searobins (armoured gurnards)

by G.C. Miller (retired), St. Simons Island, Georgia, USA and W.J. Richards, National Marine Fisheries Service, USA

Diagnostic characters: Body enclosed by 4 rows of spinous scutes on each side; lacking scales; head large, bony, with many ridges and spines; snout broad and flattened dorsoventrally, flanked anteriorly by a pair of short and broad or long and slender, projections (or rostral exsertions) of the first suborbital bones; mouth inferior, jaws incompletely closing; teeth absent on mandible, vomer, and palatine bones; tongue usually absent, but when present rudimentary with tip bifurcated; mandibular barbel present, lip and chin barbels usually present. Dorsal fin with separate spinous and soft portions, consisting of 7 to 9 spines and 16 to 23 segmented soft rays; anal fin with 16 to 23 soft rays; **pectoral fin short with joined rays and 2 free rays ventrally**. Swimbladder with single lobe. **Colour:** overall colour highly variable, from pinkish or reddish to yellowish or bluish, often with silvery reflections; often with dark or coloured spots, stripes, or bars.





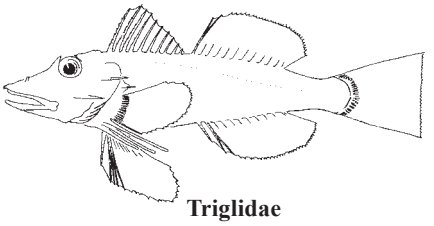
Habitat, biology, and fisheries: Armoured searobins inhabit continental or insular slopes in temperate and tropical waters. They are generally found greater than 180 m. They are often taken in trawl catches from deep waters and are considered trash fish and are very rarely used as food.

Remarks: Their lateral appearance varies little among species but diagnostic characters are best seen from dorsal views of the head, consequently dorsal views of the head are generally used in the species accounts. The diagnosis applies only to western Atlantic *Peristedion*.

Similar families occurring in the area

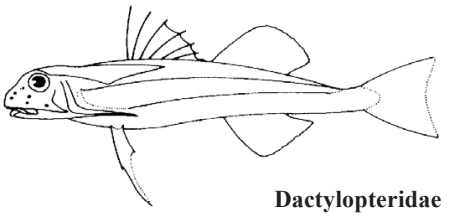
No other family has 4 rows of bony scutes covering the body. Further distinguishing characters are the following:

Triglidae: head bony but body covered with many rows of ctenoid scales, not bony scutes; 3 free lower pectoral fin rays, not 2.



Triglidae

Dactylopteridae: head bony but body covered with many rows of ctenoid scales, not bony scutes; head blunt with no projecting spines; lower pectoral-fin rays not divided to base; anterior 2 dorsal-fin spines separate from remainder of fin.



Dactylopteridae

Key to the species of Peristediidae occurring in the area

1a. Head narrow; perifacial rim extremely narrow, less than 2 mm wide at posterior margin (Fig. 1). . . . . ***Peristedion gracile*** **species group** → ***2***

1b. Head broad; perifiacial rim broad, wider than 2 mm at posterior margin . . . . . → ***4***

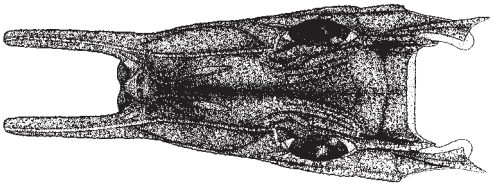


Fig. 1 ***Peristedion gracile***

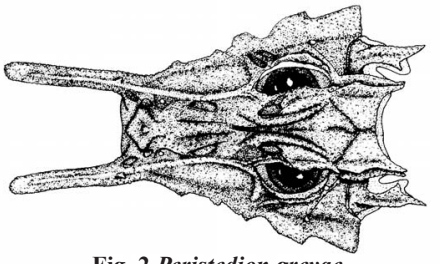


Fig. 2 ***Peristedion greyae***

2a. Interorbital broad, nearly equal to least width of rostrum; body depth and width at anus nearly as great as head, body rectangular in appearance. . . . . ***Peristedion gracile***

2b. Interorbital not broad, not nearly equal to least width of rostrum, strongly concave; body depth and width at anus much less than at head, with body not rectangular in appearance . . . . . → ***3***

3a. First free pectoral-fin ray longer than joined rays; chin barbels few, 17 to 23 usually 21 . . . . . ***Peristedion imberbe***

3b. First free pectoral-fin ray shorter than joined rays; chin barbels numerous 34 to 57, usually 41 to 43 . . . . . ***Peristedion*** **n. sp. "t"**

4a. Perifacial rim terminating posteriorly perpendicular to head; anterior edge of first ventral scute posterior to anterior edge of bony ridge of pelvic girdle . . . . . → ***5***

4b. Perifacial rim terminating posteriorly as a spine or a flat spine-like projection; anterior edge of first ventral scute equal or anterior to anterior edge of bony ridge of pelvic girdle (possible exception is *P. miniatum*) . . . . . → ***11***

5a. Dorsal preopercular ridge and second infraorbital spines very large; chin barbel counts constant 8 or 9, distinctive from other species in having the anterior cluster with 1 large and 2 small barbels, and the remaining clusters with 1 large and 1 small barbel (posterior clusters sometimes lacking small barbel . . . . . ***Peristedion miniatum***

5b. Dorsal preopercular ridge and second infraorbital spines not very large; chin barbel numbers usually much greater or less than 8 or 9, not distinctive as in *P. miniatum* . . . . . → ***6***

6a. Rostral exsertions very short, broad, triangular shaped . . . . . ***Peristedion ecuadorense***

6b. Rostral exsertions not short or triangular shaped . . . . . → ***7***

7a. Rostral exsertions extremely long and slender (when not broken), longer than snout (rostral exsertions measured from anterior tip to premaxillary symphysis; snout measured from premaxillary symphysis to anterior edge of orbit); lip barbels 1; chin barbels 0 to 1 (modally 0) . . . . . ***Peristedion antillarum***

7b. Rostral exsertions not extremely long and slender, not longer than snout; lip barbel and chin barbel counts greater than 1 . . . . . → ***8***

8a. Head extremely broad, lip barbels 1+1 . . . . . ***Peristedion longispatha***

8b. Head not extremely broad; lip barbel counts greater than 1+1 . . . . . → ***9***

9a. Lip barbels 2+1+2; mandibular barbel short, scarcely reaching past posterior articulation of jaw . . . . . ***Peristedion truncatum***

9b. Lip barbels 2+2; mandibular barbel long, from nearly reaching posterior termination of perifacial rim to posterior half of first ventral scute . . . . . → ***10***

10a. Mandibular barbel very long, reaching past termination of perifacial rim to posterior half of first ventral scute; unicuspid spines on posterior scutes of superomedian series; peritoneum and posterior roof of mouth dark, heavily pigmented . . . . . ***Peristedion unicuspis***

10b. Mandibular barbel not very long, not reaching past termination of perifacial rim; bicuspid spines on posterior scutes of superomedian series; peritoneum silvery, white, or translucent . . . . . ***Peristedion greyae***

11a. Perifacial rim terminating as a strong spine; nasal spine large, chin barbels numerous, usually 31 or more . . . . . ***Peristedion brevirostre***

11b. Perifacial rim terminating as a flat spine-like projection or as a small spine; nasal spine small or lacking; chin barbels less than 24 . . . . . → ***12***

12a. Chin barbels 12 to 18, usually 14 or 15 . . . . . ***Peristedion thompsoni***

12b. Chin barbels 18 to 23, usually 21 or 22 . . . . . ***Peristedion altipinnis*** (Brazilian species, not in area)

List of species occurring in the area

The symbol is given when species accounts are included.

- *Peristedion antillarum* Teague 1961.
- *Peristedion brevirostre* (Günther 1860).
- *Peristedion ecuadorense* Teague, 1961.
- *Peristedion gracile* Goode and Bean 1896.
- *Peristedion greyae* Miller 1967.
- *Peristedion imberbe* Poey 1861.
- *Peristedion longispatha* Goode and Bean, 1886.
- *Peristedion miniatum* (Goode, 1880).
- *Peristedion* n. sp. “t”.
- *Peristedion thompsoni* Fowler 1952.
- *Peristedion truncatum* (Günther, 1880).
- *Peristedion unicuspis* Miller 1967.

References

Miller, G. C. 1967a. A new species of western Atlantic armored sea robin, *Peristedion greyae* (Pisces: Peristediidae). *Bull. Mar. Sci*., 17:16-41.

Miller, G.C. 1967b. A new armored sea robin fish, *Peristedion unicuspis*. Family Peristediidae, from the Straits of Florida. *Proc. Biol. Soc. Wash*., 80:19-26.

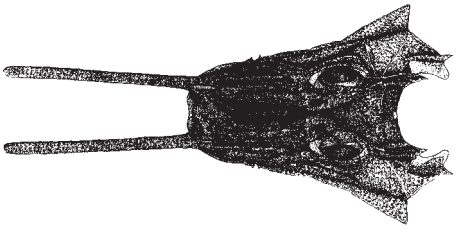
Robins, C. R. and G. C. Ray. 1986. *A field guide to Atlantic coast fishes of North America. The Peterson field Guide Series.* United States, Houghton Mifflin Co., 354 p.

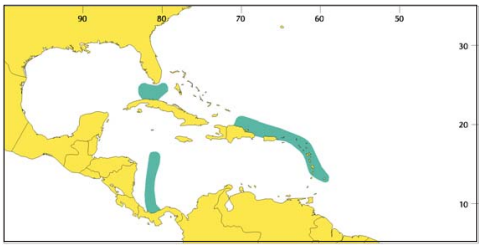
Teague, G. W. 1961. The armored sea-robins of America, a revision of the American species of the Family Peristediidae. *An. Mus. Hist. Nat. Montevideo*., (Ser. 2), 7(2):1-27.

Peristedion antillarum Teague, 1961

En - Longnose armoured searobin.

Maximum size to 18 cm standard length, commonly to 15 cm standard length. A slope species ranging from 329 to 649 m. Prejuveniles and juveniles less than 61 mm standard length usually occur at shallower depths (350 to 400 m) than adults (400 to 650 m). Bottom temperatures at capture depth are 10 to 11°C. Distribution is Antillean (including Straits of Florida) but also occurs from Honduras to Panama on offshore banks.

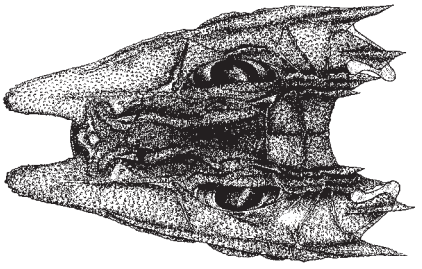


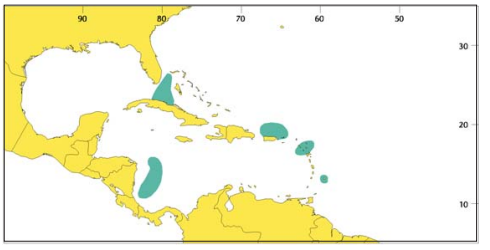


Peristedion brevirostre (Günther, 1860)

En - Flathead armoured searobin (AFS: Flathead searobin).

Maximum size to 25 cm standard length, commonly to 15 cm standard length. It is a rocky bottom slope species ranging from 220 to 527 m. The distribution is primarily Antillean but it does occur offshore from Honduras to Nicaraugua. *Peristedion platycephalum* (Goode and Bean, 1886) is a junior synonym.

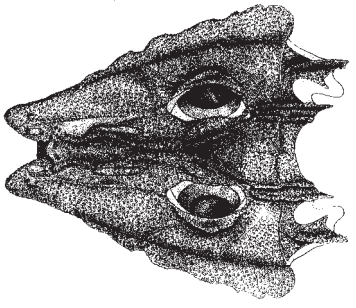


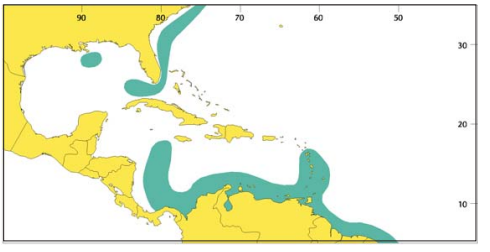


Peristedion ecuadorense Teague, 1961

En - Pyramid nose armoured searobin.

Maximum size to 20 cm standard length, commonly to 16 cm standard length. The species occurs on the slope ranging in depth from 324 to 910 m. Bottom temperatures ranging from 7 to 10.1°C averaging 9.1°C. The distribution is primarily coastal from Virginia south and into the Gulf of Mexico and from Honduras south to Brazil; but it does occur in the Lesser Antilles. It does not occur in the eastern tropical Pacific Ocean off Ecuador.

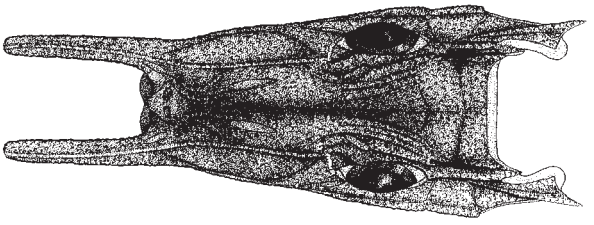


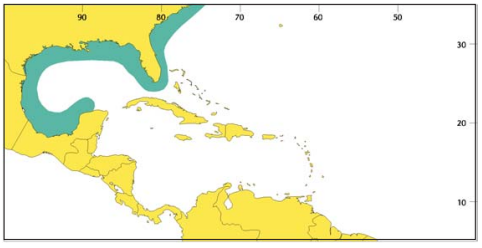


Peristedion gracile Goode and Bean, 1896

En - Temperate slender armoured searobin (AFS: Slender searobin).

Maximum size to 20 cm, commonly to 16 cm standard length. It ranges in depth from 29 to 475 m, but generally occurs on the continental shelf in less than 146 m. Bottom temperatures at capture depths ranged from 13 to 22°C, averaging 16.5°C. Adults range from Virginia south to the Florida Keys and the Gulf of Mexico. It may be geographically sympatric with the Antillean slender armoured searobin in the Florida Keys, but it is allopatric by depth.

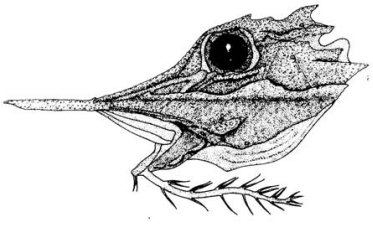


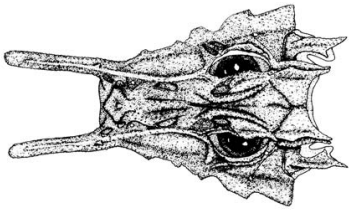


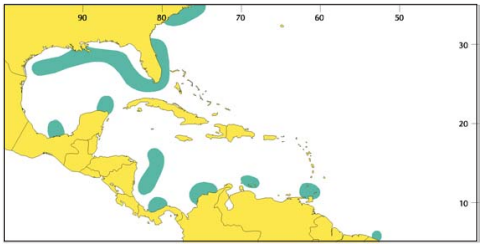
Peristedion greyae Miller, 1967

En - Prickly armoured searobin (AFS: Alligator searobin).

Small, to 19 cm standard length, commonly to 15 cm standard length. Two or 3 separate and distinct serrated ridges on mandible; when present, third ridge generally very low, and barely perceptible. A strong concavity on outer edge of perifacial rim of preopercle. Rostral exsertion spine present. Chin barbels predominantly 12 or 13, grouped in 5 clusters. Slope from 179 to 914 m average 390 m. Bottom temperatures 6.9 to 10.5°C, average 10°C. It is common to abundant in the trawl catch with royal red shrimp off the east coast of Florida and off the Mississippi River Delta in the Gulf of Mexico. A continental shelf species, with 1 exception - off Cay Sal Bank and the Tongue of the Ocean, Bahamas, and extends from Virginia south through the Gulf of Mexico to Campeche Bank, and from Honduras along the South American coast to Tobago. One record from off northern Brazil.



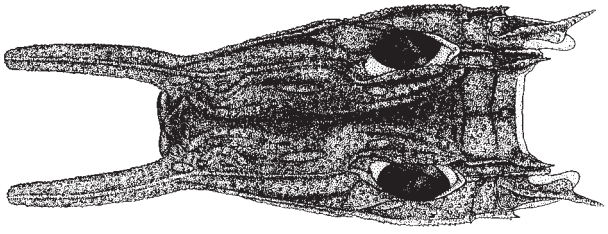


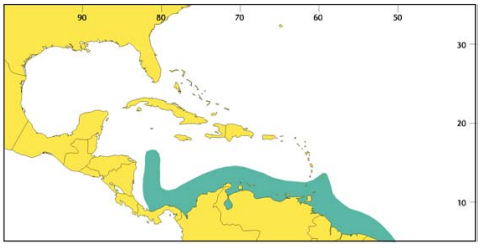


Peristedion imberbe Poey, 1861

En - Tropical slender armoured searobin.

Maximum size to 18 cm standard length, commonly to 15 cm standard length. It ranges in depth from 137 to 457 m, averaging 316 m. Bottom temperatures ranged from 8.3 to 18.3°C, averaging 13.8°C. The species is found along the coast from Honduras south to Brazil, and insular in the lower Lesser Antilles.

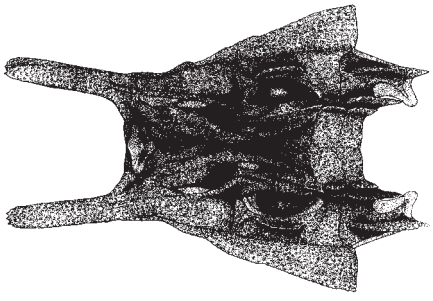


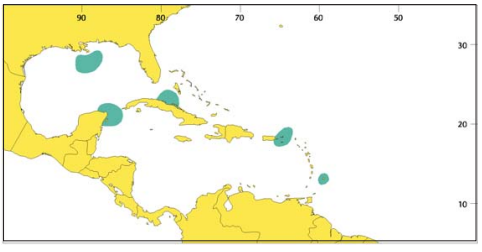


Peristedion longispatha Goode and Bean, 1886 PQL

En - Widehead armoured searobin.

Maximum size to 18 cm standard length, commonly to 16 cm standard length. The species ranges in depth from 101 to 780 m, averaging 483 m. Bottom temperatures ranged from 9 to 11°C, average 10.3°C. The distribution is primarily Antillean, but it does occur in Gulf of Mexico off the Mississippi River Delta.

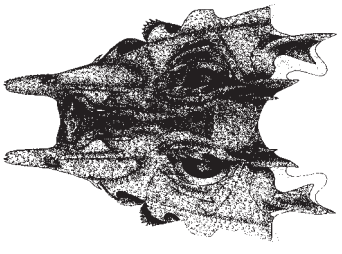


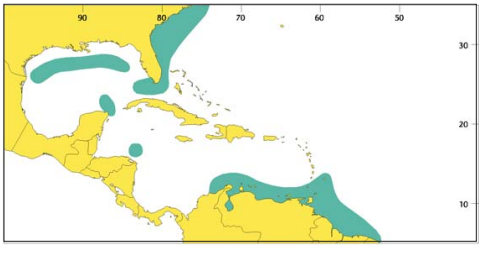


Peristedion miniatum Goode, 1880

En - Boarhead amoured searobin (AFS: Armoured searobin).

Maximum size to 30 cm standard length, commonly to 25 cm standard length. The species ranges in depth from 64 to 914 m, averaging 289 m. Bottom temperatures ranged from 10 to 17.8°C, averaging 12.9°C. It is found from Canada and Georges Bank south through the Gulf of Mexico, and from Honduras to Brazil, but excluding the Antilles. The variation in orbit size and head spination does not warrant distinguishing the southern population as a separate taxon.

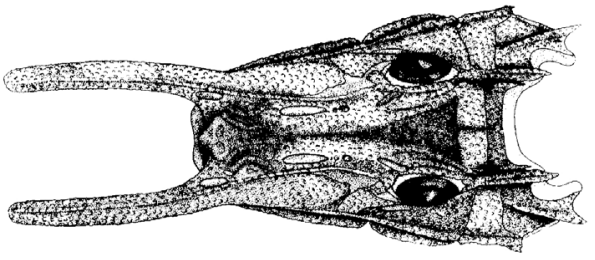


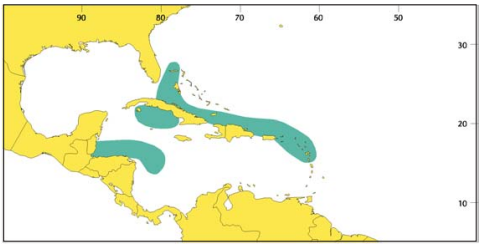


***Peristedion* n. sp. "t"**

En - Antillean slender armoured searobin.

This undescribed species has a maximum size of 17 cm standard length, commonly to 15 cm standard length. It ranges from 219 to 549 m, averaging 375 m. Bottom temperatures at capture locations ranged from 10.5 to 19°C, averaging 15.3°C. Its distribution is Antillean occurring in the Florida Keys, Antilles, and Belize to Nicaragua. It is sympatric with the tropical slender armoured searobin off Honduras and Nicaragua, but is allopatric by depth.

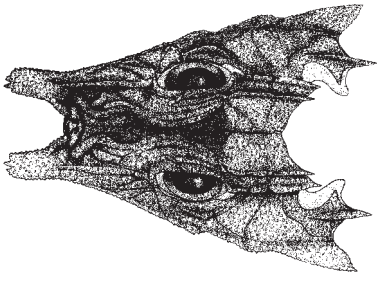


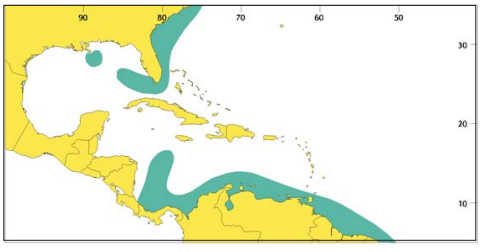


Peristedion thompsoni Fowler, 1952

En - Rimspine armoured searobin (AFS: Rimspine searobin).

Maximum size to 25 cm standard length, commonly to 16 cm standard length. The species ranges in depth from 115 to 475 m, averaging 293 m. Bottom temperatures ranged from 7.8 to 15°C, averaging 10.9°C. The species *Peristedion schmitti* Teague is a junior synonym. It is found from North Carolina south around the Florida Keys and in the northern Gulf of Mexico; and from Honduras south to Brazil. It is a coastal species.

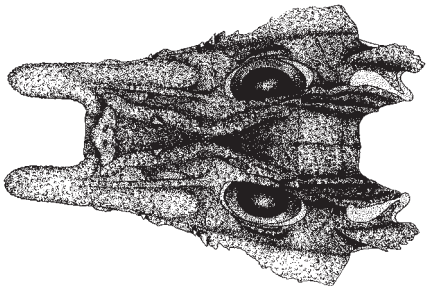


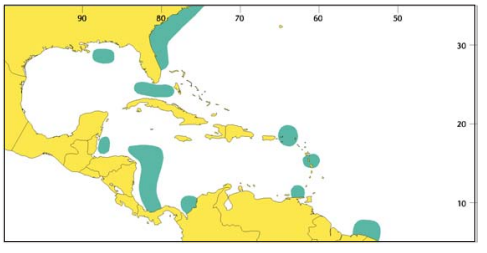


Peristedion truncatum (Günther, 1880)

En - Black armoured searobin.

Maximum size to 17 cm standard length, commonly to 15 cm standard length. The species ranges in depth from 155 to 910 m, averaging 580 m. Bottom temperatures ranged from 7.3 to 10°C, averaging 8.9°C. *Peristedion spiniger* Longley and Hildebrand, 1950 is a junior synonym. It ranges from New Jersey south to Brazil including the Gulf of Mexico, Caribbean Sea, and Lesser Antilles.

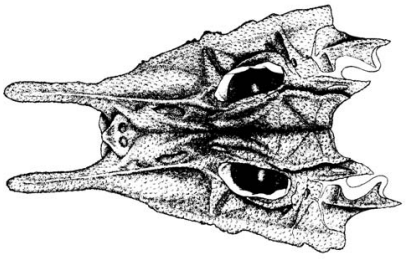


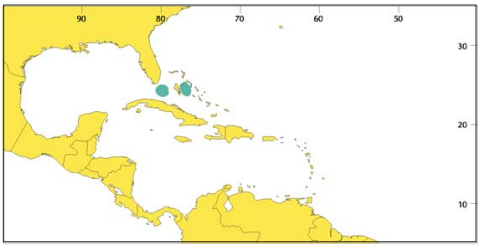


Peristedion unicuspis Miller, 1967

En - Enigma armoured searobin.

Small, maximum size to 16 cm total length. Known only from 4 specimens. The 2 type specimens were trawled in 530 m off Cay Sal Bank in the Straits of Florida and 2 from the Tongue of the Ocean in the Bahamas.





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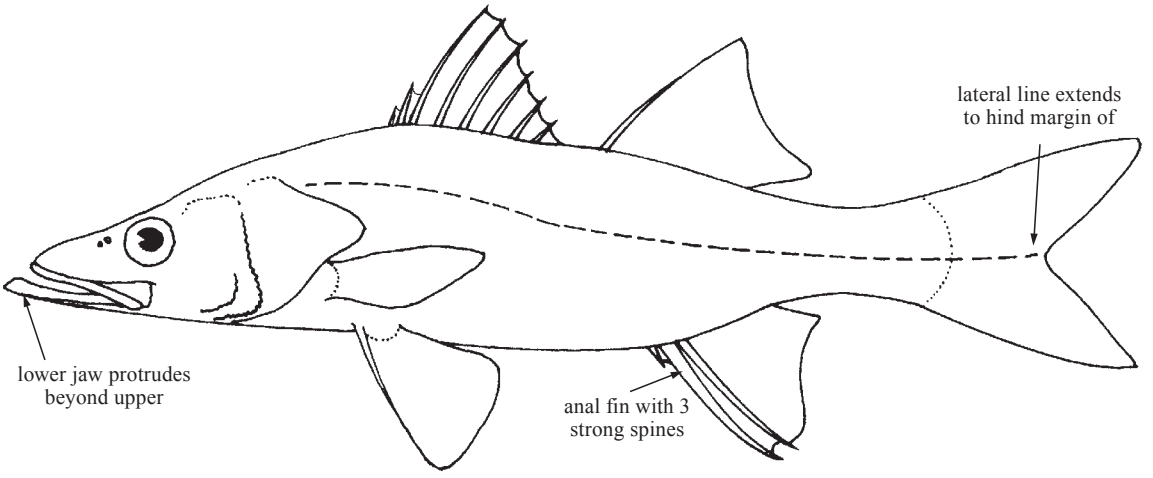
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Order PERCIFORMES
Suborder PERCOIDEI
CENTROPOMIDAE

Snooks

by T.M. Orrell, National Marine Fisheries Service, National Museum of Natural History, Washington, D.C., USA
(revised from T.H. Fraser, 1977)

Diagnostic characters: Body elongate or oblong, and compressed, usually with a convex dorsal profile, often concave at snout or above eyes. Mouth large, jaws unequal, with **lower jaw protruding beyond the upper**; teeth small, in villiform bands on jaws and on roof of mouth (vomer, palatines and sometimes ectopterygoids); preoperculum with a serrated posterior and ventral border; operculum without spines; suborbital plate with a serrated ventral edge. Two separate dorsal fins, the first with 8 strong spines, the second with 1 spine and 8 to 11 (usually 9 or 10) soft rays; **anal fin** short, **with 3 strong spines** (the second strongest) and 5 to 8 (usually 6 or 7) soft rays; pelvic fins below pectoral fins, with 1 strong spine and 5 soft rays; an axillary scale present. Scales moderate or large, ctenoid (rough to touch); **lateral line extending to the hind margin of caudal fin**. *Centropomus* is the only centropomid genus in the area. **Colour:** *Centropomus* species are yellow-brown to brown-green above, silvery on sides and below, and with a black or dark lateral line on sides; fins are dusky.

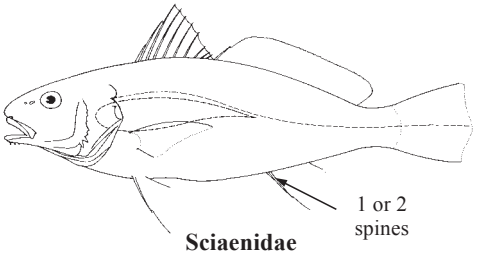


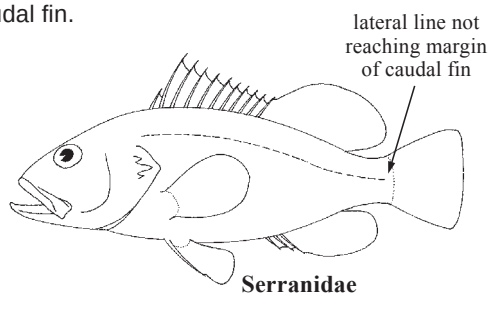
Habitat, biology, and fisheries: Snooks inhabit shallow coastal waters, estuaries, and brackish lagoons, often penetrating fresh waters. Some species grow to large sizes (*Centropomus undecimalis* to 130 cm), and all are good quality foodfish. Although none of the WesternCentral Atlantic species is subjected to a special fishery, most of them are of local importance, especially in Central and South America and on some of the Antilles. Snooks are an important game fish. FAO statistics report landings ranging from 1 081 to 3 138 t from 1995 to 1999.

Similar families occurring in the area

Sciaenidae: only 1 or 2 spines in anal fin.

Serranidae: lateral line not extending to hind margin of caudal fin.





Key to the species of Centropomidae occurring in the area (modified from Rivas, 1986)

Note: lateral scales are counted along the longitudinal scale row immediately above the lateral line to the caudal-fin base.

1a. Anal-fin soft rays 7, rarely 8, pectoral-fin soft rays 13 to 15, modally 14; pectoral fin much shorter than pelvic fin; second anal-fin spine straight or slightly sigmoid and slightly outcurved distally; anterior part of head upturned; lateral scales 61 to 72, usually 64 to 67 . . . . . ***Centropomus pectinatus***

1b. Anal-fin soft rays 6, rarely 5 or 7, pectoral-fin soft rays 14 to 17 modally 15 or 16; pectoral fin about as long as or longer than pelvic fin; second anal spine slightly incurved anterior part of head not upturned . . . . . ***→ 2***

2a. Lateral scales 49 to 59 (pored lateral-line scales to caudal-fin base 48 or 49) . ***Centropomus ensiferus***

2b. Lateral scales 67 to 92 . . . . . ***→ 3***

3a. Lateral scales 79 to 92, third dorsal-fin spine higher than fourth when erect . ***Centropomus parallelus***

3b. Lateral scales 67 to 78 . . . . . ***→ 4***

4a. Dorsal-fin soft rays 9 or 10, rarely 8; gill rakers 8 to 10, usually 8 or 9, on lower limb of first arch, not including rudiment; scales around caudal peduncle 22 to 28, usually 24 to 27; third dorsal-fin spine much higher than fourth when erect . . . . . ***Centropomus undecimalis***

4b. Dorsal-fin soft rays 9, rarely 8 or 10; gill rakers 9 to 12, usually 10 or 11, on lower limb of first arch not including rudiments . . . . . ***→ 5***

5a. Scales from origin of second dorsal fin to lateral line 10 to 13, usually 11 or 12; dorsal-fin soft rays 9; pectoral-fin soft rays 15 to 17 modally 16; lateral scales 73 to 80, usually 75 to 78 . . . . . ***Centropomus poeyi***

5b. Scales from origin of second dorsal fin to lateral line 10 to 15, usually 11 to 14; lateral scales 68 to 79, usually 70 to 77; scales from origin of anal fin to lateral line 12 to 16, usually 13 to 15 . . . . . ***Centropomus mexicanus***

List of species occurring in the area

The symbol is given when species accounts are included.

- *Centropomus ensiferus* Poey, 1860.
- *Centropomus mexicanus* Bocourt, 1868.
- *Centropomus parallelus* Poey, 1860.
- *Centropomus pectinatus* Poey, 1860.
- *Centropomus poeyi* Chávez, 1961.
- *Centropomus undecimalis* (Bloch, 1792).

References

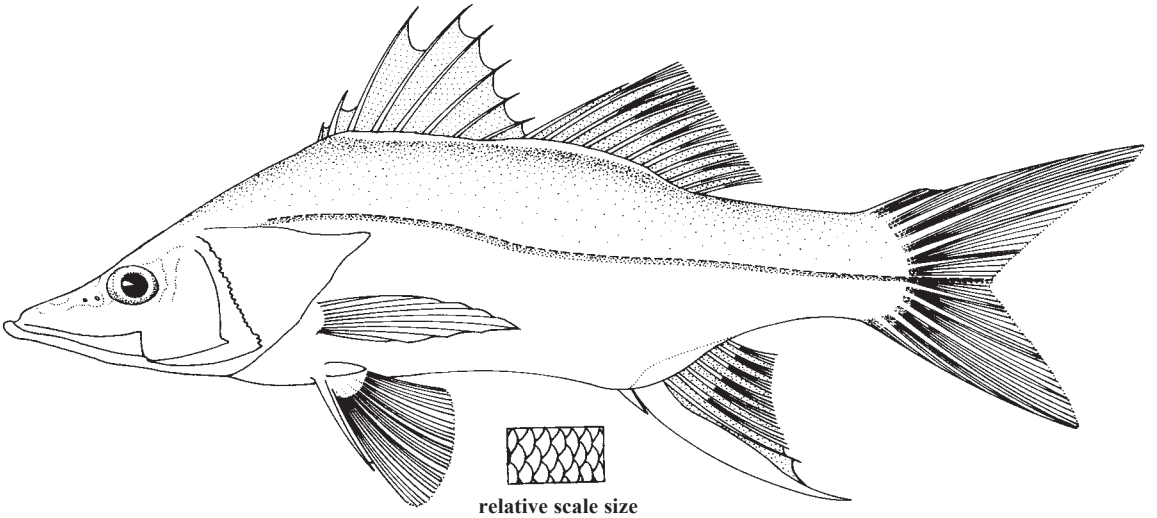
Fraser, T.H. 1977. Centropomidae. *FAO Species Identification Sheets for Fishery Purposes, Western Central Atlantic (Fishing Area 31), Volume II*, edited by W. Fischer. Rome, FAO (unpaginated).

Rivas, L.R. 1986. Systematic review of the perciform fishes of the genus *Centropomus*. *Copeia*, 1986(3):579-611.

Centropomus ensiferus Poey, 1860 EPN

Frequent synonyms / misidentifications: None / None.

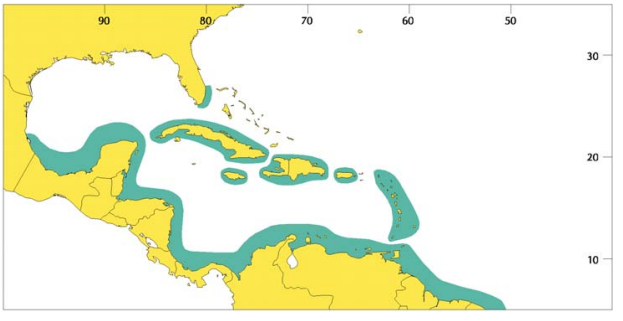
FAO names: En - Swordspine snook; **Fr** - Crossie épée; **Sp** - Robalo.



Diagnostic characters: The smallest of snooks in the area, moderately deep (body depth 65 to 72% of head length). Snout profile nearly straight to slightly concave, mouth large with lower jaw projecting beyond the upper; gill rakers (including rudiments) on outer gill arch 22 to 27. Dorsal-fin soft rays 10 rarely 9; anal-fin with 3 spines and 5 to 7 (modally 6) soft rays; pectoral-fin soft rays 14 to 17, normally15 or 16; tips of pelvic fins reaching to or past the anus. **Scales from origin of second dorsal fin to lateral line 6 to 9, usually 6 to 8**. Scales from origin of anal fin to lateral line 9 to 11, usually 9 or 10. **lateral scales 49 to 59, usually 50 to 57**. Lateral line extending to hind margin of caudal fin; pored lateral-line scales (to caudal-fin base) 48 or 49. **Tooth patch on ectopterygoid reduced or absent. Colour:** yellow-brown to brown-green above, silvery on sides and below, and with a dark lateral line on sides; fins dusky.

Size: Maximum 35 cm, 0.4 kg; common to 15 cm, 0.2 kg.

Habit, biology, and fisheries: Inhabits coastal waters, estuaries, and lagoons, penetrating into fresh waters; usually prefers less brackish or fresh water. Nothing is known about where this species may spawn and no apparent extensive migrations known. Feeds on fish and crustaceans. Fished from estuaries, brackish lagoons, and fresh water in the Antilles and in Central and South America. Caught mainly with bottom gill nets, hook-and-line, and cast nets. Marketed mostly fresh. Separate statistics are not reported for this species.

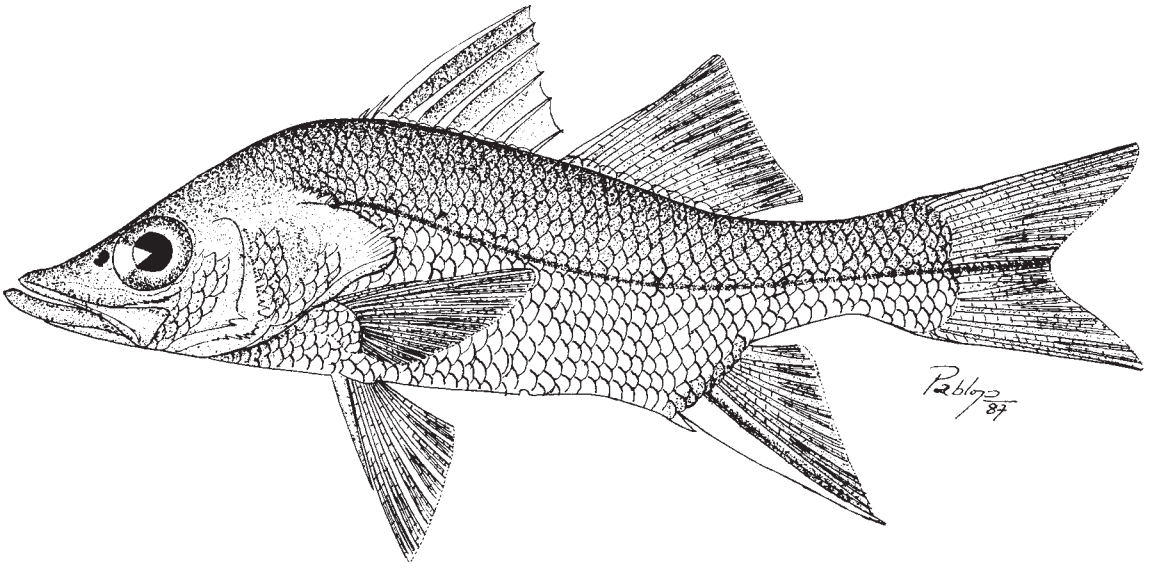


Distribution: Gulf coast of Mexico, southern Florida, Greater and Lesser Antilles, and continental Caribbean coasts of Central and South America, southward extending to Rio de Janeiro (Brazil).

Centropomus mexicanus Bocourt, 1868

Frequent synonyms / misidentifications: None / None.

FAO names: En - Largescale fat snook; **Sp** - Robalo gordo de escama grande.



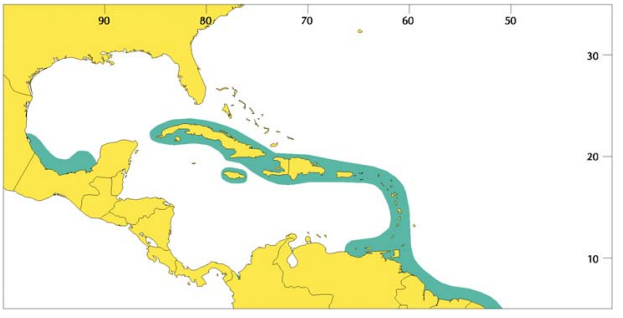
Diagnostic characters: Medium-sized, moderately deep bodied. Gill rakers 4 to 6, usually 4 or 5, on upper limb (excluding rudiments). Total gill rakers 14 to 17, usually 15 to 17 (excluding rudiments); 21 to 24, usually 22 or 23 (including rudiments). Dorsal-fin soft rays 10, rarely 9; third dorsal-fin spine higher than fourth when erect. **Anal-fin soft rays 6**; second anal-fin spine not reaching beyond vertical from caudal-fin base when deflexed. Pectoral-fin soft rays 14 to 16, modally 15. Scales from origin of second dorsal fin to lateral line 10 to 15, usually 11 to 14. **Lateral scales 68 to 78, usually 70 to 77**. Scales from origin of anal fin to lateral line 12 to 16, usually 13 to 15. **Colour:** yellow-brown to brown-green above, silvery on sides and below, and with a dark lateral line on sides; fins dusky, caudal fin reddish.

Size: Maximum 43 cm, common to 18 cm.

Habit, biology, and fisheries: Occurs more frequently in salt water than in streams. Nothing is known about where this species may spawn and no apparent extensive migrations known. Separate statistics are not reported for this species.

Distribution: Gulf coast of Mexico (Tamaulipas to Tabasco) and Greater Antilles southward to Porto Alegre, Brazil.

Note: Very similar to *Centropomus parallelus*, but with larger and fewer scales.

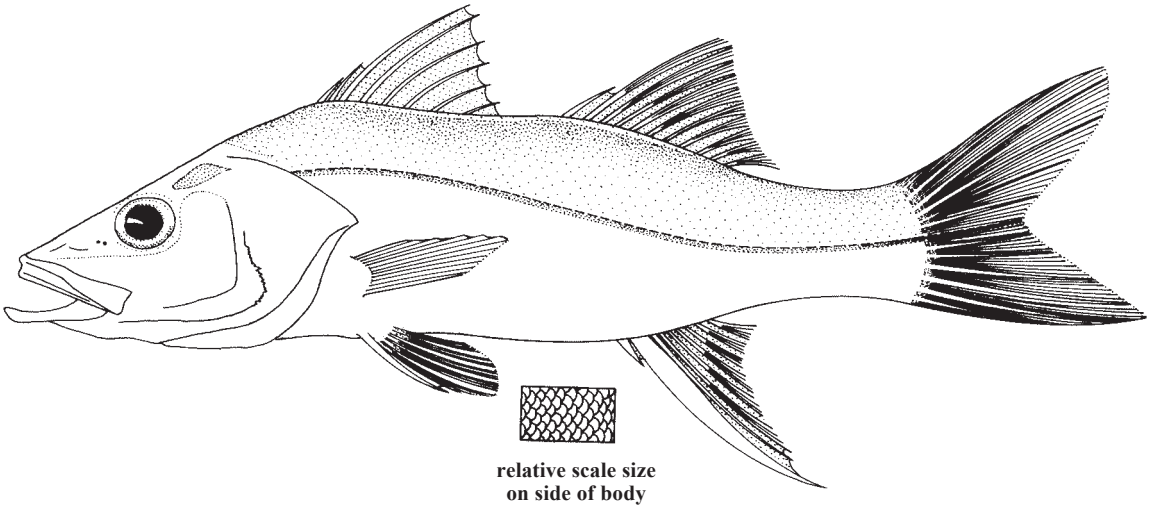


Centropomus parallelus Poey, 1860

EPP

Frequent synonyms / misidentifications: None / None.

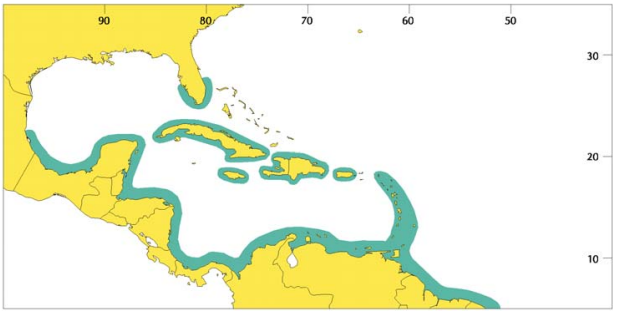
FAO names: En - Fat snook (AFS: Smallscale fat snook); **Fr** - Crossie chucumite; **Sp** - Robalo chucumite (AFS: Robalo gordo de escama chica).



Diagnostic characters: A medium-sized fish, comparatively deep (body depth 67 to 81% of head length). Snout profile straight to slightly concave; mouth large with lower jaw protruding beyond upper. Total gill rakers on first arch14 to 17 (usually 15 to 17) (not including rudiments); 21 to 25 (usually 22 to 24) (including rudiments); gill rakers on upper limb of first arch 4 or 5, not including rudiments. **Third dorsal-fin spine higher than fourth when erect**; second dorsal fin with 1 spine and 9 to 11, normally 10 soft rays. Anal-fin with 3 spines and with 6, rarely 7 soft rays. Pectoral-fin soft rays 14 to 16, modally 15. **Tips of pelvic fins reaching to or past the vent in all but the largest specimens; second anal spine not reaching to, or reaching to vertical from caudal-fin base when deflexed. Small scales, lateral scales 79 to 92. Colour**: yellow-brown to brown-green above, silvery on sides and below, and with a dark lateral line on sides; fins dusky.

Size: Maximum 63 cm, 3 kg; common to 25 cm, 0.5 kg.

Habitat, biology, and fisheries: Inhabits coastal waters, estuaries, and lagoons, penetrating into fresh water; usually prefers very low salinity brackish or fresh water over salt water. May spawn near river mouths, no apparent extensive migration known. Feeds on fish and crustaceans. Fished in estuaries, brackish lagoons and fresh water in the Antilles and in Central and South America. Caught mainly with bottom gill nets, hook-and-line, and cast nets. Marketed mostly fresh. Separate statistics are not reported for this species



Distribution: Southern Florida, Greater and Lesser Antilles, southeastern coast of the Gulf of Mexico, and continental Caribbean coasts; southward extending to Florianopolis, Brazil.

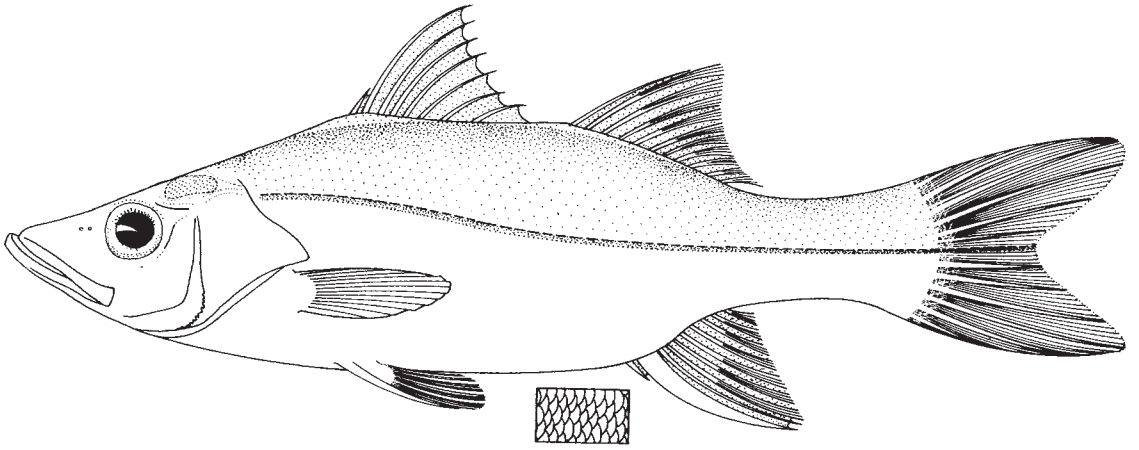
Note: The small-scale *Centropomus parallelus* is very similar to the large-scale *Centropomus mexicanus*.

Centropomus pectinatus Poey, 1860

EPS

Frequent synonyms / misidentifications: None / None.

FAO names: En - Tarpon snook; **Fr** - Crossie constantin; **Sp** - Robalo constantino (AFS: Robalo sábalo).

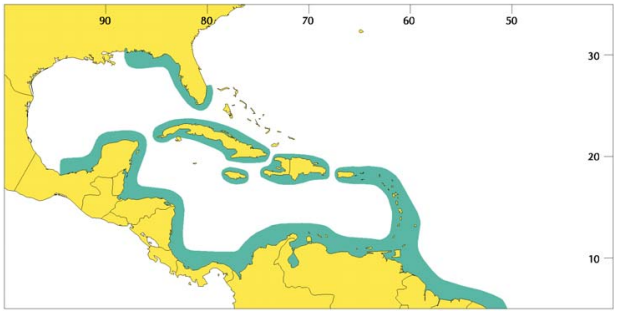


relative scale size
on side of body

Diagnostic characters: Medium-sized, moderately deep bodied. **Anterior part of head upturned**. Tooth patch on ectopterygiod reduced or absent. Gill rakers of first arch on lower limb 14 to 17 (usually 15 or 16) not including rudiments; 15 to 20 (modally 18) including rudiments; 5 or 6 (modally 6) on upper limb not including rudiments, 6 to 9 (modally 7) including rudiments; total gill rakers on first arch 22 to 28 (usually 24 to 26) including rudiments. Dorsal-fin soft rays 10, rarely 11; third dorsal-fin spine higher than fourth when erect, second anal-fin spine not reaching to tip of third when erect, nor to vertical from caudal base when deflexed. **Anal-fin with** 3 spines and **7 soft rays, rarely 8. Pectoral-fin soft rays 13 to 15 normally 13 or 14**. Tips of pelvic fins reaching to or past the anus. Lateral line extending to hind margin of caudal fin; lateral scales 61 to 72, usually 64 to 67. Scales from origin of second dorsal fin to lateral line 9 to 13, usually 10 to 12. Scales around caudal peduncle 20 to 22, modally 20. **Colour:** yellow-brown to brown-green above, silvery on sides and below, and with a dark lateral line on sides; fins dusky, pelvic fins with a large dark, diffuse mark or spot near the tips.

Size: Maximum 51 cm, 1 kg; common to 30 cm, 0.4 kg.

Habitat, biology, and fisheries: Inhabits coastal waters, estuaries, and lagoons, penetrating into fresh water; usually prefers very low brackish or fresh water. Nothing known about where this species may spawn, no apparent extensive migrations known. Feeds on fish and crustaceans. Present fishing grounds: estuaries, brackish lagoons, and fresh waters in the Antilles and in Central and South America. Caught mainly with bottom gill nets, hook-and-line, and cast nets. Marketed mostly fresh. Separate statistics are not reported for this species.

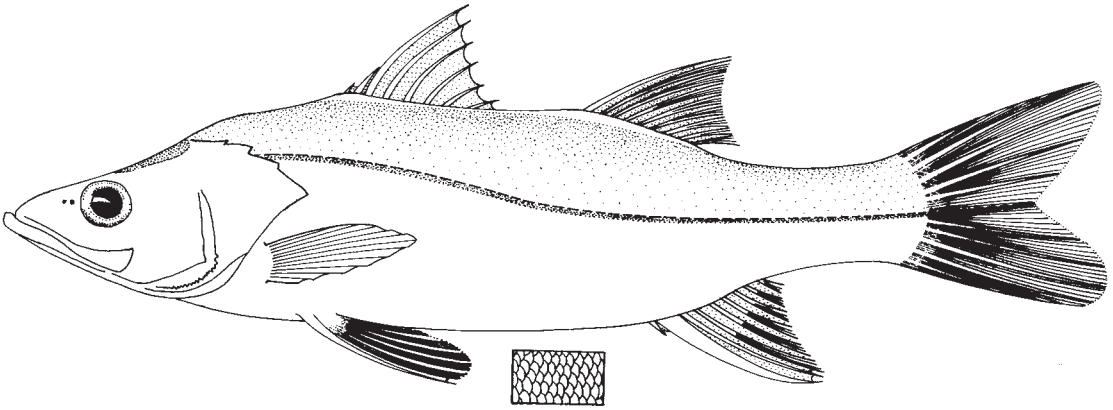


Distribution: Southern Florida, Greater and Lesser Antilles, southeastern coast of the Gulf of Mexico, and continental Caribbean coasts of Central and South America; southward extending to Rio de Janeiro (Brazil); also found along the Pacific coast of America, from Mexico to Colombia.

Centropomus poeyi Chávez, 1961

Frequent synonyms / misidentifications: None / None.

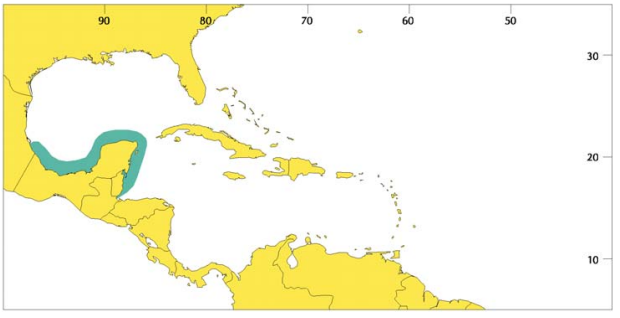
FAO names: En - Mexican snook; **Fr** - Crossie mexicain; **Sp** - Robalo prieto (AFS: Robalo mejicano).



Diagnostic characters: A fairly large fish, moderately deep (body depth 67 to 70% of head length). Snout profile nearly straight or slightly concave; mouth large with lower jaw projecting beyond the upper. Total gill rakers on first arch 15 to 18 (modally 16) not including rudiments; 22 to 25 (modally 23) including rudiments. Third dorsal-fin spine higher than fourth when erect; **second dorsal fin with** 1 spine and **9 soft rays**. Second anal-fin spine not reaching to vertical from caudal-fin base when deflexed. Pectoral-fin soft rays 15 to 17, normally 15 or 16. Tips of pelvic fins never reaching to the anus in specimens over 21 cm standard length. Lateral line extending to hind margin of caudal fin; number of lateral scales 73 to 80, normally 75 to 78. Scales from origin of second dorsal fin to lateral line 10 to 13, usually 11 or 12; scales from origin of anal fin to lateral line 12 to 15 (modally 13). Scales around caudal peduncle 24 to 29, usually 26 or 27. **Colour:** yellow-brown to brown-green above, silvery on sides and below, and with a dark lateral line on sides; fins dusky.

Size: Maximum 90 cm, 9 kg; common to 45 cm, 1.8 kg.

Habitat, biology, and fisheries: Inhabits coastal waters, estuaries, and lagoons, penetrating into fresh water; usually occurs at depths less than 20 m. Congregates in rivers in March, spawning apparently occurs in fresh or low brackish water from June through August. No apparent extensive migrations known. Feeds on fish and crustaceans. Present fishing grounds: estuaries and beaches with a centre in Veracruz State, Mexico. Caught mainly with bottom gill nets and hook-and-line; a sports fish. Marketed mostly fresh. Separate statistics are not reported for this species.

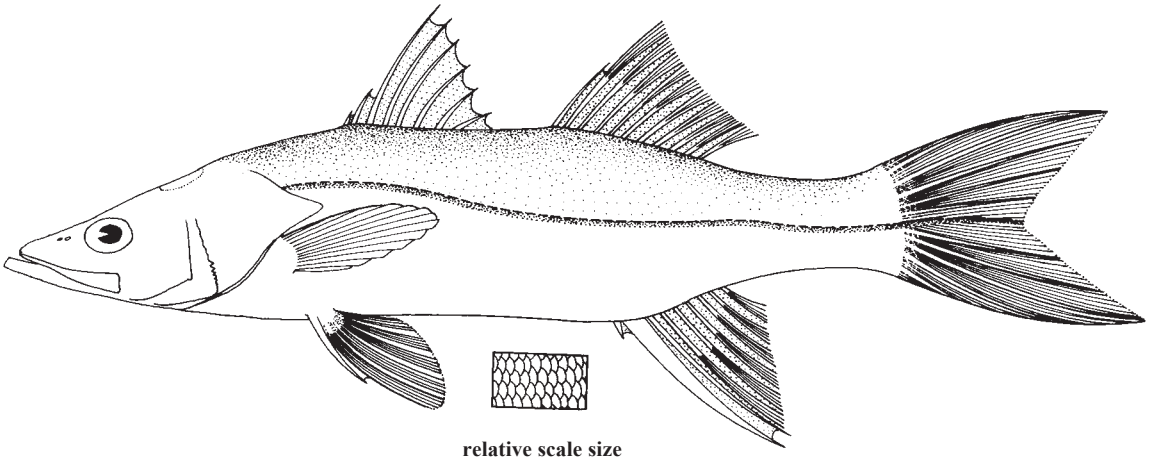


Distribution: Coast of Mexico from Tampico to Belize.

Centropomus undecimalis (Bloch, 1792) SNO

Frequent synonyms / misidentifications: None / None.

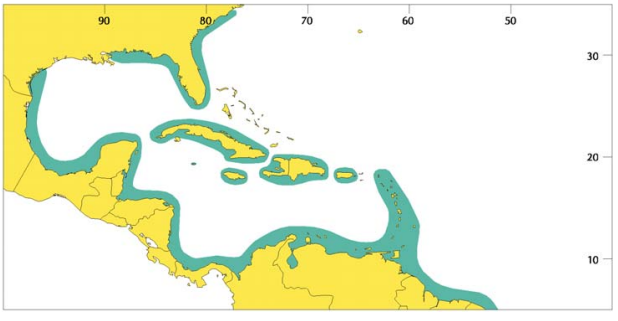
FAO names: En - Common snook; **Fr** - Crossie blanc; **Sp** - Robalo blanco (AFS: Robalo común).



Diagnostic characters: The largest and most slender of snooks in the area (body depth 59 to 64% of head length). Snout profile slightly concave; mouth large with lower jaw projecting beyond the upper. Gill rakers on lower limb of first arch 8 to 10 (usually 8 or 9) not including rudiment. **Dorsal-fin soft rays 10**, rarely 9 or 11. Anal fin with 3 spines (the second particularly strong) and soft rays 5 to 7, modally 6. Pectoral-fin soft rays 14 to 16, usually 15 or 16. Tips of pelvic fins never reaching to anus in specimens over 11 cm standard length. Lateral line extending to hind margin of caudal fin; pored lateral-line scales (to caudal-fin base) 67 to 72; scales in the row just above lateral line 67 to 77 (usually 68 to 75). Scales around caudal peduncle 22 to 28, usually 24 to 27. **Colour:** yellow-brown to brown-green above, silvery on sides and below, and with a dark lateral line on sides; fins dusky.

Size: Maximum 130 cm, 23.1 kg; common to 50 cm, 2.2 kg.

Habitat, biology, and fisheries: Inhabits coastal waters, estuaries, and lagoons, penetrating into fresh water; usually occurs at depths less than 20 m. Congregates at mouths of passes and rivers during the spawning season, May through September; seasonal movements into fresh water occur but are poorly understood, no apparent extensive migrations known. Feeds on fish and crustaceans. Present fishing grounds: estuaries and along beaches in Florida, the Antilles, and in Central and South America. Caught mainly with bottom gill nets, and hook-and-line; also with cast nets; exciting sport fish. Marketed mostly fresh; delicate, white and flaky flesh.



Distribution: Southern Florida, southeastern coast of the Gulf of Mexico, most of the Antilles, and Caribbean coast of Central and South America; southward extending to Rio de Janeiro, Brazil.

MORONIDAE

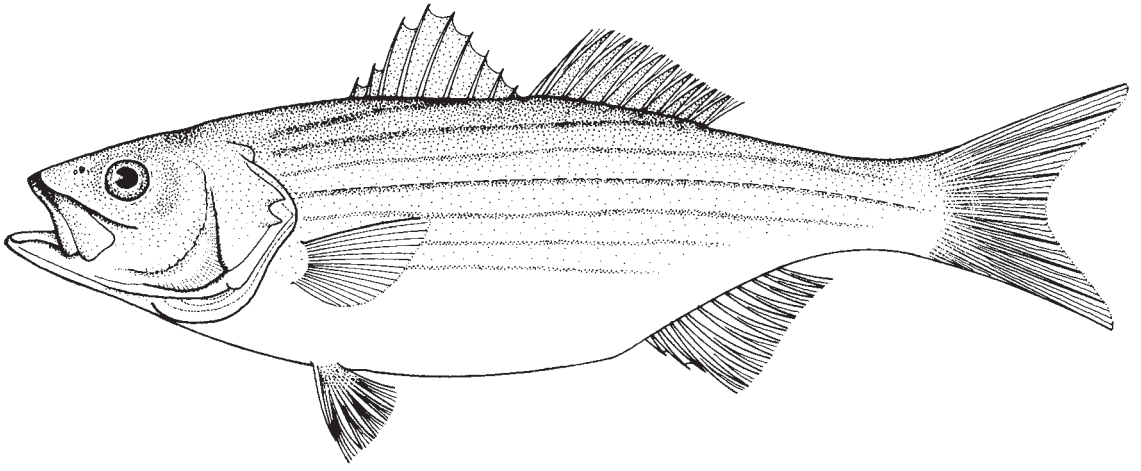
Temperate basses

by P.C. Heemstra, South African Institute for Aquatic Biodiversity, South Africa

Morone saxatilis (Walbaum, 1792) STB

Frequent synonyms / misidentifications: *Roccus saxatilis* Walbaum, 1792 / None.

FAO names: En - Striped bass; **Fr** - Bar d'Amérique; **Sp** - Lubina estriada.

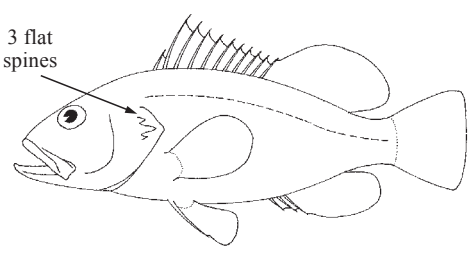


Diagnostic characters: Large fishes, attaining 180 cm, 57 kg. Body oblong, slightly compressed. Head mostly covered with small scales; **mouth large, the maxilla widely expanded posteriorly and mostly exposed when mouth is closed; no supramaxilla; jaws with bands of small conical teeth, no canines; bands of villiform teeth also present on vomer, palatines, and in 2 parallel rows on base of tongue**. Branchiostegal membranes separate, joined to isthmus far forward, with 7 rays. Gill rakers 6 to 12 on upper limb, 12 to 15 on lower limb, total 19 to 29. **Rear edge of opercle with 2 flat points; preopercle broadly rounded, weakly serrate. Dorsal fin notched to the base in front of soft-rayed portion, with 8 or 9 spines in first part and 1 spine and 10 to 13 rays in second part**. Caudal fin forked, heavily scaled at the base; principal caudal rays 9+8, branched rays 8+7. Anal fin with 3 distinct spines and 9 to 12 soft rays, fin origin well behind vertical at soft dorsal-fin origin. Pectoral fin small, unsymmetrical, the upper rays longest, length about half head length; pectoral-fin soft rays 15 to 18. Pelvic fins with 1 spine and 5 soft rays. Head and body covered with moderate, finely ctenoid scales; lateral line continuous, with 50 to 72 tubed scales, not extending onto caudal fin. Swimbladder extends into hollow of first anal-fin pterygiophore. Vertebrae: 12 abdominal plus 13 caudal. **Colour:** silvery, with 7 or 8 longitudinal black stripes on body.

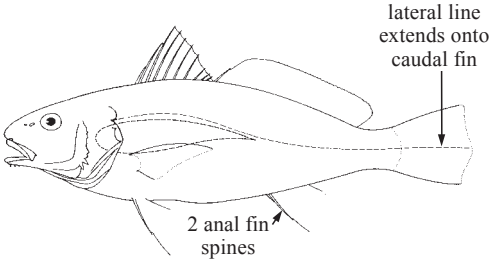
Similar families occurring in the area

Serranidae: rear edge of opercle with 3 flat spines or points; most species with a single undivided dorsal fin and symmetrical pectoral fin; caudal fin forked, lunate, emarginate, truncate, or rounded.

Sciaenidae: only 2 anal-fin spines; lateral line extends onto caudal fin.



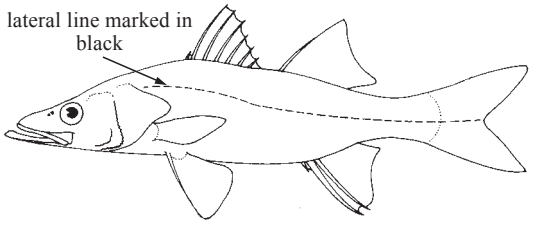
Serranidae



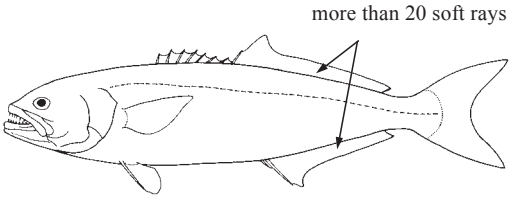
Sciaenidae

Centropomidae: lateral line conspicuously marked in black (except in *Centropomus ensiferus*) and extending to rear end of caudal fin; no spines on opercle; preopercle with large serrae; second anal-fin spine much longer than caudal peduncle depth.

Pomatomidae: soft dorsal and anal fins with more than 20 rays; spinous part of dorsal fin much shorter and lower than soft-rayed part; anal-fin origin below soft dorsal-fin origin.



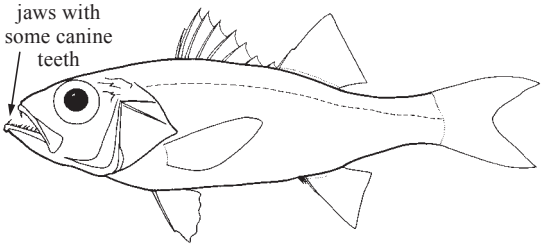
Centropomidae



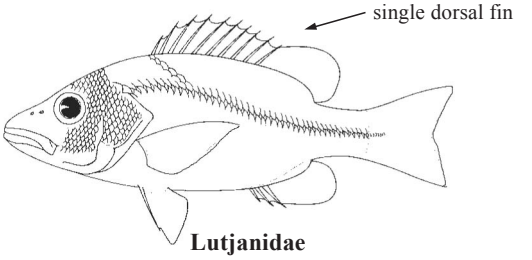
Pomatomidae

Acropomatidae: first dorsal fin with 7 to 10 spines, second dorsal fin with 1 spine and 9, 10, or 14 rays; anal fin with 2 or 3 spines and 6 to 9 or 12 rays; jaws with some canine teeth.

Lutjanidae: upper edge of maxilla covered by preorbital bone when mouth is closed; no flat points on rear edge of opercle; dorsal fin single (fin margin deeply incised in *Etelis*;); no teeth on tongue.

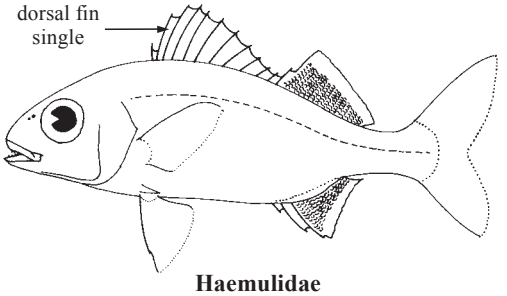


Acropomatidae



Lutjanidae

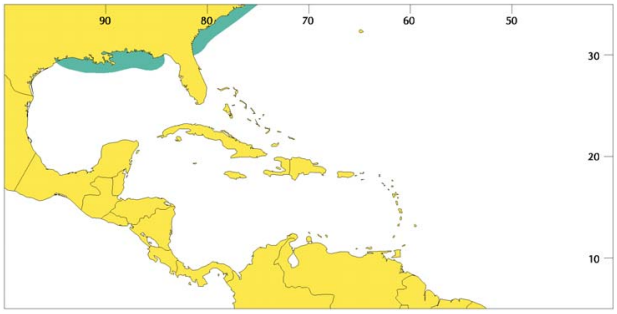
Haemulidae: maxilla mostly covered by preorbital bone when mouth is closed; no flat points on rear edge of opercle; most species with a single (undivided) dorsal fin; no teeth on vomer or palatines.



Haemulidae

Size: Maximum 1.8 m, 57 kg.

Habitat, biology, and fisheries: The anadromous striped bass occurs in rivers, estuaries, and near-shore waters; it is tolerant of turbid water and found in a variety of habitats: shallow bays, along sandy beaches, and also in rocky areas. Normally gonochoristic, with a rare incidence of hermaphroditic individuals. Males are mature at about 17 cm total length (2 years) and females at 45 to 55 cm total length (4 to 6 years); maximum age has been estimated at about 30 years. Spawning occurs in rivers and at the heads of estuaries from mid-February to July; with discrete populations occurring in the major rivers from the Gulf of Mexico to Nova Scotia; some inland populations live permanently in fresh water. Fecundity estimates range from 15 000 for a 46 cm fish to 4 million for a 13 year-old, 14.5 kg fish. Along the east coast of the USA, some populations undertake seasonal migrations, moving north in late winter or early spring, and back southwards in autumn. Striped bass feed mainly on fishes and crustaceans, with small juveniles taking mainly crustaceans and adults eating mostly fishes. Extremely important as a game and foodfish; caught by anglers and also with beach seines, fyke nets, gill nets, pound nets, fish traps, and otter trawl. Marketed fresh, or filleted and frozen. Populations have declined in recent years



Distribution: Inshore waters of the USA from Canada to the St Johns River in northern Florida, and northern Gulf of Mexico from Florida to Louisiana.

POLYPRIONIDAE

Wreckfishes (giant sea basses)

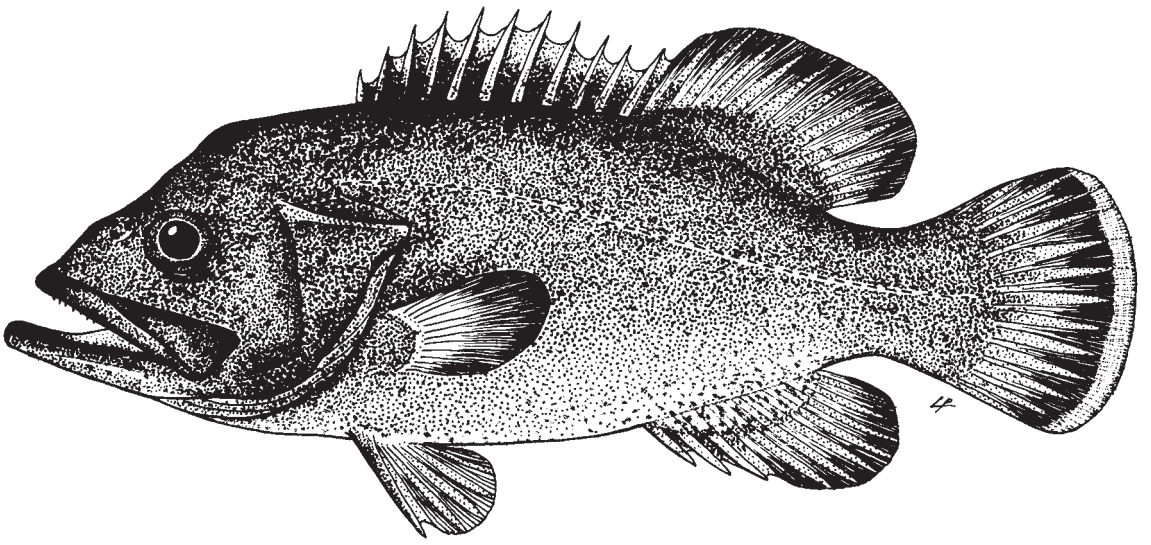
by G.R. Sedberry, Marine Resources Research Institute, South Carolina, USA

A single species occurring in the area.

Polyprion americanus (Bloch and Schneider, 1801)

Frequent synonyms / misidentifications: *Polyprion moeone* Phillipps, 1927 / *Polyprion oxygeneios* (Schneider and Forster, 1801).

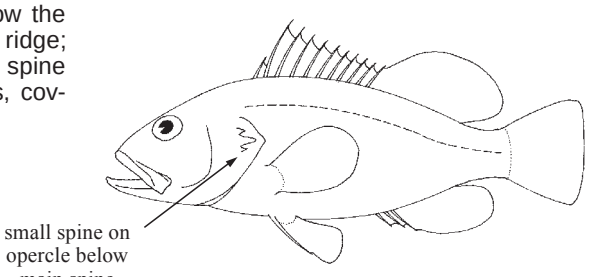
FAO names: En - Wreckfish; **Fr** - Cernier commun; **Sp** - Cherna.



Diagnostic characters: Large, oblong, moderately compressed, fairly deep-bodied, and grouper-like. Head scaly and spiny between the eyes and on nape, especially rough in young; snout smooth; mouth terminal, lower jaw projecting strongly, the maxilla-tip broad and completely exposed; jaw teeth small, no canines, with small teeth in patches on roof of mouth and tongue; **opercle with a distinctive horizontal ridge ending in a short spine**, a smaller spine above, but none below the principal spine. Dorsal fin with 11 or 12 strong spines and 11 or 12 soft rays, the 2 parts of the fin moderately notched; caudal fin truncate (adults) or rounded (juveniles); pectoral fins nearly symmetrical, shorter than pelvic fins; pelvic fins inserted below or a little behind the pectoral-fin base; anal fin with 3 strong spines and 9 or 10 soft rays. Scales small and rough (strongly ctenoid); lateral line not extending onto caudal fin. **Colour:** dark slate grey to brownish above, lighter below; pelagic juveniles mottled light and dark grey.

Similar families occurring in the area

Serranidae: a small spine at edge of opercle below the main spine, which does not include a horizontal ridge; there is usually another small spine above the main spine (upper and lowermost spines often inconspicuous, covered by skin).

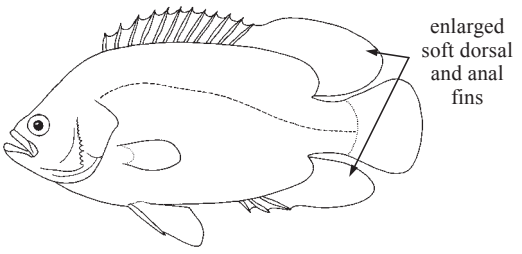


Serranidae

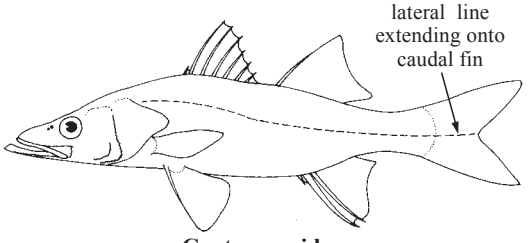
Lobotidae: soft portions of dorsal and anal fins enlarged, forming broadly rounded lobes; no teeth on roof of mouth; no ridge on opercle.

Centropomidae: elongate, with 2 separate dorsal fins, and with lateral line extending onto hind margin of forked caudal fin; lateral line black and no opercular spines; no ridge on opercle.

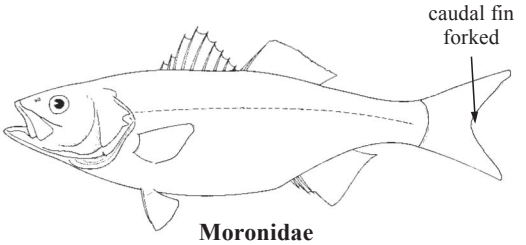
Moronidae: silvery fishes, sometimes with longitudinal stripes; forked tails; no ridge on opercle; found in coastal, estuarine, and fresh water.



Lobotidae



Centropomidae



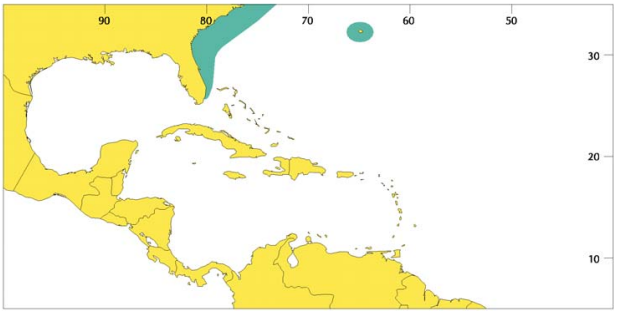
Moronidae

Size: Maximum to 2 m, 100 kg; average 98 cm, 17 kg in the area.

Habitat, biology, and fisheries: Strictly marine in temperate waters; absent from the tropics. Feeds on fishes and squids; spawns December to April. Juveniles pelagic to a length of 60 cm; larger juveniles and adults demersal on deep rocky bottoms (50 to 800 m). Because of habitat preference (deep rocky slopes), they are only locally abundant. Caught mainly with bottom longlines and vertical lines. Excellent foodfish, usually marketed fresh. Commercially abundant in Area 31 off the southeastern USA; historically fished in Bermuda, where now considered commercially extinct. Minor recreational use in the Bahamas. USA landings (all reported Area 31 catch is from the US) have declined since 1990. FAO statistics report landings ranging from 1 to 112 t from 1995 to 1999.

Distribution: Pelagic juveniles widely dispersed; demersal phases narrowly distributed. From Grand Banks, Newfoundland to the Florida Straits and southern Brazil to Valdes Peninsula, Argentina, including Bermuda but excluding the tropics. Eastern North Atlantic from Norway to the Cape of Good Hope, including the Mediterranean. Also mid-Atlantic ridge and associated islands (e.g. Azores), southwestern Pacific (Australia, New Zealand, as *Polyprion moeone*) and southern Indian Ocean. Pelagic juveniles common in the surface waters of the eastern North Atlantic, but rare in the western North Atlantic.

Remarks: One of the most valuable fishes in the Portuguese market, but ranks well below groupers and other reef fishes in Area 31. They are long-lived (31 years) and susceptible to overfishing because of limited habitat availability. Pelagic juveniles caught as bycatch in drift net and purse seine fisheries in the eastern Atlantic. Significant catches made in southern Brazil, Azores, Madeira, Australia, and New Zealand. Included in the Percichthyidae or Serranidae by earlier authors. Roberts (1986) synonymized *Polyprion moeone* and *Polyprion americanus*.



References

Roberts, C.D. 1986. Systematics of the percomorph fish genus *Polyprion* Oken, 1817. Ph.D. Diss., Univ. Wellington, 283 p.

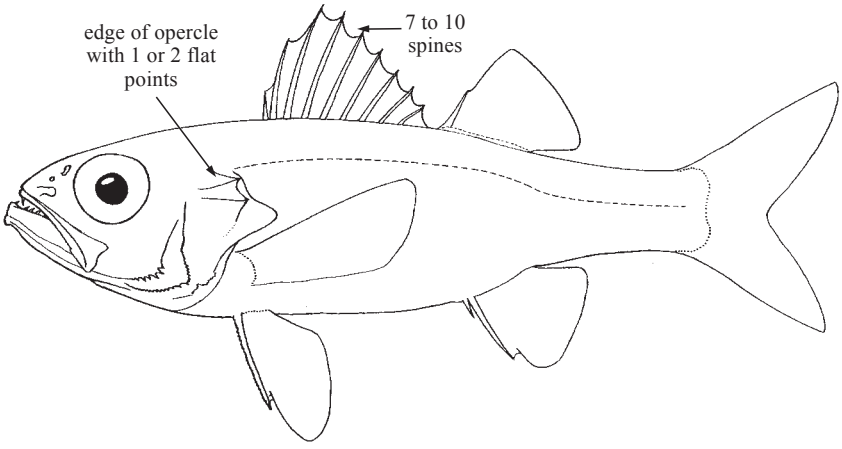
Sedberry, G.R., C.A.P. Andrade, J.L. Carlin, R.W. Chapman, B.E. Luckhurst, C.S. Manooch III, G. Menezes, B. Thomsen and G.F. Ulrich. 1999. Wreckfish (*Polyprion americanus*) in the North Atlantic: fisheries, biology, and management of a widely distributed and long-lived fish, Chapter 4. In Life in the Slow Lane: Ecology and Conservation of Long-Lived Marine Animals, edited by J.A. Musick. *Amer. Fish. Soc. Symp.*, 23:27-50.

ACROPOMATIDAE

Temperate ocean-basses

by P.C. Heemstra, South African Institute for Aquatic Biodiversity and Y. Yamanoue, University of Tokyo, Japan

Diagnostic characters: Small to large fishes (to 80 cm, 10 kg in western Atlantic) with oblong body, the depth less than or about equal to head length, 2.7 to 4.8 times in standard length. Mouth large, the maxilla mostly exposed with mouth closed, reaching to below or beyond middle of eye and expanded posteriorly, the greatest width (including supramaxilla) more than 1/4 eye diameter; interorbital region broad and flat; **rear edge of opercle with 1 or 2 flat points or several sharp spines**; gill membranes separate, free from isthmus; branchiostegal rays 6 or 7; gill rakers well developed. **Dorsal fin divided to the base before last spine or completely separated into spiny and soft-rayed fins; first part with 7 to 10 spines, second with 1 spine and 9, 10, or 14 soft rays; anal fin with 2 or 3 spines and 6 to 9 or 12 soft rays**; caudal fin forked; pectoral fins longer than pelvic fins; pelvic fins with 1 spine, 5 branched rays, and no large axillary process of fused scales. Body covered with scales; head with scales on cheeks; operculum with or without scales; lateral line continuous, with 25 to 55 tubed scales, plus 3 to 5 on caudal fin. Vertebrae 10 abdominal and 15 or 16 caudal. **Colour:** dusky silver, violet brown to black.



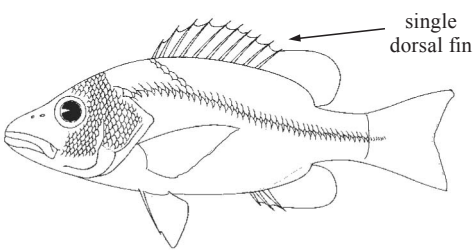
Habitat, biology, and fisheries: Adults benthopelagic on the outer continental shelf and slope in depths of 87 to 910 m. Biology little known. The small size and apparent rarity of acropomatids preclude their being of commercial importance in the area.

Remarks: The composition and definition of the Acropomatidae are problematic. Some of the species here assigned to this ill-defined 'family' are placed by some recent authors in the Percichthyidae; the genus *Percichthys* comprises 2 species of fresh-water fishes in Chile and Argentina; they have 31 to 36 vertebrae and are not closely related to the 'acropomatids'. The genus *Scombrops*, with 3 or 4 species, is placed by some authors in the Pomatomidae or in its own family, Scombropidae.

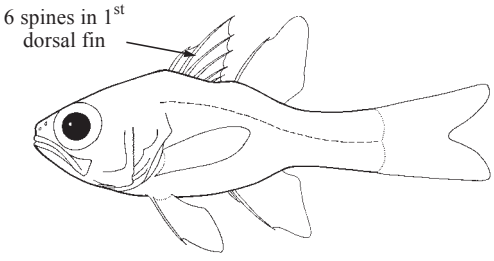
Similar families occurring in the area

Lutjanidae: dorsal fin single (but deeply incised in *Etelis*), with 10 to 12 spines and 8 to 14 rays; scaly axillary process well developed at base of pelvic fins; maxilla mostly covered by preorbital bone with mouth closed.

Apogonidae: first dorsal fin with 6 spines; anal fin with 2 spines and 8 rays; lateral-line scales 23 to 25; vertebrae 10 precaudal and 14 caudal.



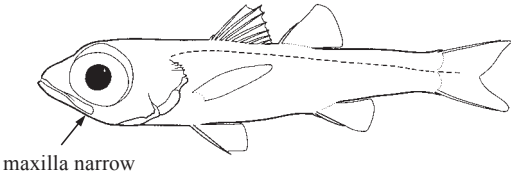
Lutjanidae



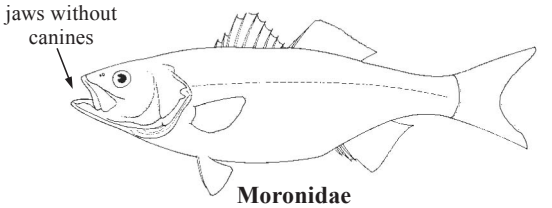
Apogonidae

Epigonidae: maxilla narrow (greatest width less than 1/5 eye diameter); first dorsal fin with 6 to 8 spines; anal fin with 1 or 2 spines (3 in *Sphyraenops*, which also has 3 distinct opercular spines).

Moronidae: first dorsal fin with 8 or 9 spines, second dorsal fin with 1 spine and 10 to 13 rays; anal fin with 3 spines and 9 to 12 rays; pectoral fin about half head length; jaws with small conical teeth, no canines.



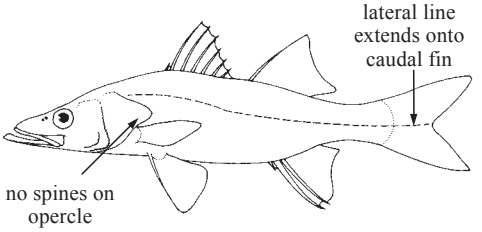
Epigonidae



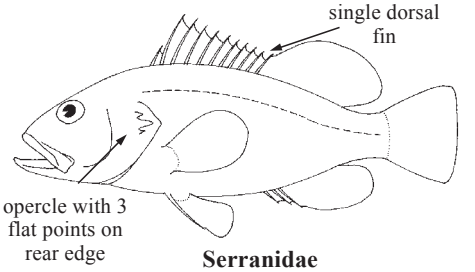
Moronidae

Centropomidae: no spines on opercle; preopercle with large serrae; second anal-fin spine much longer than caudal peduncle depth; lateral line conspicuously marked in black (except in *Centropomus ensiferus*) and extending to rear end of caudal fin.

Serranidae: opercle with 3 spines or flat points on rear edge; single (undivided) dorsal fin in most species, with 2 to 11 spines and 10 to 27 rays.



Centropomidae



Serranidae

Key to the species of Acropomatidae occurring in the area

1a. First dorsal fin with 8 weak spines, second dorsal fin with 1 spine and 14 soft rays; anal fin with 3 spines and 12 soft rays; lateral-line scales 45 to 50; body depth contained 3.5 to 3.7 times in standard length; preopercle smooth, opercle with 2 flat points; jaws with long slender canines; branchiostegal rays 7; pectoral fins short, about half head length . . . ***Scombrops oculatus***

1b. Dorsal-fin soft rays 9 or 10; anal-fin soft rays 6 to 9; lateral-line scales 25 to 50 . . . . . → ***2***

2a. Branchiostegal rays 6; body covered with firm ctenoid scales; first dorsal fin with 8 spines, second dorsal fin with 1 spine and 9 rays; anal fin with 3 spines and 7 rays; pectoral-fin rays 13 or 14; lateral-line scales 30 to 35; body depth 3.4 to 3.7 times in standard length; pectoral fin almost equal to head length and reaching past vertical at anal-fin origin; rear edge of opercle with 2 simple, sharp spines; preopercle with a few short spines on lower half of rear edge; jaws with 1 row of minute teeth; no canines; gill rakers on first arch 7 in upper limb and 21 in lower limb . . . . . ***Bathysphyraenops simplex***

2b. Branchiostegal rays 7; body scales ctenoid or cycloid; first dorsal fin with 8 or 9 spines, second dorsal fin with 1 spine and 9 or 10 rays; anal fin with 2 or 3 spines and 7 to 9 rays; pectoral-fin rays 14 to 18; lateral-line scales 25 to 50; body depth 2.8 to 4.8 times in standard length; opercle not with 2 simple, sharp spines; preopercle smooth or serrate, with strong spines; gill rakers on first arch 4 to 7 on upper limb and 14 to 18 on lower limb . . . . . → ***3***

3a. Scales ctenoid, adherent; body depth 3.4 to 3.7 times in standard length; first dorsal fin with 8 spines, second dorsal fin with 1 spine and 9 to 11 soft rays; anal fin with 3 spines and 7 or 8 soft rays; pectoral-fin soft rays 14 or 15; lateral line interrupted, pored scales 35 to 39; 3 rows of scales from lateral line to base of second dorsal fin; rear edge of opercle with 2 spines or a cluster of spines; preopercle finely serrate; subopercle with 1 strong spine or a cluster of spines; 1 to 3 spines on interopercle; jaws with 1 row of small conical teeth; supramaxilla absent; gill rakers on first arch 7 to 9 on upper limb and 19 to 22 on lower limb . . . . . ***Howella brodiei***

3b. Body scales mostly cycloid, more or less deciduous; first dorsal fin with 9 spines, second dorsal fin with 1 spine and 9 or 10 soft rays; anal fin with 2 or 3 spines and 7 to 9 soft rays; pectoral-fin soft rays 14 to 17; lateral line usually continuous, pored scales 25 to 27, 29 to 31 or 46 to 51; rear edge of opercle with 1 or 2 flat points; jaws with some canine teeth; supramaxilla present . . . . . → ***4***

4a. Body depth 2.9 to 3.4 times in standard length; anal fin with 3 spines and 7 soft rays; preopercle margin weak and flexible, no distinct serrae; lateral-line scales 42 to 48; gill rakers 4 to 7 on upper limb and 15 to 18 on lower limb of first arch . . . . . → ***5***

4b. Body depth distinctly less than head length, contained 3.2 to 4.8 times in standard length; anal fin with 2 or 3 spines and 6 to 9 soft rays; preopercle with at least a few serrae . . . . . → ***6***

5a. Mid-lateral part of lower jaw with a row of 12 to 14 small canines; front and rear parts of jaw with patches of villiform teeth, and 2 large canines on either side of symphysis; first anal-fin pterygiophore slender and straight . . . . . ***Verilus sordidus***

5b. Mid-lateral part of lower jaw with a row of about 20 to 40 minute teeth; front and rear parts of jaw with patches of villiform teeth, and a pair large canines at symphysis; first anal-fin pterygiophore recurved, with laterally-expanded lamina forming a distinct hollow . . . . . ***Neoscombrops atlanticus***

6a. First dorsal fin with 8 spines; anal fin with 3 spines and 8 or 9 soft rays; pelvic-fin spine serrate, other fin spines smooth; preopercle serrate, subopercle and interopercle smooth; lateral-line scales 46 to 51; body depth contained 3.7 to 4.8 times in standard length . . . . . ***Synagrops trispinosus***

6b. First dorsal fin with 9 spines; anal fin with 2 spines and 7 or 9 soft rays; pelvic-fin spine smooth or serrate; lateral-line scales 29 to 35; body depth 3.3 to 3.8 times in standard length . . . . . → ***7***

7a. Anal-fin soft rays 9; no ridges on lower rear margin of preopercle; lateral-line scales about 35; gill rakers on lower limb 17 or 18; all fin spines smooth . . . . . ***Synagrops pseudomicrolepis***

7b. Anal-fin soft rays 7; lower rear margin of preopercle with 2 or 3 small ridges; lateral-line scales 29 to 31; lower gill rakers 11 to 16 . . . . . → ***8***

8a. Anterior edge of pelvic-fin spine and second spines of first dorsal and anal fins serrate; total gill rakers 17 to 20 . . . . . ***Synagrops spinosus***

8b. No fin spines serrate; total gill rakers 13 to 17 . . . . . ***Synagrops bellus***

List of species occurring in the area

The symbol is given when species accounts are included.

Bathysphyraenops simplex Parr, 1933. To 12 cm. Bahamas, Cuba, tropical central Atlantic, W Indian Ocean, and W and central Pacific Ocean.

Howella brodiei Ogilby, 1899. To 12 cm. Suriname, W and E N Atlantic, and W Pacific.

Neoscombrops atlanticus Mochizuki and Sano, 1984. To at least 13.4 cm standard length. Colombia.

Scombrops oculatus (Poey, 1860).

Synagrops bellus (Goode and Bean, 1896). To at least 36 cm. Bermuda, Canada to Florida, N Gulf of Mexico, Suriname, and E Atlantic.

Synagrops pseudomicrolepis Schultz, 1940. To 13 cm. Cuba to Suriname.

Synagrops spinosus Schultz, 1940. To 13 cm. North Carolina, Gulf of Mexico, Suriname, W Pacific.

Synagrops trispinosus Mochizuki and Sano, 1984. To 12 cm. Nicaragua, Colombia, Venezuela, Jamaica, Virgin Islands, Puerto Rico, and Suriname.

Verilus sordidus Poey, 1860. To 37+ cm. Cuba and Venezuela.

References

Mejía, L.S., A. P. Acero, and L. Saavedra. 2001. Review of the genus *Synagrops* from the tropical western Atlantic (Perciformes: Acropomatidae). *Caribb. J. Sci*., 37(3-4):202-209.

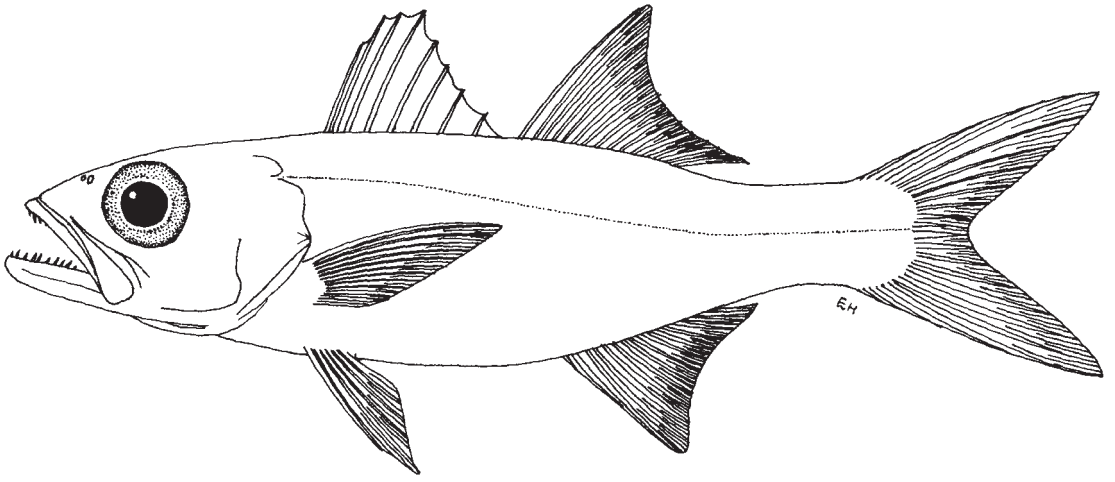
Mochizuki, K. and M. Sano. 1984. A new perchichthyid fish *Neoscombrops atlanticus* from the Caribbean Sea. *Jap. J. Ichthyol*., 30(4):335-340.

Post, A. and J.C. Quéro. 1991. Distribution et taxinomie des *Howella* (Perciformes, Perchichthyidae) de l'Atlantique. *Cybium*, 1991,15(2):111-128.

Scombrops oculatus (Poey, 1860)

Frequent synonyms / misidentifications: None / None.

FAO Names: En - Atlantic scombrops; **Fr** - Vivaneau brun; **Sp** - Escolar chino.

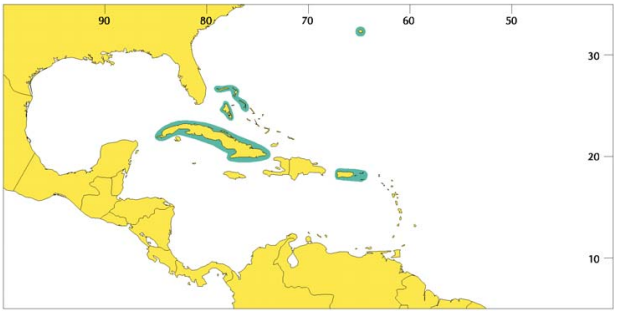


Diagnostic characters: Body oblong, somewhat compressed; depth contained 3.4 to 3.6 times, head 2.8 to 3.0 times in standard length. Eyes very large, diameter contained 3.2 to 3.5 times in head length. Mouth large, the lower jaw projecting; maxilla exposed with mouth closed, reaching past vertical at middle of eye; maxilla scaly, with large supramaxilla; teeth long, sharp, well separated; teeth on vomer and palatines compressed, in a single row. Preopercle entire; opercle with 2 flat points. Branchiostegal membranes separate, free from isthmus, with 7 rays. **Two dorsal fins, the first with 8 weak spines; second dorsal fin with 1 spine and 14 rays; caudal fin distinctly forked; anal fin with 3 spines and 12 rays; basal half of soft dorsal and anal fins scaly**. Scales cycloid, deciduous; lateral-line scales 45 to 50. **Colour:** dark violet brown, paler below.

Habitat, biology, and fisheries: Occurs on rough bottom in depths of 200 to 640 m. Taken by sport fishermen in the Bahama Channel. Probably caught at most Carribean islands where hook-and-line fishing in 200 to 600 m takes place. As of 1999, the IGFA All-tackle world record for *Scombrops oculatus* is a fish of 9.9 kg caught at Bimini, Bahamas in 1997.

Size: Attains at least 104 cm fork length and a weight of 10 kg.

Distribution: Bermuda, Bahamas, Cuba, Puerto Rico, Virgin Islands, and probably most other islands of the Carribean.



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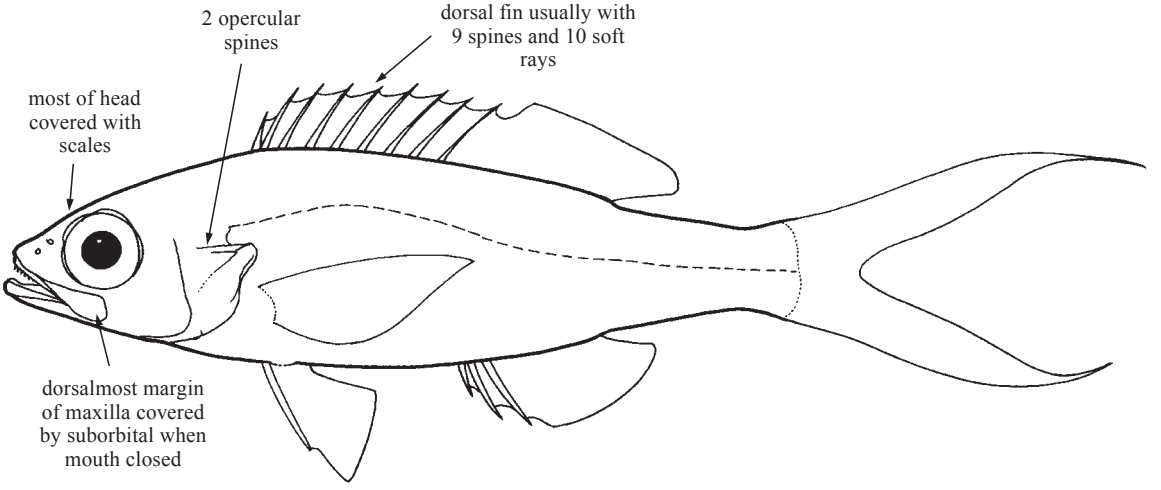
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SYMPHYSANODONTIDAE

Bunquelovelies (wampeejawed fishes, shelf beauties, slopefishes)

by W.D. Anderson, Jr., Grice Marine Biological Laboratory, Charleston, South Carolina, USA

Diagnostic characters: Small fishes (to about 15 cm standard length); body slender to moderately deep, somewhat compressed. Head moderate. Eye moderate to large, its diameter longer than snout. Snout relatively blunt. **Anterior ends of premaxillae incised, forming conspicuous symphysial notch that receives anterior ends of dentaries. Mouth terminal and oblique; jaws about equal. Extreme dorsalmost margin of maxilla covered by very narrow suborbital with mouth closed**. Premaxilla with small teeth, usually larger anteriorly; symphysial notch toothless. Dentary with small teeth usually extending from posterior elevation of the bone almost to symphysis; teeth on and near posterior elevation usually larger; **usually a number of relatively large exserted teeth at anterior ends of dentaries, these teeth fitting into symphysial notch in premaxillae with mouth closed**. No teeth on vomer, pterygoids, or tongue; teeth usually absent on palatines. **Most of head, including maxillae and dentaries, covered with scales. Suborbital extremely narrow, its height (width) about 1% standard length. Opercular spines 2**. Branchiostegal rays 7. Gill rakers on first arch 9 to 14 on upper limb and 24 to 29 on lower limb, total on first arch 34 to 42. Dorsal fin continuous, not incised at junction of spinous and soft rays. Caudal fin deeply forked. Both lobes of caudal fin and pelvic fin well to extremely elongated in larger males of *Symphysanodon berryi*. Dorsal and anal fins without scales, but with scaly sheaths at their bases. Pelvic axillary scales and scaly interpelvic process well developed. **Dorsal fin usually with 9 spines and 10 soft rays**. Anal fin with 3 spines and 7 or 8 soft rays. Principal caudal-fin rays 17 (9 in upper lobe, 8 in lower lobe); branched caudal-fin rays 15 (8 in upper lobe, 7 in lower lobe). Pectoral fin with 16 to 18 rays. Pelvic fin thoracic, inserted beneath pectoral fin, with 1 spine and 5 soft rays. Scales moderate in size, ctenoid. Tubed lateral-line scales 45 to 52. Vertebrae 25 (10 precaudal + 15 caudal). **Colour:** where known, mainly orange.



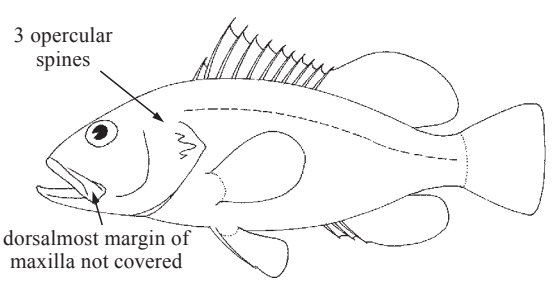
Habitat, biology, and fisheries: Bottom-associated fishes, collected over the continental shelf and upper continental slope and around islands. Probably planktivorous. Due to their small size, of no interest to fisheries, but most likely important as food for larger species of fishes.

Remarks: Have been considered by various workers to be members of either the family Serranidae or the family Lutjanidae, but species of Symphysanodontidae possess characters that clearly distinguish them from serranids and lutjanids and lack characters that would associate them with either of those groups of fishes. Counts of gill rakers are of those on the first arch, including rudiments, when present. Counts of lateral-line scales are of tubed scales.

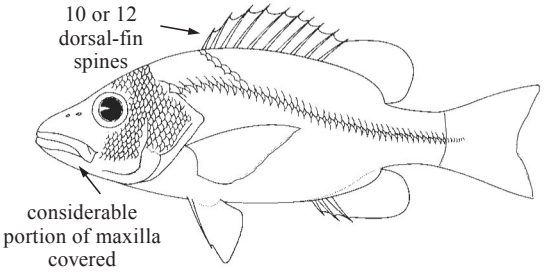
Similar families occurring in the area

Serranidae: 3 opercular spines (2 in Symphysanodontidae); dorsalmost margin of maxilla not covered by suborbital when mouth closed; vertebrae usually 24 or 26 (25 in Symphysanodontidae).

Lutjanidae: maxilla covered to considerable degree by suborbital when mouth closed; anterior ends of premaxillae not incised to form conspicuous symphysial notch that receives anterior ends of dentaries when mouth closed; usually 10 or 12 dorsal-fin spines (almost always 9 dorsal-fin spines in Symphysanodontidae); vertebrae 24 (25 in Symphysanodontidae).



Serranidae



Lutjanidae

Key to the species of Symphysanodontidae occurring in the area

1a. Body slender, depth of body 3.6 to 4.5 times in standard length (22 to 28% standard length); lateral-line scales 48 to 52; gill rakers on first arch 9 to 12 on upper limb and 24 to 28 on lower limb, total 34 to 39; anal-fin soft rays 7; length of pelvic fin 20 to more than 87% standard length; length of upper caudal-fin lobe 29 to more than 128% standard length; length of lower caudal-fin lobe 28 to more than 111% standard length; (individuals with well to extremely elongated pelvic and caudal fins are males) . . . . . ***Symphysanodon berryi***

1b. Body moderately deep, depth of body 2.8 to 3.0 times in standard length (33 to 36% standard length); lateral-line scales 45 or 46; gill rakers on first arch 12 to 14 on upper limb and 26 to 29 on lower limb, total 39 to 42; anal-fin soft rays usually 8 (7 in about 10% of specimens examined); length of pelvic fin 26 to 28% standard length; length of upper caudal-fin lobe 39 to more than 42% standard length; length of lower caudal-fin lobe 37 to 39% standard length . . . . . ***Symphysanodon octoactinus***

List of species occurring in the area

The symbol is given when species accounts are included.

Symphysanodon berryi Anderson, 1970.

Symphysanodon octoactinus Anderson, 1970.

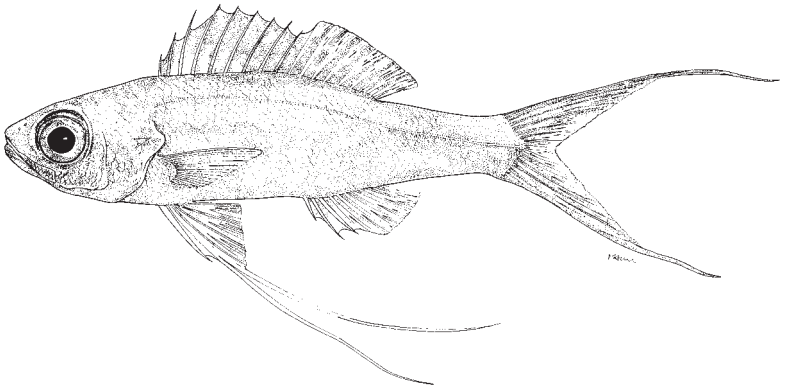
Reference

Anderson, W.D., Jr. 1970. Revision of the genus *Symphysanodon* (Pisces: Lutjanidae) with descriptions of four new species. *Fish. Bull.*, 68:325-346.

Symphysanodon berryi Anderson, 1970 YMY

Frequent synonyms / misidentifications: None / None.

FAO names: En - Slope bass.



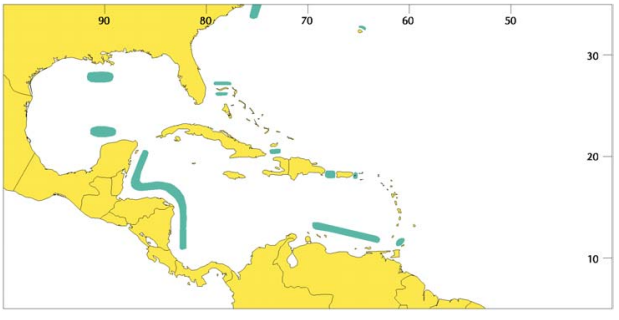
Diagnostic characters: Body slender, depth 22 to 28% standard length. Gill rakers on first arch 9 to 12 on upper limb and 24 to 28 on lower limb, total 34 to 39. Caudal fin deeply forked; **both lobes of fin produced into filaments in large males, increasing in length with increase in standard length. Length of upper caudal-fin lobe 29 to more than 128% standard length, varying from 30 to more than 35% standard length in females more than about 80 mm standard length and from 34 to more than 128% standard length in males more than about 85 mm standard length. Length of lower caudal-fin lobe 28 to more than 111% standard length, varying from 30 to more than 34% standard length in females more than about 80 mm standard length and from 32 to more than 111% standard length in males more than about 85 mm standard length. Pelvic fin usually not extending to vent in females; first pelvic-fin soft ray noticeably elongated in males more than about 85 mm standard length, increasing in length with increase in standard length, extremely filamentous in large individuals; medial branch of first pelvic-fin soft ray reaching past fork of caudal fin in some large males. Length of pelvic fin 20 to more than 87% standard length, varying in females from 21 to 25% standard length and in males from 30 to more than 87% standard length in specimens more than about 85 mm standard length**. Dorsal fin with 9, very rarely 8, spines and 10, very rarely 9 or 11, soft rays. **Anal fin with 3 spines and 7 soft rays**. Pectoral fin with 16 to 18, usually 17, rays. **Tubed scales in lateral line 48 to 52. Colour:** head and body mostly bright orange; iris of eye with considerable orange.

Size: Maximum standard length to about 15 cm, commonly to 11 cm.

Habitat, biology, and fisheries: Collected from depths of 100 to 475 m. No other information available.

Distribution: Known in the western Atlantic from off North Carolina, Louisiana, the Bahamas, Cuba, Dominican Republic, Puerto Rico, Tobago, Mexico (Yucatán and Quintana Roo), Belize, Honduras, Nicaragua, and Venezuela, from the central Atlantic off Ascension Island; and from the eastern Atlantic off the Island of Pagalu. A juvenile (53.4 mm standard length) has been collected by midwater trawl (fished between the surface and 575 m) over very deep water in the northern Sargasso Sea near Bermuda, and 2 specimens (134 and 144 mm standard length), indistinguishable from this species, have been obtained off the Maldives, southwest of Sri Lanka in the Indian Ocean.

Remarks: At the Museum of Comparative Zoology (Harvard University), there are many specimens of *Symphysanodon* from the western North Atlantic, mostly postlarvae obtained by midwater trawls, that may be representatives of this species. These specimens were captured at numerous localities: from Lat. 41.6°N (well to the southeast of Sable Island, Nova Scotia) southward along the east coast of the USA to the vicinity of Miami, off many of the islands of the West Indies, and through much of the Caribbean Sea.

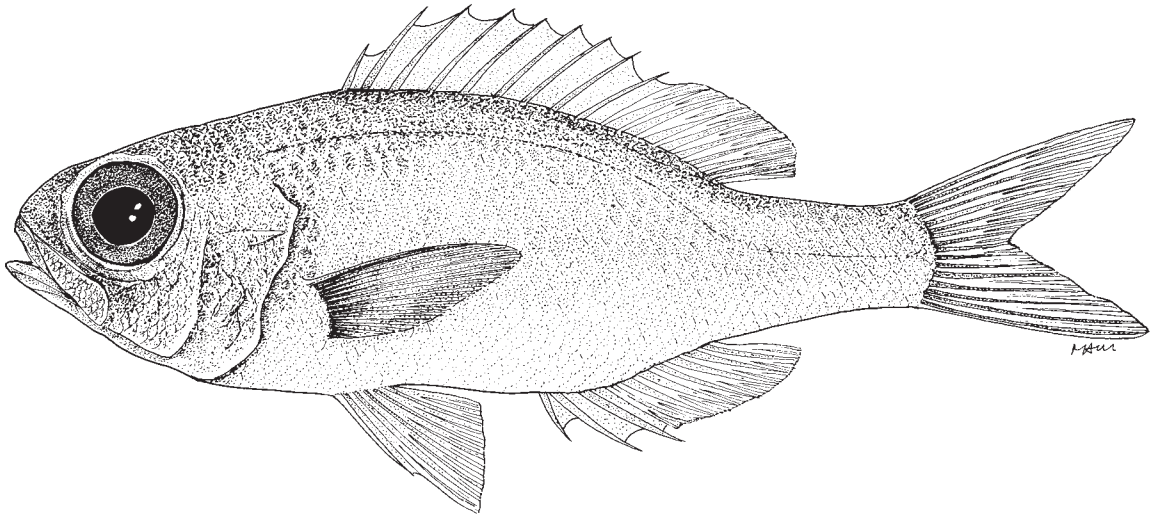


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Symphysanodon octoactinus Anderson, 1970

Frequent synonyms / misidentifications: None / None.

FAO names: En - Insular bunquelovely.

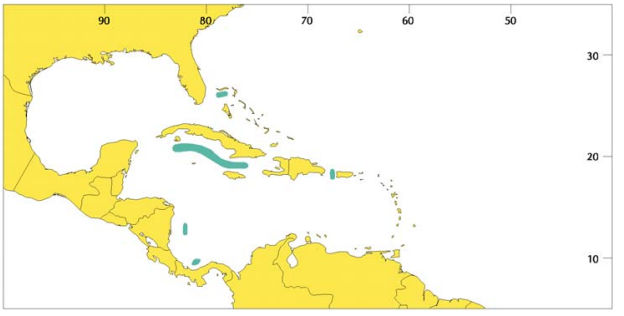


Diagnostic characters: Body moderately deep, depth 33 to 36% standard length. Gill rakers on first arch 12 to 14 on upper limb and 26 to 29 on lower limb, total 39 to 42. Caudal fin deeply forked, **lobes of fin apparently never greatly produced** (however, caudal fin damaged on most specimens examined). Length of upper caudal-fin lobe 39 to more than 42% standard length. Length of lower caudal-fin lobe 37 to 39% standard length. **Length of pelvic fin 26 to 28% standard length**. Dorsal fin with 9 (rarely 10) spines, and 10 (rarely 9) soft rays. **Anal fin with 3 spines and 8 (occasionally 7) soft rays**. Pectoral fin with 16 (rarely 17) rays. **Tubed scales in lateral line 45 or 46. Colour:** no information is available on live coloration.

Size: Maximum standard length to about 13 cm.

Habitat, biology, and fisheries: Occurs in depths of 155 to 405 m. No other information available.

Distribution: Known from off the Bahamas, Cuba, Puerto Rico, Nicaragua, and Panama.



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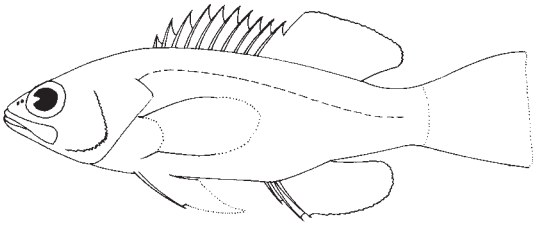
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SERRANIDAE

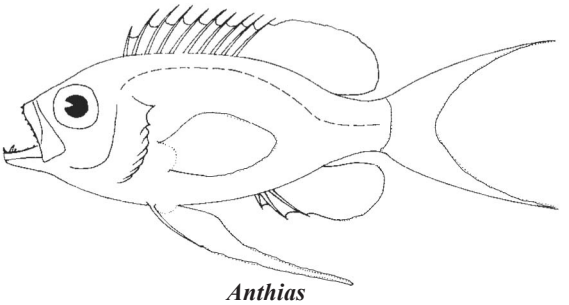
Groupers (seabasses, creolefish, coney, hinds, hamlets, anthiines, and soapfishes)

by P.C. Heemstra, South African Institute for Aquatic Biodiversity, Grahamstown
W.D. Anderson, Jr. (Anthiinae), Grice Marine Biological Laboratory, Charleston, South Carolina, USA,
and P.S. Lobel (*Hypoplectrus*), Boston University Marine Program, Massachusetts, USA

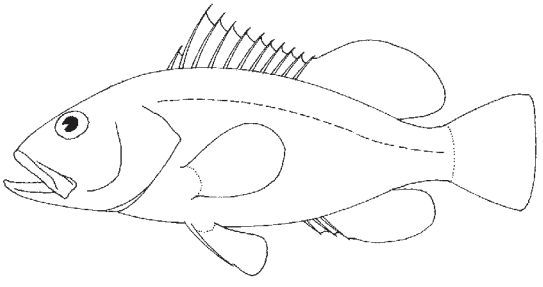
Diagnostic characters: Small to enormous fishes (the largest grouper, the jewfish, attains a length of 2.5 m and a weight of 400 kg; maximum size for the smallest serranid, *Jeboehlkia gladifer*, is about 5 cm total length); body robust or compressed and deep-bodied to moderately elongate and slender, with a deep caudal peduncle. **Mouth moderate to large, terminal, or the lower jaw projecting, the upper jaw more or less protrusile; maxilla mostly exposed posteriorly (not covered by preorbital bone when mouth is closed, except in *Parasphyraenops atrimanus*), reaching below or slightly past eye; small, slender, conical teeth on jaws (teeth absent in *Schultzea*); anterior teeth of some species enlarged (caniniform); no molars or incisiform teeth; vomer and palatine bones (on roof of mouth) usually with villiform teeth. Rear edge of opercle with 3 flat spines or points in most species, the upper (dorsal) spine and lower (ventral) spine often inconspicuous (merely acute projections of the opercle edge and covered by skin and scales), the middle spine largest and usually projecting as a distinct (exposed) spine; preopercle vertical limb generally serrate**, the lower (horizontal) limb serrate or undulate, sometimes with strong antrorse (forward-directed) spines; some species with a projecting lobe at angle of preopercle. Branchiostegal membranes separate, joined to isthmus far forward, with 7 branchiostegal rays (6 in *Schultzea* and *Serraniculus*). Pseudobranch (on inner side of gill cover) well developed. Gill rakers long or short, sometimes bearing minute teeth. **Dorsal fin usually single**, but spiny and soft-rayed parts separate in *Liopropoma* species; dorsal fin with 2 to 11 spines and 10 to 27 soft rays; anal fin with 3 spines (spines absent in *Rypticus*) and 6 to 17 soft rays; caudal fin forked, lunate, emarginate, truncate, or rounded, with 13 to 16 branched rays; pectoral fins rounded to somewhat pointed, usually longer than pelvic fins; pelvic fin with 1 spine and 5 soft rays, the origin slightly before or behind pectoral-fin base; scaly axillary process of pelvic fin rudimentary or absent. Lateral line present (absent in *Jeboehlkia*). Scales small to moderately large, usually ctenoid, but sometimes nearly smooth; head at least partly scaled, snout and preorbital region usually naked, but cheeks scaly. Vertebrae 24 to 26, with 10 or 11 abdominal and 14 to 16 caudal vertebrae. **Colour:** variable, with patterns of spots, light or dark stripes, vertical or oblique bars, or nearly plain. Many species are capable of rapid colour changes; xanthic (all yellow) phases are common in some species, and several species have distinctively coloured deep- and shallow-water forms. Colour patterns are helpful for identification of species, but one needs to be aware of variations within the species.



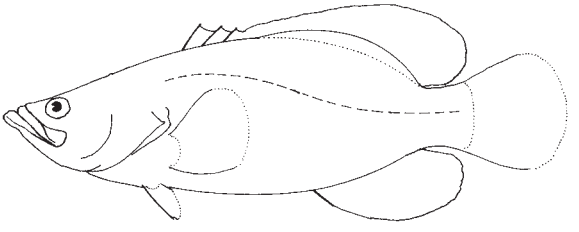
Serranus



Anthias



Epinephelus



Rypticus

Habitat, biology, and fisheries: Seabasses and groupers are mostly demersal (benthic or bottom-oriented) fishes of tropical and subtropical areas, ranging from shallow coastal waters to moderate depths; the great majority of species occur on continental or insular shelves in less than 200 m. A few species occur in temperate waters. Although some serranids prefer seagrass beds and mud or sandy bottoms, most are found on coral reefs and rocky (high relief) substrates. Juveniles of a few species are common in lower reaches of estuaries. Except for breeding aggregations, most epinephelines (Subfamily Epinephelinae) are solitary, but anthiines (Subfamily Anthiinae) occur in groups apparently feeding on zooplankton a few metres above the bottom. Seabasses (Subfamily Serraninae) seem more gregarious than groupers (perhaps because they are usually smaller); but, like the groupers, most serranines are moderately sedentary and often seen sitting on the bottom. All serranids are predators, feeding on invertebrates (mainly crustaceans and cephalopods) and fishes; some species have long, numerous gill rakers and are thus adapted for feeding on zooplankton. Although the reproduction of many species has yet to be studied, it appears that the vast majority of serranids are hermaphroditic. Anthiines and most groupers (Tribe Epinephelini) in the area are protogynous hermaphrodites, i.e. they first mature as females and, after spawning 1 or more times as females, they change sex, spawning thereafter as males. Synchronous hermaphroditism, with both sexes functional at the same time in a single individual, is characteristic of most species in the Subfamily Serraninae. Although these synchronous hermaphrodites can fertilize their own eggs, they normally spawn in pairs and alternate the release of eggs or sperm in order to have their eggs fertilized by the other fish. Some groupers form large aggregations at specific sites at the time of spawning, making them more vulnerable to over-fishing. These spawning aggregations should be protected from fishing, as they are essential to the replenishment of grouper populations. Most groupers are solitary fishes and tagging studies have shown that they are generally resident on a particular reef for a long time (often years). Site specificity and the relatively slow growth rate of groupers (some species may not be mature until an age of 8 to 10 years) also make them particularly vulnerable. Groupers are among the most highly-priced foodfishes and are avidly sought by commercial, artisanal, and sport fishermen; however, large groupers of some species (especially *Mycteroperca venenosa*) may cause ciguatera poisoning. Serranids are caught with hook-and-line, gill nets, trammel nets, bottom set longlines, spears, traps, and in trawls. Some groupers are important in aquaculture, and a few species have been spawned in captivity. Several species are used in cage-culture operations in the western Pacific region. The smaller serranids, particularly the colourful Anthiinae, Liopropomatini, and Serraninae are of value as aquarium fishes.

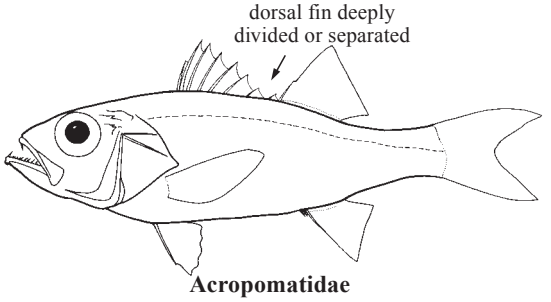
Remarks: The composition of the family used here follows Johnson (1983, 1984) and Baldwin and Johnson (1993). In the 1977 edition of the *FAO Species Identification Sheets for the Western Central Atlantic*, the tribe Grammistini and the subfamily Anthiinae were recognized as separate families. Lateral scale series are the oblique series of scales running dorsoposteriorly above the lateral line; these scales are counted from the first lateral-line scale (above the upper end of the gill opening) to the base of the caudal fin. The last dorsal- and anal-fin rays are double (split to the base) but counted as a single ray. Total gill raker counts include rudimentary rakers, which are wider than high and spaced at the same intervals as the gill rakers; developed rakers are higher than wide.

Remarks for *Hypoplectrus* species: The problem of defining a species is clearly evident when describing the hamletfish (*Hypoplectrus* Gill, 1861) because of their extremely diverse colour patterns and nearly identical morphology. The question is how reliable is colour pattern for distinguishing very closely related and probably recently diverged taxa? There has been a longtime debate about whether hamletfish represent 1 polychromatic species or closely related different species (Domeier, 1994). In the 1850's, Poey described additional species based on subtle colour variations. Some of these variations were so slight that they were not considered valid but others have remained recognized as species (Longley and Hildebrand, 1941). Hamletfish do not show any structural differences between the species and appear to be very similar genetically (Domeier, 1994). Later research has shown that the species or colour morphs are very consistent in maintaining reproductive pair bonds between mates of the same colour pattern although hybrid breeding occurs if no other choice is given (Lobel, 1992 and Domeier, 1994). The situation probably reflects a very recent divergence of species and, as a species flock problem, it is analogous to the systematic issues of African rift lake cichlids. On any given reef, several species coexist and, significantly, mating is usually between fish having the same colour pattern. Hybrids are rare and display mixed parental colour patterns (Domeier, 1994). No obvious ecological differences have been yet defined. Most of the species have broad distribution throughout the Caribbean but with centres of abundance in certain regions. Three species in particular (*Hypoplectrus providencianus, Hypoplectrus gemma,* and *Hypoplectrus* sp nov Belize) have the most restrictive distributions. *Hypoplectrus* species are carnivores feeding on a variety of tiny fishes and crustaceans. Some hamlets are believed to mimic pomacentrid fishes as a means to get closer to prey (Randall and Randall, 1960 and Thresher, 1978). The juveniles of some other serranids and certain lutjanids can be mistaken for hamlets. Fishery is for live specimens for the aquarium trade.

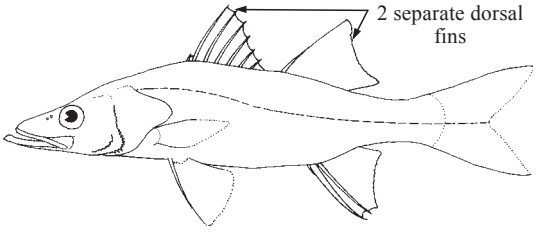
Similar families occurring in the area

Acropomatidae: rear edge of opercle with 2 flat points; dorsal fin deeply divided or as separate spinous fin with 7 to 10 spines and soft-rayed fin with 1 spine and 9, 10, or 14 rays.

Centropomidae: head depressed anteriorly; pectoral fins shorter than pelvic fins; lateral line extends to rear margin of caudal fin; no spines on opercle; 2 separate dorsal fins, the first with 8 spines.



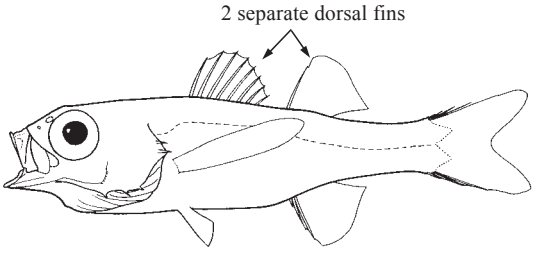
Acropomatidae



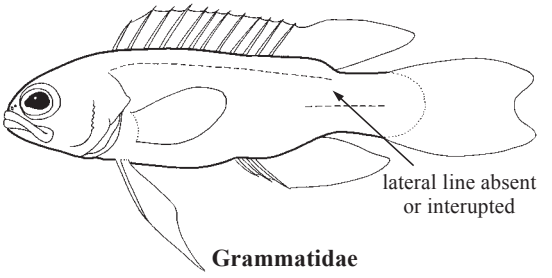
Centropomidae

Epigonidae: dorsal fins separate, first with 6 to 8 spines, second with 1 spine and 8 to 11 rays; anal fin with 1 to 3 spines and 7 to 10 rays; eye diameter about 1/3 or more of head length.

Grammatidae: lateral line absent or interrupted, running close to dorsal-fin base and terminating on upper surface of caudal peduncle or below last dorsal-fin ray; nasal organ without lamellae; preopercle edge smooth; opercle with 0 to 2 spines.



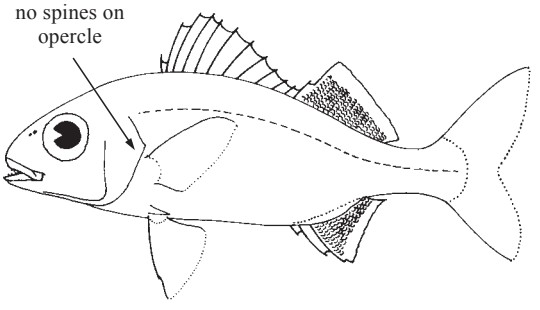
Epigonidae



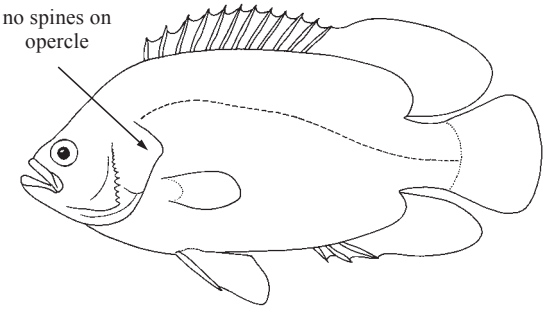
Grammatidae

Haemulidae: maxilla mostly covered by preorbital bone when mouth is closed; no teeth on vomer or palatines; no spines on opercle.

Lobotidae: no spines on opercle; no teeth on vomer or palatines; soft dorsal and anal fins enlarged, projecting well past caudal-fin base.



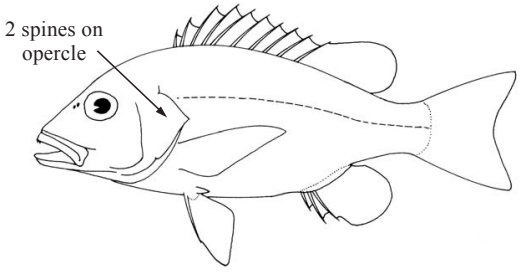
Haemulidae



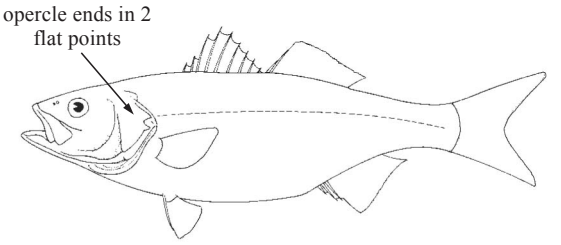
Lobotidae

Lutjanidae: maxilla mostly covered by preorbital bone when mouth is closed; 2 spines on opercle; scaly axillary process at base of pelvic fins usually well developed.

Moronidae: opercle ends in 2 flat points; dorsal fin notched to the base in front of soft-rayed part, with 8 or 9 spines in first part and 1 spine and 10 to 13 rays in second fin.



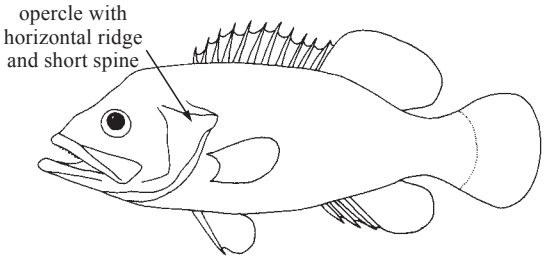
Lutjanidae



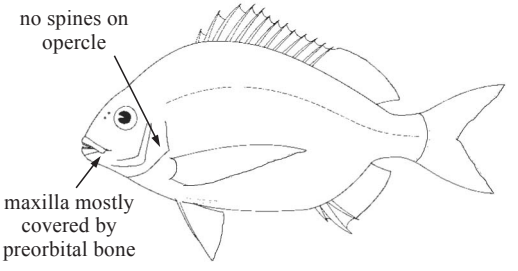
Moronidae

Polyprionidae: opercle with distinct horizontal ridge ending in a short spine; preopercle with large spines in juvenile, serrate in adults; dorsal fin with 11 or 12 spines and 11 or 12 soft rays; pectoral fins shorter than pelvic fins.

Sparidae: jaws with incisiform and/or molariform teeth; distal (posterior) end of maxilla and premaxilla connected, forming a moveable joint; maxilla mostly covered by preorbital bone when mouth is closed; no scales on cheek; no spines on opercle; edge of preopercle smooth.



Polyprionidae



Sparidae

Key to the genera and selected species of Serranidae occurring in the area

1a. Dorsal fin with 8 to 11 spines and 9 to 20 rays; anal fin with 3 spines and 6 to 13 rays; most of upper edge of operculum free, not connected by skin to body (Fig. 1a) . . . . . → *3*

1b. Dorsal fin with 2 to 4 or 7 spines and 18 to 27 rays; anal fin with no spine and 13 to 17 rays or 3 spines and 14 to 16 rays; gill opening restricted dorsally, with most of dorsal edge of operculum bound by skin to the body (Fig. 1b) . . . **(Tribe Grammistini)** → *2*

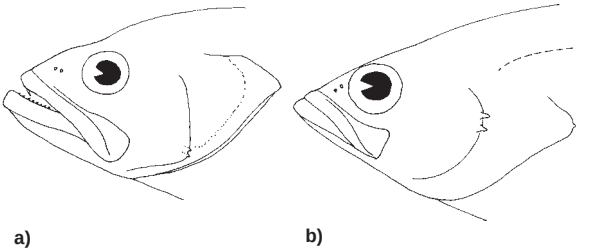


Fig. 1 operculum

2a. Dorsal fin spines 2 to 4; no anal-fin spine (Fig. 2) . . . . . ***Rypticus***

2b. Dorsal fin with 7 spines, 18 or 19 rays; anal fin with 3 spines, 14 to 16 rays (Fig. 3) . . . . . ***Pseudogramma gregoryi***

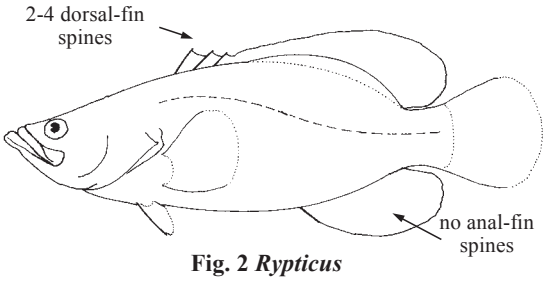


Fig. 2 ***Rypticus***

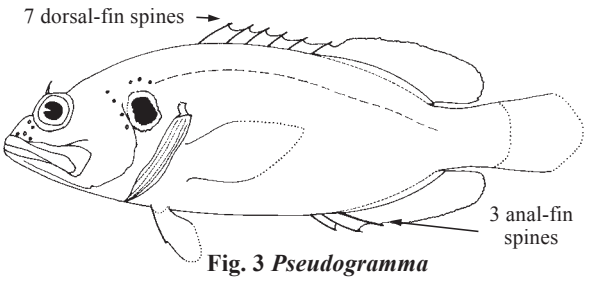


Fig. 3 ***Pseudogramma***

3a. Anus closer to anal-fin origin than to pelvic-fin bases; dorsal snout profile straight or rounded (convex) but not concave; head normal . . . . . → ***4***

3b. Anus closer to pelvic-fin bases than to anal-fin origin; snout short and concave (Fig. 4), so that head appears abnormal ('pug-headed'); dorsal fin with 10 spines and 13 or 14 rays . . . . . ***Bullisichthys caribbaeus***

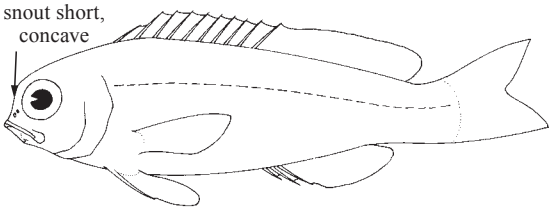


Fig. 4 ***Bullisichthys caribbaeus***

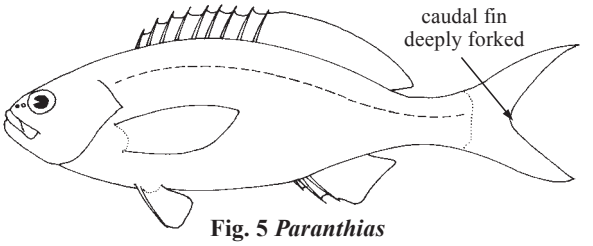


Fig. 5 ***Paranthias***

4a. Caudal fin deeply forked (lunate) the middle rays less than half length of upper and lower caudal lobes; dorsal fin with 9 spines and 17 to 19 rays; head small, its length contained 3.4 to 3.9 times in standard length; lateral-line scales 69 to 77; lateral-scale series 124 to 129; gill rakers 12 to 14 on upper limb, 24 to 26 on lower limb (Fig. 5) . . . . . ***Paranthias furcifer***

4b. Caudal fin rounded, truncate, or concave (emarginate) in most species (deeply forked only in *Anthias* and *Hemanthias*) dorsal fin NOT with 9 spines and 17 to 19 rays; head larger, its length contained 2.3 to 3.3 times in standard length . . . . . → ***5***

5a. Dorsal fin with 8 spines and 13 rays; preopercle with a large antrorse spine on lower edge (hidden by skin and scales) (Fig. 6); middle opercle spine extending to edge of operculum; body pinkish lavender, with 6 yellow longitudinal stripes; bright red blotch on front half of anal fin . . . . . ***Gonioplectrus hispanus***

5b. Dorsal fin with 7 to 11 spines and 9 to 20 rays; preopercle without a large antrorse spine in most species; middle opercle spine not reaching edge of operculum; colour not as in 5a . . . . . → ***6***

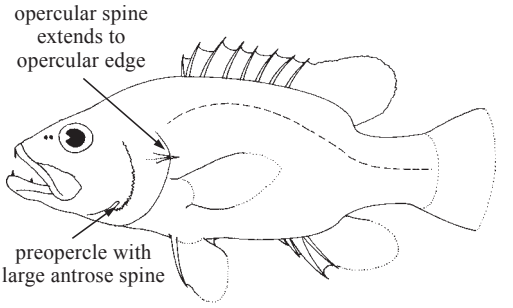


Fig. 6 ***Gonioplectrus hispanus***

6a. Front nostrils distinctly tubular, located closer to upper lip than to rear nostrils; dorsal fin with 7 to 9 spines and 9 to 14 rays . . . . . → ***7***

6b. Front nostrils variously shaped, but always closer to rear nostrils than to upper lip; dorsal fin with 9 to 11 spines and 10 to 20 rays . . . . . → ***9***

7a. Dorsal fin with 8 or 9 spines and 13 to 15 rays; dorsal fin continuous with only a shallow notch in margin between spinous and soft-rayed parts (Fig. 7) . . . . . ***Bathyanthias***

7b. Dorsal fin with 7 or 8 spines and 9, 12, or 13 rays; dorsal fin divided to the base between spinous and soft-rayed parts . . . . . → ***8***

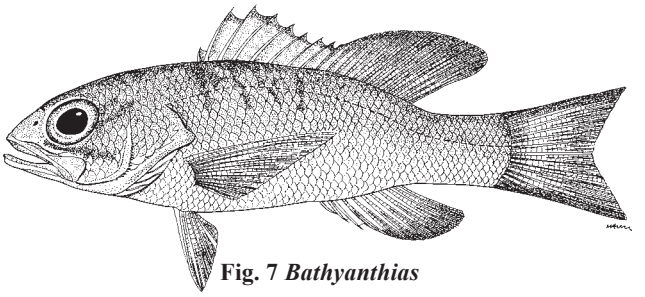


Fig. 7 ***Bathyanthias***

8a. Lateral line absent; dorsal fin with apparently 7 spines (first spine a minute nubbin), the first apparent spine elongate, about twice length of second apparent spine, and reaching origin of soft dorsal fin when depressed; dorsal-fin rays 9 (Fig. 8) . . . . . ***Jeboehlkia gladifer***

8b. Lateral line present; dorsal fin with 8 spines, the first 2 subequal and not reaching origin of soft dorsal fin; dorsal-fin rays 12 or 13 (Fig. 9) . . . . . ***Liopropoma***

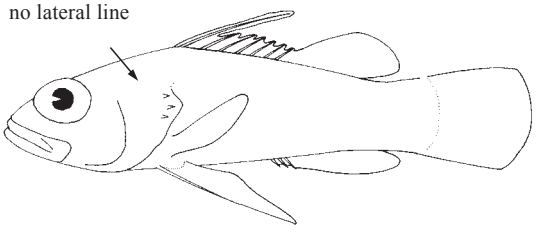


Fig. 8 ***Jeboehlkia gladifer***

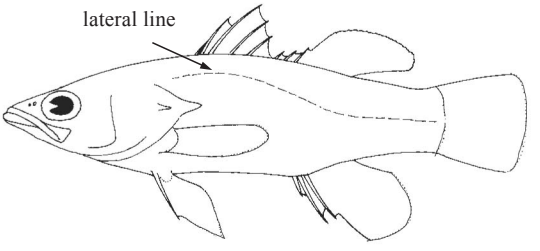


Fig. 9 ***Liopropoma***

9a. A thin, moveable supramaxilla bone along upper, rear edge of maxilla (Fig. 10a) (supramaxilla is covered by skin and not obvious, but it can be discerned by pushing the upper edge of the maxilla with a fingernail or dissecting needle; the supramaxilla is more apparent if the skin is cut and peeled off the free, rear part of the maxilla); most teeth depressible (hinged); scaly flap of skin joining upper part of inner (posterior) side of pectoral-fin base to body; soft dorsal and anal fins mostly covered with thick skin and scales; scales on body small, lateral scale series (69 to 146) more numerous than lateral-line scales; dorsal fin with 9 to 11 spines and 13 to 20 rays . . . . . → ***10***

9b. Supramaxilla absent (Fig. 10b); teeth fixed (not depressible); no scaly flap of skin joining upper part of pectoral-fin base to body; soft dorsal and anal fins mostly naked (hence the rays are easy to count); scales larger, the lateral scale series about the same number (39 to 55) as the lateral-line scales; dorsal fin with 10 spines and 10 to 17 rays . . . . . → ***14***

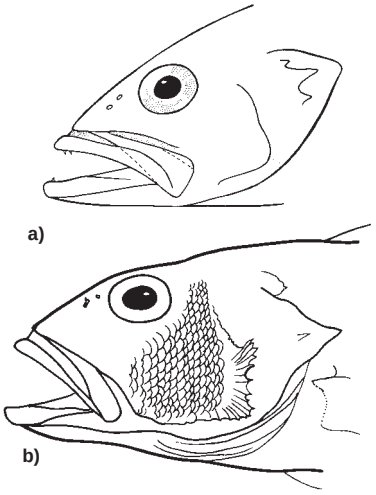


Fig. 10

10a. Large antrorse spine at corner of preopercle (covered by skin) (Fig. 11); snout short, less than or equal to eye diameter; dorsal fin with 11 spines and 17 to 19 rays; anal-fin rays 9 . . . ***Alphestes afer***

10b. No large antrorse spine on corner of preopercle (but there may a few enlarged, ventrally-directed serrae there); snout longer than eye diameter; dorsal fin with 9 to 11 spines and 13 to 20 rays; anal-fin rays 8 to 13 . . . . . → ***11***

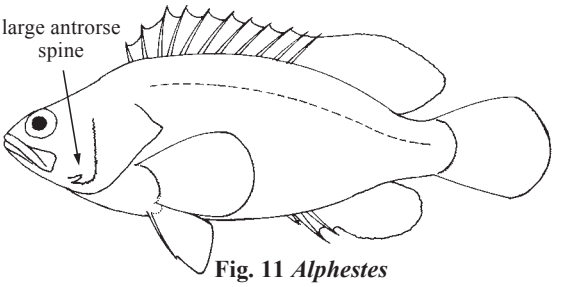


Fig. 11 ***Alphestes***

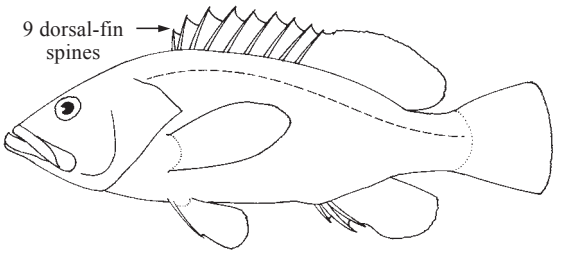


Fig. 12 ***Cephalopholis***

11a. Dorsal-fin spines 9 (Fig. 12); caudal fin rounded or convex . . . . . ***Cephalopholis***

11b. Dorsal-fin spines 10 or 11; caudal fin rounded, truncate, or emarginate . . . . . → ***12***

12a. Body depth greater than head length, contained 2.2 to 2.5 times in standard length; body scales smooth; dorsal fin with 11 spines and 18 to 20 rays (Fig. 13) . . . . . ***Dermatolepis inermis***

12b. Body depth usually not greater than head length, 2.5 to 3.6 times in standard length; midlateral body scales rough (smooth on some species of *Mycteroperca*); dorsal fin with 10 or 11 spines and 13 to 19 rays . . . . . → ***13***

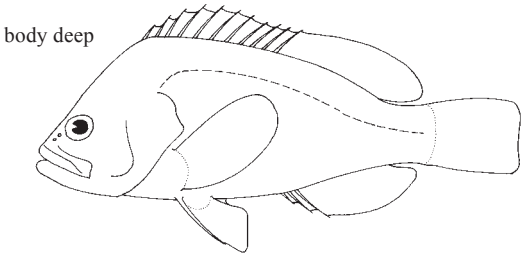


Fig. 13 ***Dermatolepis***

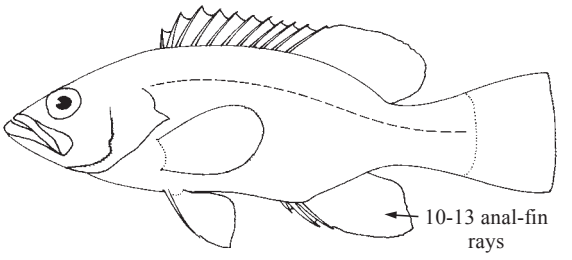


Fig. 14 ***Mycteroperca***

13a. Anal-fin rays 10 to 13 (Fig. 14) . . . . . ***Mycteroperca***

13b. Anal-fin rays 7 to 9 (rarely 10) (Fig. 15) . . . . . ***Epinephelus***

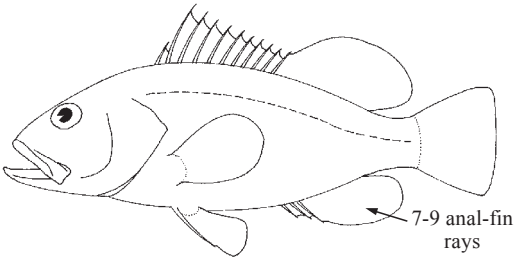


Fig. 15 ***Epinephelus***

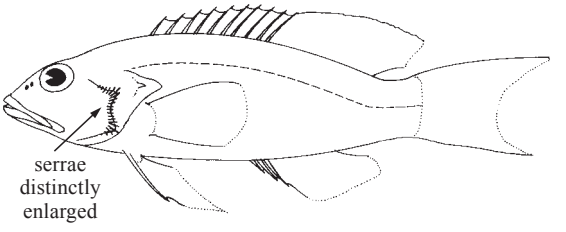


Fig. 16 ***Diplectrum***

14a. Preopercle expanded posteriorly, serrae distinctly enlarged or spinous; no scales on dorsal fin; dorsal fin with 10 spines and 11 to 13 rays; anal fin with 3 spines and 6 to 8 soft rays (Fig. 16) . . . . . ***Diplectrum***

14b. Preopercle not expanded posteriorly, the serrae at the angle only slightly enlarged . . . . . → ***15***

15a. Upper jaw distinctly protrusile; jaw teeth rudimentary or absent; no teeth on vomer or palatines; body slender, the depth 20 to 23% standard length; posterior process of premaxilla relatively narrow and near middle of alveolar ramus (Fig. 17a) . . . . . → ***16***

15b. Upper jaw moderately protrusile; jaw teeth distinct; vomer and palatines with teeth; body depth 27 to 48% standard length; posterior process of premaxilla broad and near tip of alveolar ramus (Fig. 17b) . . . . . → ***17***

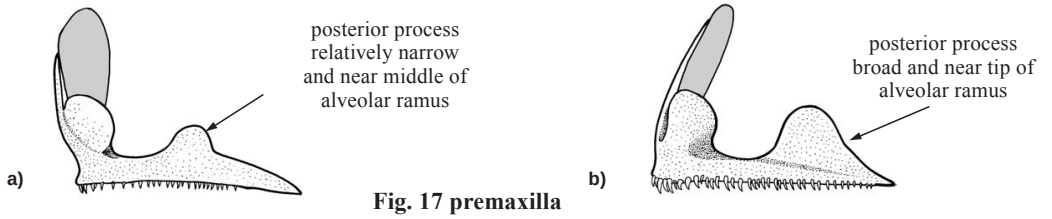


Fig. 17 premaxilla

16a. No teeth in jaws; branchiostegal rays 6; dorsal fin with 10 spines and 11 or 12 soft rays, margin not deeply notched; middle opercle spine straight (horizontal); body orange-brown; irregular bluish white blotches and spots on body and fins (Fig. 18) . . . . . ***Schultzea beta***

16b. Jaws with 1 row of minute teeth; branchiostegal rays 7; dorsal fin with 10 spines and 10 soft rays, margin deeply notched between spinous and soft-rayed parts; middle opercle spine curves dorsally (Fig. 19) . . . . . ***Parasphyraenops***

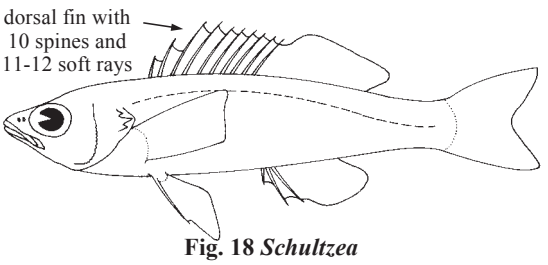


Fig. 18 *Schultzea*

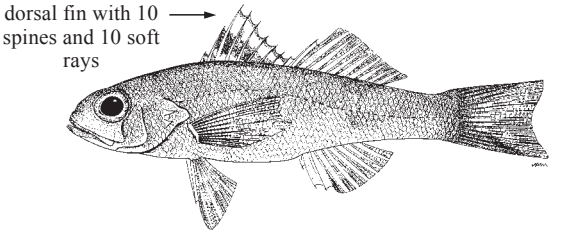


Fig. 19 *Parasphyraenops*

17a. Body deep (Fig. 20), compressed, the depth contained 2.1 to 2.4 times in standard length; dorsal fin with 10 spines and 14 to 17 soft rays, the interspinous fin membranes not incised; lateral-line scales 48 to 53; gill rakers on first arch 6 to 8 on upper limb and 11 to 15 on lower limb; pelvic fins reach to or beyond anus . . . . . ***Hypoplectrus***

17b. Body not so deep and compressed, depth 2.3 to 3.7 times in standard length; dorsal fin with 10 spines and 10 to 16 soft rays, the interspinous fin membranes distinctly incised; lateral-line scales 28 to 64; total gill rakers on first arch 9 to 48 . . . . . → ***18***

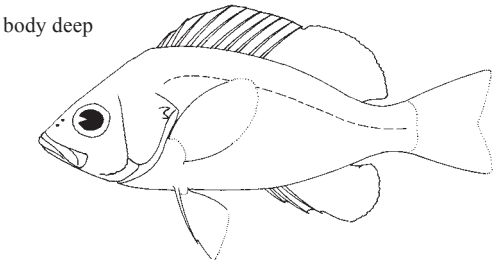


Fig. 20 *Hypoplectrus*

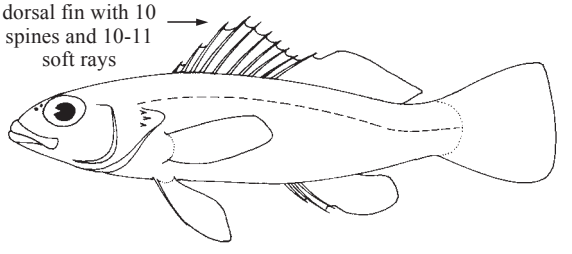


Fig. 21 *Serraniculus*

18a. Branchiostegal rays 6; dorsal fin with 10 spines and 10 or 11 soft rays (Fig. 21); lateral-line scales 40 to 46; head and body mottled dark brown; pale blue spots on soft dorsal and caudal fins; total gill rakers on first arch 9 to 13; maximum size 6 cm standard length . . . . . ***Serraniculus pumilio***

18b. Branchiostegal rays 7; dorsal fin with 10 spines and 10 to 17 rays; lateral-line scales 28 to 64; total gill rakers on first arch 14 to 48 . . . . . → ***19***

19a. Scales large, 28 or 29 in lateral line; dorsal fin with 10 spines and 15 to 17 soft rays; preopercle with 1 to 3 strong antrorse spines on lower edge; total gill rakers 14 to 18 (Fig. 22) . . . . ***Plectranthias garrupellus***

19b. Scales smaller, 31 to 64 in lateral line; dorsal fin with 10 spines and 10 to 16 soft rays; no strong antrorse spines on preopercle; total gill rakers 14 to 44 . . . . . → ***20***

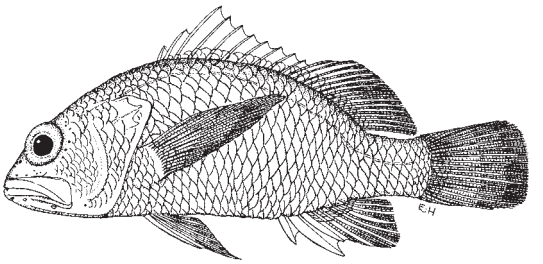


Fig. 22 ***Plectranthias garrupellus***

20a. Branched caudal-fin rays 13 to 15; dorsal fin with 10 spines and 10 to 14 soft rays; total gill rakers on first arch 14 to 31 . . . . . → ***21***

20b. Branched caudal-fin rays 13; dorsal fin with 10 spines and 13 to 16 soft rays; total gill rakers on first arch 34 to 44 . . . . . → ***24***

21a. Caudal fin of adults sinuous or trilobed, the upper, middle, and lower rays elongated (Fig. 23); dorsal-fin rays 10 to 12; interspinous dorsal-fin membranes forming a short filament at tips of most spines; pectoral-fin rays 16 to 20; lateral-line scales 46 to 49 . . . . . ***Centropristis***

21b. Caudal fin of adults truncate, or emarginate; dorsal fin rays 10 to 14; no obvious filaments at tips of dorsal-fin spines; pectoral-fin rays 13 to 18; lateral-line scales 39 to 63 . . . . . → ***22***

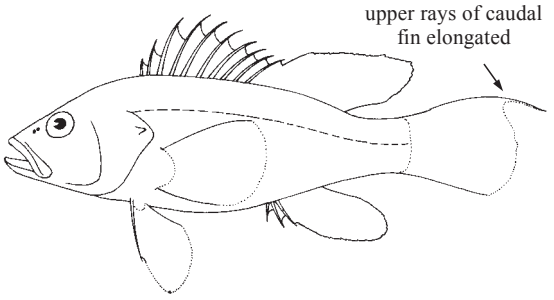


Fig. 23 ***Centropristis***

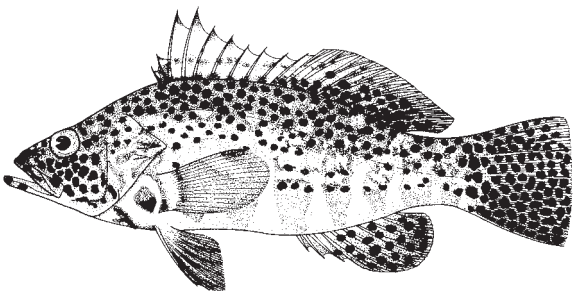


Fig. 24 ***Paralabrax dewegeri***

22a. Lateral-line scales 55 to 63; dorsal fin with 10 spines and 13 or 14 soft rays, the third and fourth spines distinctly longer than fifth and sixth spines; pectoral-fin rays 17; large dark spot at pectoral-fin base, with a dark band in front and behind (Fig. 24) . . . . . ***Paralabrax dewegeri***

22b. Lateral-line scales 39 to 55; dorsal fin with 10 spines and 10 to 13 soft rays, the third and fourth spines not much longer than fifth and sixth spines; pectoral rays 13 to 18; colour pattern at pectoral-fin base not as in 22a . . . . . → ***23***

23a. Pectoral-fin rays 18; caudal-fin branched rays 7+6; dark oval spot at caudal-fin base and large dark blotch on first 2 rows of scales below lateral line at middle of body . . ***Centropristis fuscula***

23b. Pectoral-fin rays 13 to 17; caudal-fin branched rays 8+7 . . . . . ***Serranus***

24a. Maxilla and most or all of interorbital area naked (Fig. 25) . . . . . ***Hemanthias***
24b. Maxilla and interorbital area scaly (Fig. 26) . . . . . → ***25***

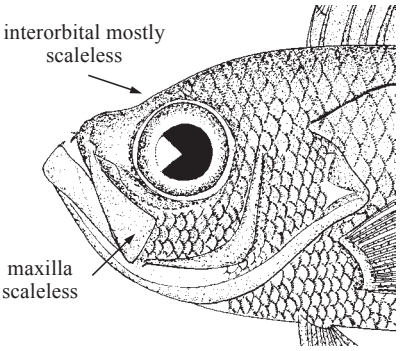


Fig. 25 lateral view of head (*Hemanthias*)

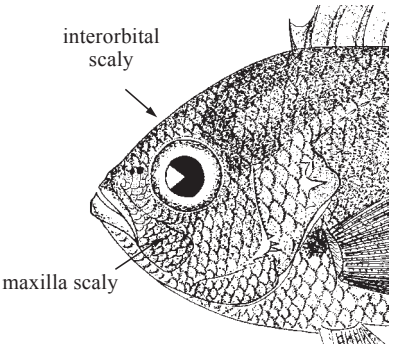


Fig. 26 lateral view of head (*Pronotogrammus*)

25a. Vomerine tooth patch elongated posteriorly; large oval patch of teeth on tongue; soft dorsal-fin rays 13 to 16; pectoral-fin rays 16 to 18; lateral-line scales 35 to 41 (Fig. 27)
. . . . . ***Pronotogrammus martinicensis***
25b. Vomerine tooth patch triangular or V-shaped; tongue usually without teeth; soft dorsal-fin rays 14 or 15; pectoral-fin rays 18 to 21; lateral-line scales 31 to 57 (Fig. 28) . . . . . ***Anthias***

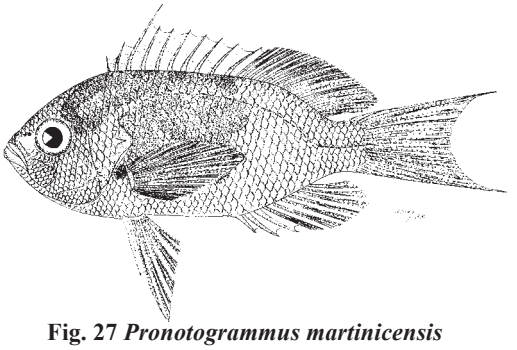


Fig. 27 *Pronotogrammus martinicensis*

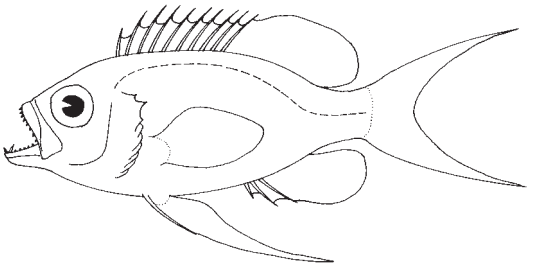


Fig. 28 *Anthias*

Key to the species of *Anthias* and *Hemanthias* occurring in the area

Remarks on key charcters: a)counts of gill rakers are of those on the first gill arch, including rudiments, if present; b) counts of lateral-line scales are of tubed scales; c) counts of circum-caudal-peduncular scales are of the least number of scales around the narrowest part of the caudal peduncle.

1a. Maxilla naked (Fig. 25) . . . . . → ***2***
1b. Maxilla scaly (Fig. 26) . . . . . → ***4***

2a. Lateral-line scales 54 to 62; circum-caudal-peduncular scales 40 to 46; pelvic-fin length 24 to 76% standard length (40 to 76% standard length in specimens greater than about 19 cm standard length); caudal fin deeply forked in specimens less than about 20 cm standard length, becoming less deeply forked with growth; caudal fin truncate (or nearly so) with a median notch in specimens greater than about 31 cm standard length . . . . . ***Hemanthias leptus***
2b. Lateral-line scales 42 to 53; circum-caudal-peduncular scales 22 to 29; pelvic-fin length 24 to 38% standard length; caudal fin deeply forked . . . . . → ***3***

3a. Usually, several dorsal-fin spines with long filaments, filament of fourth dorsal-fin spine up to 65% standard length; preopercle usually with 1 to several serrae enlarged into spines or spine-like processes at angle; pectoral-fin rays 16 to 21 (usually 18 or 19); soft dorsal-fin rays 13 or 14 (usually 14) . . . . . ***Hemanthias vivanus***

3b. Dorsal-fin spines without long filaments (spines may have short filaments); preopercle serrate, but without well-developed spines or spine-like processes at angle; pectoral-fin rays 15 to 19 (usually 16 or 17); soft dorsal-fin rays 13 to 16 (usually 15) . . . . ***Hemanthias aureorubens***

4a. Lateral line interrupted for short distance ventral to base of soft dorsal fin; lateral-line scales 51 to 57; posterior border of anterior nostril produced into slender filament that reaches or falls slightly short of orbit when reflected; 2 nostrils on each side of head fairly well separated, internarial distance 4 to 5 times in snout length; body depth at first dorsal-fin spine 26 to 32% standard length; head length 28 to 32% standard length; total gill rakers on first arch 34 to 39 (usually 35 to 37); soft rays in anal fin 7 to 9 (almost always 8) . . . . . ***Anthias tenuis***

4b. Lateral line continuous, not interrupted; lateral-line scales 31 to 48; posterior border of anterior nostril produced into short flap, but never produced into long slender filament; 2 nostrils on each side of head close together, internarial distance 7 to 15 times in snout length; body depth at first dorsal-fin spine 34 to 44% standard length; head length 34 to 40% standard length; total gill rakers on first arch 38 to 44; soft rays in anal fin 6 to 8 (usually 7) . . . . . → ***5***

5a. Lateral-line scales 31 to 34; sum of lateral-line scales plus total number of gill rakers, in individual specimens, 71 to 76; caudal-fin lobes moderate (length of upper lobe 31 to 49% standard length) . . . . . ***Anthias nicholsi***

5b. Lateral-line scales 36 to 48; sum of lateral-line scales plus total gill rakers, in individual specimens, 75 to 88; caudal-fin lobes moderately to well produced (length of upper lobe 49 to 110% standard length) . . . . . → ***6***

6a. Lateral-line scales 42 to 48; midline of gular region with scales; soft dorsal-fin rays 14 (occasionally 15); pelvic-fin length 27 to 41% standard length . . . . . ***Anthias woodsi***

6b. Lateral-line scales 36 to 41; gular region without scales; soft dorsal-fin rays 15; pelvic-fin length 35 to greater than 64% standard length . . . . . ***Anthias asperilinguis***

Key to the species of *Bathyanthias* occurring in the area

1a. Dorsal fin with 9 spines and 14 soft rays . . . . . ***Bathyanthias roseus***

1b. Dorsal fin with 8 spines and 13 or 14 soft rays . . . . . ***Bathyanthias cubensis***

Key to the species of *Centropristis* occurring in the area

1a. Caudal fin of adults sinuous or trilobed, the uppermost, middle, and lowermost rays elongated (Fig. 29a); juveniles with rounded caudal fin; dorsal-fin with short filaments at tips of spines; dorsal-fin rays 11 (rarely 10 or 12); caudal-fin branched rays 15; total gill rakers on first arch (including rudiments) 17 to 29 . . . . . → ***2***

1b. Caudal fin of adults emarginate (Fig. 29b); no obvious filaments at tips of dorsal-fin spines; dorsal-fin rays 12; caudal-fin branched rays 13; dark oval spot at caudal-fin base and a large dark blotch on first 2 rows of scales below lateral line at middle of body; total gill rakers on first arch 20 . . . . . ***Centropristis fuscula***

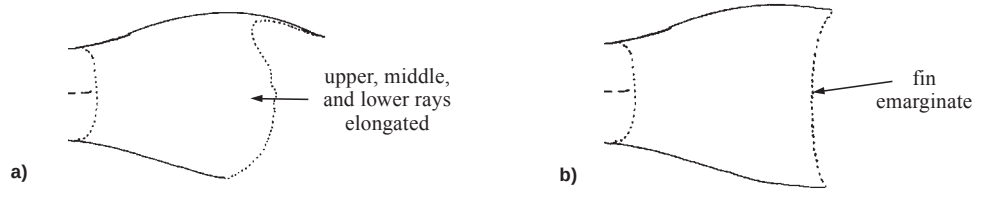


Fig. 29 caudal fins

2a. Adults dark, with a pale spot on each scale, forming longitudinal series of silvery spots; dorsal-fin spines silvery blue, the membranes black, with silvery streaks and spots; irregular pale blotches often visible on dorsal part of body; juveniles mottled with brown blotches and small white spots, a dark brown or black midlateral band from eye to base of caudal fin; large black spot at base of last 3 dorsal spines; turquoise horizontal streaks on lower part of head; total gill rakers 21 to 29 . . . . . ***Centropristis striata***

2b. Body pale, with 7 more or less distinct, dark vertical bars; dorsal and caudal fins pale, with several dark spots and a few smaller white spots; total gill rakers 17 to 22 . . . . . → ***3***

3a. Dorsal spines with short filaments rarely extending past spine tips; no large black spot at base of last 3 dorsal-fin spines; dark bars on body blackish brown and distinct, the lower third of bars often separated as a longitudinal series of black blotches; dorsal and caudal fins with small black spots; adult with violet streaks on front of head, upper jaw and lip; interorbital width 6 to 9% standard length . . . . . ***Centropristis ocyurus***

3b. Dorsal fin filaments often extending past spine tips; a large black spot at base of last 3 dorsal-fin spines; dark bars on body brownish, not well defined; dark spots on dorsal and caudal fins reddish brown or golden brown; interorbital width 4 to 6% standard length . . . . . ***Centropristis philadelphica***

Key to the species of *Cephalopholis* occurring in the area

1a. Head, body, and fins pale grey, brown, or olive green, covered with orange-brown or reddish spots; 4 distinct spots, which can change rapidly from black to white or back again, on body at base of dorsal fin; anal-fin rays 8; pectoral-fin rays 16 . . . . . ***Cephalopholis cruentata***

1b. Head and body covered with small dark-edged pale blue spots; 2 small black spots on top of caudal peduncle and 2 at tip of lower jaw; anal-fin rays 9; pectoral-fin rays 17 to 19 . . . . . ***Cephalopholis fulva***

Key to the species of *Diplectrum* occurring in the area

1a. Preopercle with 2 clusters of spines (enlarged serrae) (Fig. 30a); cheek-scale rows (from eye to rear lower corner of preopercle) 10 to 15; lateral-scale series 66 to 88 . ***Diplectrum formosum***

1b. Preopercle with 1 cluster of spines (Fig. 30b); cheek-scale rows 7 to 12; lateral-scale series 54 to 75 . . . . . → ***2***

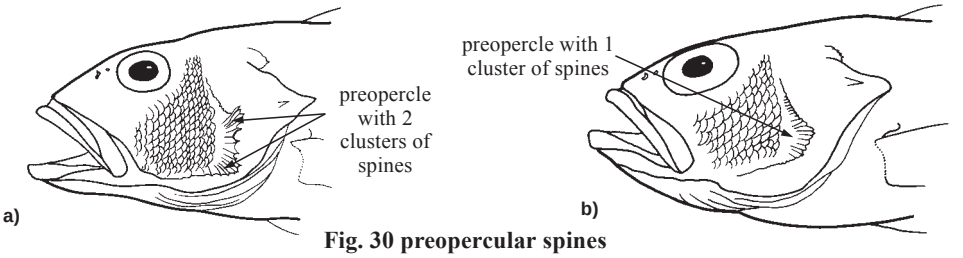


Fig. 30 preopercular spines

2a. Preopercle lobe pointed; pectoral-fin rays 14 to 16; greatest eye diameter more than preorbital width (measured from eye to ventral edge of preorbital bone) . . . . ***Diplectrum bivittatum***

2b. Preopercle lobe rectangular; pectoral-fin rays 16 to 18; greatest eye diameter less than preorbital width . . . . . ***Diplectrum radiale***

Key to the species of *Epinephelus* occurring in the area

1a. Dorsal-fin rays 13 to 15; anal-fin rays 9; pelvic-fin origin in front of vertical at lower end of pectoral-fin base; pelvic fins (of fish 10 to 50 cm standard length) about equal to or longer than pectoral fins; head and body not covered with dark red spots . . . . . → ***8***

1b. Dorsal-fin rays 14 to 18; anal-fin rays 8 to 10; pelvic-fin origin below or behind lower end of pectoral-fin base; pelvic fins not longer than pectoral fins (usually less than 90% pectoral-fin length) . . . . . → ***2***

2a. Anal-fin rays 8 to 10; rear margin of caudal fin truncate or concave . . . . . → *3*

2b. Anal-fin rays 8; caudal fin convex or rounded . . . . . → *4*

3a. Dorsal-fin membranes distinctly incised between the spines, the third or fourth spine longest; adults dark reddish brown, the head, body and median fins covered with small white spots (most spots smaller than pupil); juveniles bright yellow, covered with small bluish white spots . . . . . ***Epinephelus drummondhayi***

3b. Interspinous dorsal-fin membranes not incised; second or third dorsal-fin spine longest; head and body dark reddish brown, usually with irregular pale spots and blotches, and black dots on snout and cheek; median fins dark distally, with a narrow white edge; inside of mouth red to orange . . . . . ***Epinephelus morio***

4a. Third to eleventh dorsal-fin spines about equal and distinctly shorter than anterior dorsal-fin rays; head and body very broad, the greatest body width equals half or more of body depth . . . . . ***Epinephelus itajara***

4b. Second, third, or fourth dorsal-fin spines longest, longer than anterior dorsal rays; body width usually less than half of body depth . . . . . → *5*

5a. Head and body covered with dark orange-brown or dark red spots . . . . . → *6*

5b. No dark orange-brown or dark red spots . . . . . → *7*

6a. Black saddle blotch on caudal peduncle and 3 to 5 dark blotches at base of dorsal fin; no blackish margin on soft-rayed part of dorsal fin; pectoral-fin rays 18 to 20 . . . ***Epinephelus adscensionis***

6b. No black saddle on peduncle; no dark blotches at base of dorsal fin; soft-rayed part of dorsal fin with blackish margin; pectoral-fin rays 16 to 18 . . . . . ***Epinephelus guttatus***

7a. Head and body pale, with irregular dark bars or bands (but colour can change from almost white to uniform dark brown in less than a minute); black saddle blotch on peduncle; black dots below and behind eye; dark tuning-fork mark between the eyes; lateral-line scales about 50 . . . . . ***Epinephelus striatus***

7b. Head and body brownish, usually with irregular pale spots or blotches; no dark marks on top of head; lateral-line scales 62 to 73 . . . . . ***Epinephelus marginatus***

8a. Dorsal-fin spines 10, the second spine longest, twice length of tenth spine; adults dark reddish brown or brownish grey to black; juveniles with yellow caudal fin and scattered white spots on body; no black bar or saddle blotch on caudal peduncle . . . . . ***Epinephelus nigritus***

8b. Dorsal-fin spines 11, the third or fourth longest, but scarcely longer than tenth spine; juveniles (less than 20 cm standard length) with a black bar or saddle blotch on caudal peduncle . . . . . → *9*

9a. Body brownish, with 8 or 9 dark bars (last 2 bars may be fused into a wide band on caudal peduncle) . . . . . ***Epinephelus mystacinus***

9b. No dark bars on body . . . . . → *10*

10a. Interspinous dorsal-fin membranes not deeply incised, their margin yellow or yellowish green in juveniles and small adults; nostrils subequal; a pearly blue line from eye to corner of preopercle; black saddle on caudal peduncle not reaching below lateral line . . . . . ***Epinephelus flavolimbatus***

10b. Interspinous dorsal-fin membranes deeply incised, their margin black; no blue line from eye to preopercle; posterior nostrils 3 to 5 times larger than anteriors (except in fish less than 15 cm standard length); black saddle on caudal peduncle of juveniles reaching below lateral line . . . . . ***Epinephelus niveatus***

Key by colour to the *Hypoplectrus* species occurring in the area

1a. Body flank with barred body pattern . . . . . → *2*
1b. Body flank not barred . . . . . → *3*

2a. Body colour blue with bars . . . . . *Hypoplectrus indigo*
2b. Body colour brown with bars and with tiny blue snout spots . . . . . *Hypoplectrus puella*

3a. Body colour solid bright pale blue . . . . . → *4*
3b. Body colour not solid bright blue . . . . . → *5*

4a. Caudal fin with black on outside rays . . . . . *Hypoplectrus gemma*
4b. Fins without black rays . . . . . *Hypoplectrus* **sp. 'Belize'**

5a. Body colour whitish . . . . . → *6*
5b. Body colour not white . . . . . → *7*

6a. White body with dark bar through eye; no snout spots . . . . . *Hypoplectrus providencianus*
6b. Plain white body; spot(s) present or absent on snout caudal peduncle . . . . *Hypoplectrus unicolor*

7a. Body and fins coloured yellow or mixed blue, blue-black and yellow . . . . . → *8*
7b. Body colour solid tan to black, fins hyaline or black . . . . . → *12*

8a. Body solid yellow with snout spots . . . . . *Hypoplectrus gummigutta*
8b. Body colour not solid yellow . . . . . → *9*

9a. Body and fins all dark blue to black with yellow caudal fin; no snout spots . . *Hypoplectrus chlorurus*
9b. Body colour mixed yellow and blue or blue-black . . . . . → *10*

10a. Body bicoloured with dark blue dorsally and yellow ventrally; dorsal fin same colour as upper flank (dark blue); snout spots tiny, if any . . . . . *Hypoplectrus aberrans*
10b. Body bicoloured blue and yellow with large snout spots . . . . . → *11*

11a. Body colour split anteriorly-posteriorly with yellow (ventrally and posterior) and blue (dorsally and anterior), with distinct snout spots . . . . . *Hypoplectrus guttavarius*
11b. Body blue dorsally and yellow ventrally; snout spots present . . . . . *Hypoplectrus* **cf.** *maculiferus*

12a. Body black to tan; no snout spots . . . . . *Hypoplectrus nigricans*
12b. Body tan; spot present on snout, pectoral-fin base, and caudal peduncle . . . *Hypoplectrus* **sp. 'tan'**

Key to the species of *Liopropoma* occurring in the area

1a. Head and body with 5 red, reddish brown, or orange longitudinal stripes . . . . . → *2*
1b. Colour pattern not with 5 reddish longitudinal stripes . . . . . → *3*

2a. Head and body with reddish brown stripes; black spot at anal fin margin; 2 black spots at rear margin of caudal fin connected medially; snout length contained 3.7 to 4.6 times in head length . . . . . *Liopropoma rubre*
2b. Head and body with reddish orange stripes; no black spot on anal fin; a blue-edged black spot in each corner of caudal fin; snout length contained 4.7 to 5.0 times in head length . . . . . *Liopropoma carmabi*

3a. Broad yellow-edged, dark reddish brown midlateral stripe from tip of snout to caudal fin; soft dorsal and anal fins immaculate; rear margin of caudal fin white, with a submarginal black area merging with the dark brown midlateral stripe . . . . . ***Liopropoma eukrines***

3b. Head and body rosy orange, salmon, dark red, or reddish grey; no midlateral dark stripe . . . . . → ***4***

4a. Head and body salmon to dark red or reddish grey; yellow band from tip of snout to eye; fins orange or reddish; rear margin of caudal fin white, with a submarginal black zone; small black spot at margin of soft dorsal fin; (some specimens also have a black spot at anal-fin margin) . . . . . ***Liopropoma mowbrayi***

4b. Head and body rosy orange; dorsal body scales with a yellow spot, which change to orange below lateral line; median fins yellow; yellow stripe from tip of snout to opercle . . . . . ***Liopropoma aberrans***

Key to the species of *Mycteroperca* occurring in the area

1a. Total gill rakers on first arch 48 to 55; body depth contained 2.7 to 3.2 times in standard length; head and body greyish brown, covered with irregular white spots and blotches; 3 or 4 dark brown stripes running posteriorly from eye and continuing along lower half of body as wavy dark stripes . . . . . ***Mycteroperca acutirostris***

1b. Total gill rakers on first arch 11 to 41; body depth 2.9 to 3.6 times in standard length; colour not as in 1a . . . . . → ***2***

2a. Preopercle (of fish larger than 30 cm) with a distinct notch above the serrate lobe at angle . . . . . → ***3***

2b. Preopercle edge without a distinct notch or lobe . . . . . → ***6***

3a. Median fins of adults without exserted rays; head and body brownish or grey, with dark blotches or mottling on sides and dorsally; ventral parts generally pale, but large males often have a dark grey swath from above pelvic fins to underside of caudal peduncle; lateral line scales 88 to 96; lateral-scale series 128 to 146 . . . . . ***Mycteroperca microlepis***

3b. Some median fin rays produced beyond fin membranes in large adults; colour not as in 3a; lateral-line scales 70 to 82; lateral-scale series 108 to 128 . . . . . → ***4***

4a. Total gill rakers on first arch 23 to 27; dorsal 1/2 of body with small close-set brown spots; large adults almost uniform brown dorsally; pectoral fins dark with white margin; mouth and spinous dorsal-fin margin yellow; juveniles bicoloured, dark above and light below; exserted rays (of adults) project equally beyond caudal-fin membrane; pelvic-fin 15 to 17% standard length . . . . . ***Mycteroperca interstitialis***

4b. Total gill rakers on first arch 27 to 41; colour not as in 4a; exserted caudal-fin rays (present only in adults) uneven . . . . . → ***5***

5a. Body pale greyish brown, covered (except ventrally) with small, dark reddish brown spots; pectoral-fin membrane clear, the rays dark, the fin margin pale; lower limb gill rakers on first arch 17 to 21; pelvic-fin length 18 to 20% standard length . . . . . ***Mycteroperca phenax***

5b. Adults pale brown, with yellowish grey pectoral fins; juveniles greenish brown, with irregular brown spots on body; soft dorsal and anal fins with white edge and broad dark submarginal zone; lower gill rakers on first arch 21 to 26 (Jamaica and Caribbean coast of Venezuela) . . . . . ***Mycteroperca cidi***

6a. Developed gill rakers on lower-limb of first arch 4 to 8; body with about 8 or 9 pale oblique lines dorsally, continued below into a pale reticulate pattern; median fin rays exserted in large adults . . . . . ***Mycteroperca tigris***

6b. Developed gill rakers on lower limb of first arch 9 to 16; colour pattern not as in 6a; no exserted fin rays . . . . . → ***7***

7a. Adults with distal third of pectoral fins bright yellow, sharply demarcated from rest of fin; small red spots on lower part of head and body; rear nostrils about twice size of front nostrils; total gill rakers on first arch 24 to 27 . . . . . ***Mycteroperca venenosa***

7b. Pectoral fins of adults with narrow orange or white margin that shades gradually into rest of fin; sides of head and body ventrally with yellowish brown spots surrounded by a pale blue network; total gill rakers on first arch 17 to 24; rear nostils not much larger than front nostrils . . . . . ***Mycteroperca bonaci***

Key to the species of *Parasphyraenops* occurring in the area

1a. Preorbital bone expanded posteriorly, covering most of maxilla when mouth is closed, and running along entire length of third infraorbital bone; anal-fin rays 6; body pale, with black blotch in axil of pectoral fin . . . . . ***Parasphyraenops atrimanus***

1b. Preorbital narrow, overlapping only the anterior end of third infraorbital; maxilla mostly exposed when mouth is closed; anal-fin rays 7; body pale, with 2 dark, longitudinal stripes . . . . . ***Parasphyraenops incisus***

Key to the species of *Rypticus* occurring in the area

1a. Head and body usually pale, with dark markings . . . . . → ***2***

1b. Head and body dark, with or without pale markings . . . . . → ***4***

2a. Dorsal fin with 3 or 4 spines and 20 to 24 soft rays; colour olive green to reddish brown; with small, widely spaced, dark red-brown to black spots, limited to head and front of body in adults . . . . . ***Rypticus subbifrenatus***

2b. Dorsal fin with 2 spines and 24 to 27 soft rays . . . . . → ***3***

3a. Head and body dark dorsally, pale below and covered with small dark spots . . ***Rypticus bistrispinus***

3b. Head with large dark spots, some as large or larger than pupil . . . . . ***Rypticus bornoi***

4a. Body dark brown with pale blotches or distinct pale spots; snout length 6 to 9% standard length . . . . . → ***5***

4b. Head and body uniformly dark brown; pores on lower jaw and margin of preopercle few, large, and distinct; snout length 5 to 6% standard length . . . . . ***Rypticus randalli***

5a. Dorsal-fin spines 3; body with pale blotches; jaws and belly mottled; pores on lower jaw and preopercle margin numerous, small, in scattered patches . . . . . ***Rypticus saponaceus***

5b. Dorsal-fin spines usually 2; body with distinct, small, pale spots; jaws and belly uniformly pale; pores on lower jaw and preopercle single, distinct . . . . . ***Rypticus maculatus***

Key to the species of *Serranus* occurring in the area

1a. Middle opercle spine enlarged and curving distinctly upward; preorbital enlarged, the snout length 12 to 14% standard length; caudal fin forked, the upper lobe longest; lateral-line scales 50 to 55 . . . . . ***Serranus luciopercanus***

1b. Middle opercle spine not curved upward; snout length 7 to 12% standard length; caudal fin truncate or emarginate; lateral-line scales 39 to 52 . . . . . → ***2***

2a. Head and body pale, without dark markings (live colour unknown); eyes huge, their horizontal diameter contained 2.5 to 2.9 times in head length; top of head scaly to level of rear edge of pupil; body scales of adults rather deciduous; lateral-line scales 45 to 50; gill rakers 19 to 23 . . . . . ***Serranus maytagi***

2b. Head and body not uniformly pale; eye diameter contained more than 3 times in head length . . . . . → ***3***

3a. Top of head scaly forward to rear end of interorbital region; opercle spines poorly developed (Fig. 31a); scales weakly ctenoid and often deciduous . . . . . → ***4***

3b. Top of head naked; opercle spines well developed (Fig. 31b); scales strongly ctenoid, not deciduous . . . . . → ***5***

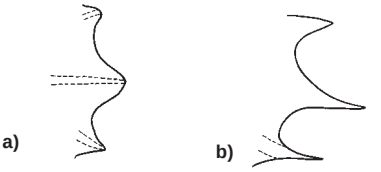


Fig. 31 opercular spines

4a. Inner surface of opercle with black mark just anterior to and slightly below middle spine (mark is wedge-shaped in fish from Gulf of Mexico, more ovate in Caribbean fish and roundest in fish from Brazil); rows of cheek scales 5; fish from northern Gulf uniformly pale brown, but southern specimens (from Venezuela and Brazil) show a distinct dark bar from bases of eighth and ninth dorsal-fin spines toward (but not quite reaching) anus; total gill rakers on first arch 15 to 20; pectoral-fin rays 15 to 17 . . . . . ***Serranus atrobranchus***

4b. No black mark on inner side of opercle; black blotch in middle of soft dorsal fin, usually continued ventrally on body as a dark bar; body usually dusky, with a white area from anus to lateral line and a dark vertical bar on caudal peduncle; head silvery, with a broad brown band from eye to interopercle; juveniles with nearly vertical black bar on body from dorsal-fin spines 3, 4, and 5 and another from dorsal-fin soft rays 5, 6, and 7, both bars cross dorsal fin and become fainter on ventral part of body; 3 dark stripes: the first from eye to upper caudal peduncle; second stripe from behind eye to base of first dorsal soft-ray, and third stripe from nape to base of fourth dorsal-fin spine . . . . . ***Serranus notospilus***

5a. Body reddish brown; belly white, sharply delimited from surrounding colour; large black blotch on anterior soft dorsal-fin rays and continuing ventrally on body as the first of 4 dark vertical bars; median and pectoral fins covered with small dark brown or blackish spots; dorsal-fin soft rays 12 to 14; pectoral-fin rays 15 to 17; gill rakers 15 to 19; lateral-line scales 42 to 46 . . . . . ***Serranus subligarius***

5b. Colour not as in 5a; dorsal-fin soft rays 10 to 12 (rarely 13); pectoral-fin rays 13 to16; gill rakers on first arch 14 to 31; lateral-line scales 39 to 52 . . . . . → ***6***

6a. Body depth contained 2.7 to 3.0 times in standard length; caudal fin mottled, with 2 distinct black spots, one above the other, at fin base; body mottled brown, with 7 faint dark bars; prominent white area on belly; pectoral-fin rays 16 or 17; gill rakers on first arch 15 to 18; lateral-line scales 39 to 44 . . . . . ***Serranus flaviventris***

6b. Body depth 2.9 to 3.9 times in standard length; colour pattern not as in 6a; pectoral-fin rays 13 to 16; gill rakers on first arch 14 to 25; lateral-line scales 42 to 52 . . . . . → ***7***

7a. Head and body pale brownish orange, with large pale blotches dorsally; caudal fin with black 'V' formed by submarginal black stripes along upper and lower edges of fin, the edges pale greenish blue in live fish; juveniles with black blotches dorsally; pectoral-fin rays 15; dorsal-fin margin notched before soft-rayed part, the fourth and fifth spines distinctly longer than tenth spine; gill rakers on first arch 21 to 25; lateral-line scales 50 to 52 . . . . . ***Serranus tabacarius***

7b. Colour not as in 7a; pectoral-fin rays 13 to 16; dorsal-fin margin not notched before soft-rayed part, the fourth and fifth spines not much longer than tenth spine; gill rakers on first arch 14 to 20; lateral-line scales 42 to 51 . . . . . → ***8***

8a. Head and front of body dark brown, with several irregular blue stripes in life; a series of 6 or 7 dark brown or blackish spots along upper and lower margins of caudal fin; belly (from pectoral-fin base to anus) snow white; body above anal fin reddish brown; soft dorsal and anal fins with brown spots; pectoral-fin rays 13 or 14; lateral-line scales 45 to 47; caudal peduncle scales 26 to 30 . . . . . ***Serranus chionaraia***

8b. Colour not as in 8a; pectoral-fin rays 13 to 16; lateral-line scales 42 to 51; caudal peduncle scales 23 to 39 . . . . . → ***9***

9a. Body pale greenish dorsally, shading to pale yellow ventrally, with 6 or 7 irregular dark brown to black vertical bars and longitudinal rows of small dark blotches, which become vertically elongate in adults; lower part of head and body with black blotches; black spot distally in dorsal fin from third to fifth spines; snout longer than eye diameter; gill rakers on first arch 15 to 19; lateral-line scales 48 to 51 . . . . . ***Serranus tigrinus***

9b. Colour not as in 9a; snout not longer than eye; gill rakers on first arch 17 to 31; lateral-line scales 42 to 51 . . . . . → ***10***

10a. Body brownish, with vertical white bar just before anus; juveniles with dark bar from anterior dorsal-fin spines to belly just in front of white bar (dark bar faint or absent in adults); no dark spots on fins; pectoral-fin rays 15 or 16; gill rakers 17 to 20; lateral-line scales 47 to 51 . . . . . ***Serranus phoebe***

10b. Colour not as in 10a; pectoral-fin rays 13 to 15; lateral-line scales 42 to 51 . . . . . → ***11***

11a. Body orange-brown, shading to white below; 7 pale blue (rarely greenish) bars above lateral line, first on nape, last on caudal peduncle, bars 2 to 6 extend into dorsal fin; body below lateral line with 3 or 4 vertically elongate, chalky blotches; blue bar across top of head just behind eyes; snout and interorbital region bluish green; underwater, the fish is bright blue with black bars; gill rakers on first arch 27 to 31; lateral-line scales 46 to 50; cheek scale rows 5 or 6; lower edge of operculum serrate . . . . . ***Serranus tortugarum***

11b. Colour not as in 11a; gill rakers on first arch 14 to 18; lateral-line scales 42 to 50; cheek scales 6 to 12 . . . . . → ***12***

12a. Caudal-fin base with 4 dark spots in a curved vertical series; a series of 4 to 6 dark brown spots, each with a yellow bar (fish from deep water) or red bar (fish from shallow water) below, from belly to lower edge of caudal peduncle; dark brown stripe or series of blotches along lateral line; cheek scale rows 6 or 7; lateral-line scales 42 to 48; caudal peduncle scales 23 to 26 . . . . . ***Serranus baldwini***

12b. Body orange or salmon dorsally, shading to white ventrally with 7 orange yellow bars; 2 black-edged, yellow-orange blotches behind eye; an irregular dark brown area below spinous dorsal fin; a row of black spots on body along base of dorsal fin; dorsal-fin spines tipped with pale blue; cheek scale rows 10 to 12; lateral-line scales 46 to 50; caudal peduncle scales 31 to 36 . . . . . ***Serranus annularis***

List of species occurring in the area

The symbol is given when species accounts are included.

Alphestes afer (Bloch, 1793).

Anthias asperilinguis Günther, 1859.
Anthias nicholsi Firth, 1933.
Anthias tenuis Nichols, 1920.
Anthias woodsi Anderson and Heemstra, 1980.

Bathyanthias cubensis (Schultz, 1958). 15 cm. Cuba, Gulf of Mexico, Panama, Belize, French Guiana to Venezuela.
Bathyanthias mexicanus (Schultz, 1958). Western Gulf of Mexico.
Bathyanthias roseus (Günther, 1880). 10 cm. Recife, Brazil.

Bullisichthys caribbaeus Rivas, 1971. 7cm. Nicaragua, Dominica, Great Inagua.

Centropristis fuscula Poey,1861. 15 cm. Cuba.
Centropristis ocyurus (Jordan and Evermann, 1887). 30 cm. NC to FL Keys, Gulf of Mexico to Yucatán.
Centropristis philadelphica (Linnaeus, 1758). 30 cm. Virginia to Palm Beach, FL, N Gulf of Mexico.
Centropristis striata (Linnaeus, 1758).
Centropristis rufus Cuvier, 1829. A doubtful species; said to be from Martinique.

Cephalopholis cruentata (Lacepède, 1802).
Cephalopholis fulva (Linnaeus, 1758).

Dermatolepis inermis (Valenciennes, 1833).

Diplectrum bivittatum (Valenciennes, 1828). 25 cm. E coast of FL, FL Keys, W.I. (but not Bahamas) Gulf of Mexico to Brazil; previous records from Bermuda are erroneus.
Diplectrum formosum (Linnaeus, 1766).
Diplectrum radiale (Quoy and Gaimard, 1824). 25 cm. Venezuela to São Paulo Brazil.

Epinephelus adscensionis (Osbeck, 1765).
Epinephelus drummondhayi Goode and Bean, 1878.
Epinephelus flavolimbatus Poey, 1865.
Epinephelus guttatus (Linnaeus, 1758).
Epinephelus itajara (Lichtenstein, 1822).
Epinephelus morio (Valenciennes, 1828).
Epinephelus mystacinus (Poey, 1852).
Epinephelus nigritus (Holbrook, 1855).
Epinephelus niveatus (Valenciennes, 1828).
Epinephelus striatus (Bloch, 1792).

Gonioplectrus hispanus (Cuvier, 1828).

Hemanthias aureorubens (Longley, 1935).
Hemanthias leptus (Ginsburg, 1952).
Hemanthias vivanus (Jordan and Swain, 1885).

Hypoplectrus aberrans Poey, 1868.
Hypoplectrus chlorurus (Cuvier, 1828).
Hypoplectrus gemma Goode and Bean, 1882.
Hypoplectrus gummigutta (Poey, 1851).
Hypoplectrus guttavarius (Poey, 1852).
Hypoplectrus indigo (Poey, 1851).
Hypoplectrus cf. *maculiferus* Poey, 1871.
Hypoplectrus nigricans (Poey, 1852).
Hypoplectrus providencianus Acero and Garzón-Ferreira, 1994.
Hypoplectrus puella (Cuvier, 1828).
Hypoplectrus sp. nov. 'tan.'
Hypoplectrus sp. nov. 'Belize.'
Hypoplectrus unicolor (Walbaum, 1792).

Jeboehlkia gladifer Robins, 1967. 10 mm larva from off New York; adult 41 mm SL, from W Caribbean.

Liopropoma aberrans (Poey, 1860). 11 cm SL. Cuba, Bahamas, Jamaica, Belize.
Liopropoma carmabi (Randall, 1963). 40 mm SL. Florida Keys, W.I., Curaçao, Bonaire.
Liopropoma eukrines (Starck and Courtenay, 1962). 10 cm SL. North Carolina to Florida Keys, NW Gulf of Mexico.
Liopropoma mowbrayi Woods and Kanazawa, 1951. 8 cm SL. Bermuda, S Florida, W.I. Curaçao.
Liopropoma rubre Poey, 1861. 8 cm SL. Bermuda, S Florida, Yucatán, Belize, Honduras, W.I., Curaçao, Venezuela.

Mycteroperca acutirostris (Valenciennes, 1828).
Mycteroperca bonaci (Poey, 1860).
Mycteroperca cidi Cervigón, 1966.
Mycteroperca interstitialis (Poey, 1860).
Mycteroperca microlepis (Goode and Bean, 1879).
Mycteroperca phenax Jordan and Swain, 1884.
Mycteroperca tigris (Valenciennes, 1833).
Mycteroperca venenosa (Linnaeus, 1758).

Paralabrax dewegeri (Metzelaar, 1919).

Paranthias furcifer (Valenciennes, 1828).

Parasphyraenops atrimanus Bean, 1912. Maximum to at least 84 mm SL. Bermuda, Venezuela.
Parasphyraenops incisus (Colin, 1978). Maximum size at least 30 mm SL. Jamaica, Puerto Rico.

Plectranthias garrupellus Robins and Starck, 1961.

Pronotogrammus martinicensis (Guichenot, 1868).

Pseudogramma gregoryi (Breder, 1927). 55 mm SL. Bermuda, S Florida, W.I., Belize, Panama, Colombia, Venezuela, Ascension Island = *Rhegma bermudensis* Kanazawa, 1952.

Rypticus bistrispinus (Mitchill, 1818). 15 cm. E Gulf of Mexico, S Florida, W.I., Venezuela.
Rypticus bornoi Beebe and Tee-Van, 1928. 6 cm. Bahamas, Haiti, Panama
= *Rypticus macrostigma* Courtenay, 1967.
Rypticus maculatus (Holbrook, 1855). 20 cm. North Carolina to Gulf of Mexico.
Rypticus randalli Courtenay, 1967. 20 cm. W.I., Panama to Bahia, Brazil
= *Rypticus brachyrhinus* Courtenay, 1967.
Rypticus saponaceus (Bloch and Schneider, 1801). 33 cm. Bermuda, Bahamas and S Florida to Brazil; W. Africa.
Rypticus subbifrenatus Gill, 1861. 16 cm. Bermuda, Florida Keys, Bahamas, W.I., Panama to Venezuela.

Schultzea beta (Hildebrand, 1940). 12 cm SL. North Carolina, Florida Keys, Bahamas, Mexico, W.I.
= *Schultzea campechanus* Woods, 1958.

Serraniculus pumilio Ginsburg, 1952. 65 mm SL. Continental coast from North Carolina to Venezuela and PR.

Serranus annularis (Günther, 1880). 7 cm SL. Bermuda, Georgia, Florida Keys, NW Gulf of Mexico W.I.,Florida, Guyana, Brazil.
Serranus atrobranchus (Cuvier, 1829). 9 cm SL. Florida, N Gulf of Mexico to N Brazil.
Serranus baldwini (Evermann and Marsh, 1900). 6 cm SL. S Florida, W.I., Venezuela, Suriname
= *Paralabrax maculata* Howell Rivero, 1938.
Serranus chionaraia Robins and Starck, 1961. 5 cm SL. Florida Keys, Honduras, Puerto Rico.
Serranus flaviventris (Cuvier, 1829). 8 cm SL. W.I., Venezuela, Brazil, Uruguay.
Serranus luciopercanus Poey, 1852. 12 cm SL. W.I., Honduras.
Serranus maytagi Robins and Starck, 1961. 9 cm SL. Central Caribbean.
Serranus notospilus Longley, 1935. 8 cm SL. Georgia, Florida Keys, Gulf of Mexico to Suriname.
Serranus phoebe Poey, 1851. 15 cm SL. Bermuda, North Carolina to Florida Keys, NW Gulf of Mexico, W.I., Venezuela, Guyana.
Serranus subligarius (Cope, 1870). 7 cm SL. North Carolina to Texas.
Serranus tabacarius (Cuvier, 1829). 17 cm SL. Bermuda, Georgia, Florida, E Gulf of Mexico, W.I., Venezuela to Brazil.
Serranus tigrinus (Bloch, 1790). 10 cm SL. Bermuda, S Florida W.I., Curaçao, Venezuela.
Serranus tortugarum Longley, 1935. 8 cm SL. S Florida, W.I., Honduras, Panama, Venezuela.

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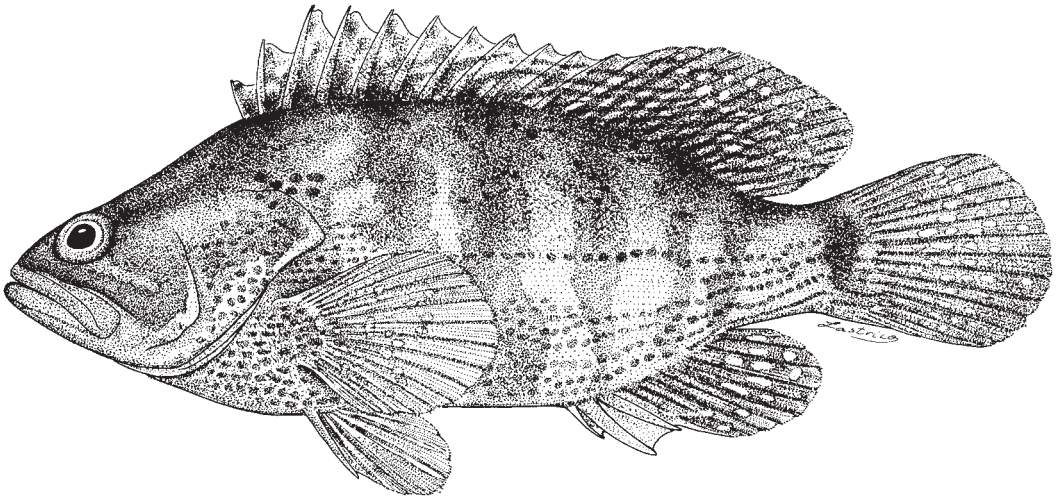
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Alphestes afer (Bloch, 1793) LSF

Frequent synonyms / misidentifications: *Epinephelus afer* (Bloch, 1793) / None.

FAO names: En - Mutton hamlet; **Fr** - Varech; **Sp** - Guaseta



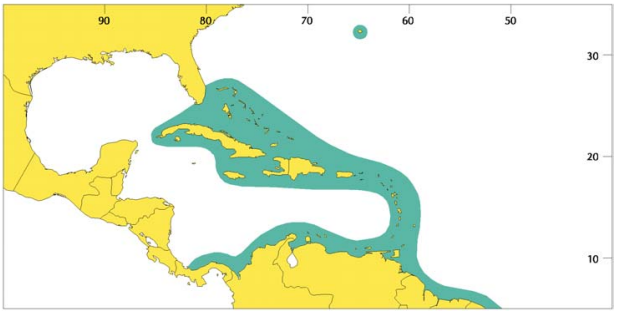
Diagnostic characters: Body depth slightly less than head length, 2.4 to 3.1 in standard length (for fish 13 to 22 cm standard length); caudal peduncle depth 12 to 14% standard length. Eye diameter greater than snout length, 4.1 to 5.3 in head length. Gill rakers on first arch 6 to 8 on upper limb, 16 or 17 on lower limb, 22 to 25 total. Preopercle rounded, the posterior edge distinctly serrate with a large spine (usually hidden by skin) directed downwards and forward at the 'angle'. Caudal fin rounded; dorsal fin with 11 spines and 17 to 19 soft rays; anal fin with 3 spines and 9 soft rays; pectoral fins with 16 or 17 rays. **Scales smooth; lateral-line scales 55 to 61; lateral scale series 68 to 77. Colour:** head, body, and median fins olivaceous or light brown, irregularly blotched and barred with dark brown and densely spotted with orange; head, body, and all fins with scattered, small white spots; pectoral fins orange or yellow with faint brownish reticulations.

Size: Maximum about 33 cm; common to 25 cm.

Habitat, biology, and fisheries: The mutton hamlet is a shallow-water (from shore to at least 35 m depth), cryptically coloured, secretive species. It is sedentary during the day, lying among seaweed or hiding in crevices and next to sponges or rocks in the preferred seagrass habitat. This species relies on its effective camouflage to escape detection, and will sometimes even lie on its side and partly cover itself with sand. With its cryptic coloration and sedentary habits, the mutton hamlet resembles scorpaenid fishes, and can easily be approached or even touched. A nocturnal predator, feeding mainly on benthic crustaceans. Although abundant in the Caribbean area, the mutton hamlet is too small to be of commercial importance. Separate statistics are not reported for this species. Caught on handlines and in traps.

Distribution: Western Atlantic: Bermuda, south Florida, Bahamas, Cuba (and probably most other West Indian islands), Panama, Venezuela to the state of São Paulo, Brazil.

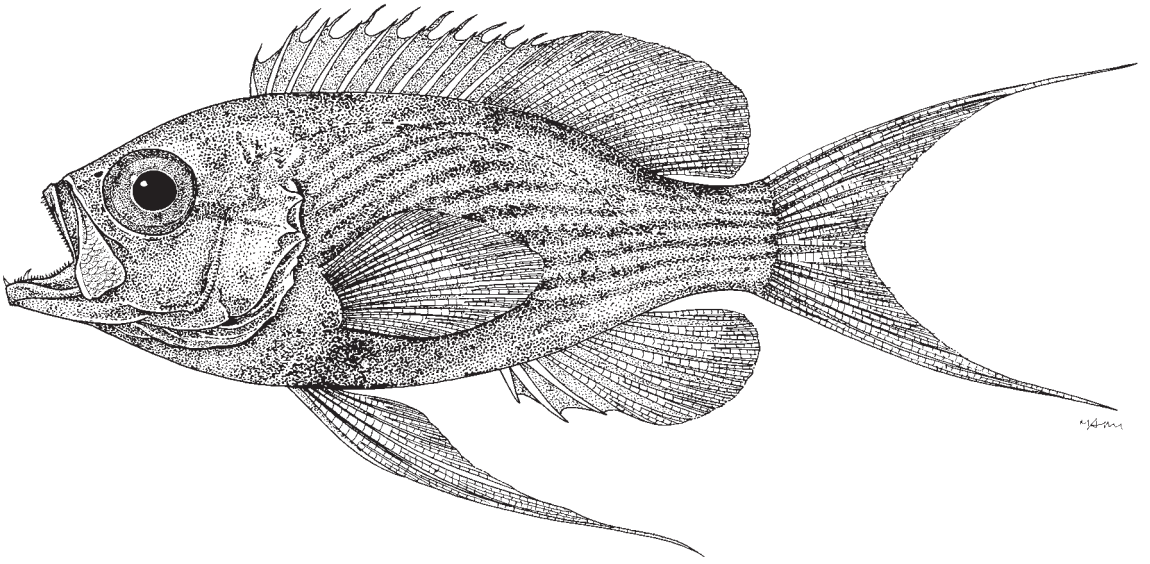
Remarks: Smith (1971) synonymized the eastern Pacific species *Alphestes galapagensis* Fowler, *Alphestes fasciatus* Hildebrand and *Alphestes immaculatus* Breder with the Atlantic spcecies *Alphestes afer*. Subsequently, Heemstra and Randall (1993) recognized these amphi-American populations as distinct species because of their different colour patterns and the greater depth of the caudal peduncle in *A. afer*. The distinctive dark crossbars on the pectoral fins of *A. galapagensis* are lacking in *A. afer*; and *A. afer* usually has 23 or 24 total gill rakers, whereas *A. galapagensis* has 20 to 22 gill rakers.



Anthias asperilinguis Günther, 1859

Frequent synonyms / misidentifications: None / None.

FAO names: En - Jeweled gemfish.

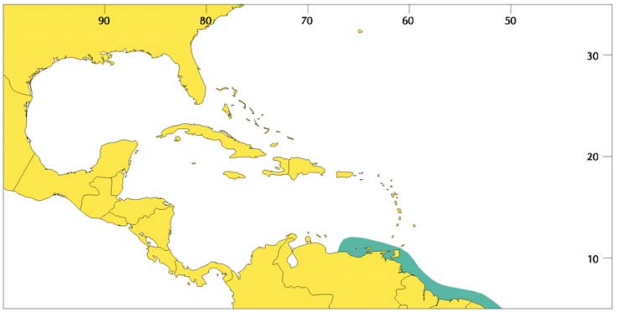


Diagnostic characters: Body moderately deep, depth of body at first dorsal-fin spine 36 to 41% standard length. Head moderate, its length 34 to 37% standard length. Orbit longer than snout, horizontal diameter of bony orbit 11 to 14% standard length. **The 2 nostrils on each side of head close together; internarial distance 8 to 11 times in snout length; posterior border of anterior nostril produced into a short flap, but never produced into a long slender filament**. Upper and lower jaws each with a series of conical teeth; canine or canine-like teeth present anteriorly in both jaws; vomer and palatines with villiform to small conical teeth; **vomerine tooth patch approximately triangular, without posterior prolongation; endopterygoids and tongue usually toothless. Most of head, including maxilla, covered with scales. Gill rakers on first arch 11 to 13 on upper limb and 26 to 28 on lower limb, total 38 to 40.** Dorsal fin single, not incised at junction of spinous and soft portions; **dorsal fin with 10 spines and 15 soft rays**. Anal-fin length 28 to greater than 34% standard length; **anal fin with 3 spines and 7 soft rays**. Caudal fin deeply forked. **Pelvic fin slightly to well produced, 35 to greater than 64% standard length**. Pectoral fin with 18 or 19 rays. **Lateral line continuous, not interrupted; tubed scales in lateral line 36 to 41. Circum-caudal-peduncular scales 17 or 18. Colour:** live coloration is unknown, but is probably some shade of rose or red.

Size: Maximum standard length to about 16 cm.

Habitat, biology, and fisheries: Known from depths of 230 to 320 m. No other information available.

Distribution: Known from off Venezuela (near Latitude 11° N, Longitude 67° W) to northeastern Brazil (just north of the equator).



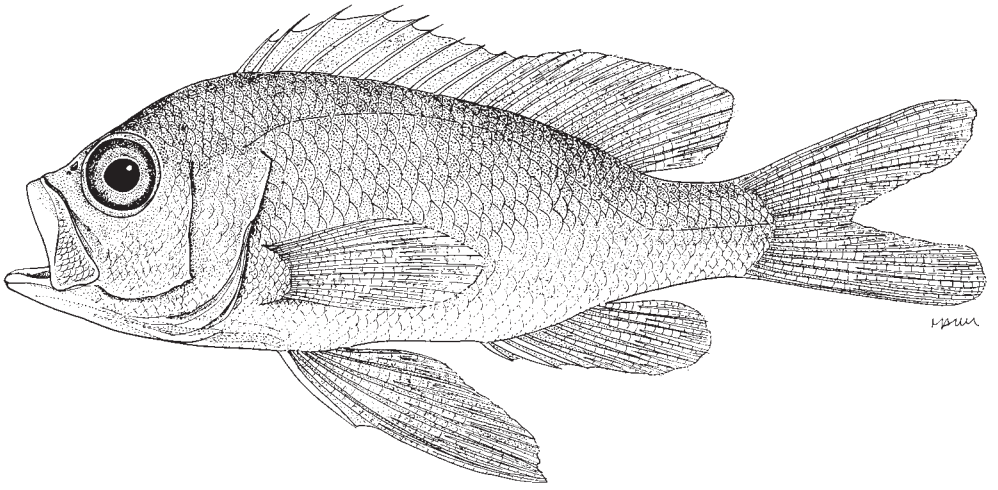
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Anthias nicholsi Firth, 1933

Frequent synonyms / misidentifications: None / None.

FAO names: En - Yellowfin bass.

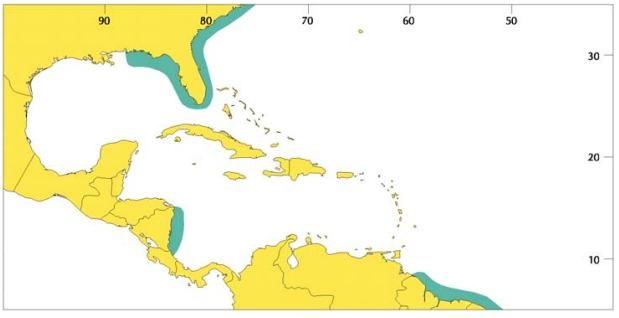


Diagnostic characters: Body moderately deep, depth of body at first dorsal-fin spine 34 to 44% standard length. Head moderate, its length 34 to 39% standard length. Orbit almost always longer than snout, horizontal diameter of bony orbit 9 to 13% standard length in specimens greater than about 7 cm standard length. **The 2 nostrils on each side of head close together; internarial distance 7 to 9 times in snout length; posterior border of anterior nostril produced into short flap, but never produced into a long slender filament**. Upper and lower jaws each with a series of conical teeth; canine or canine-like teeth present anteriorly in both jaws; vomer and palatines with teeth; **vomerine tooth patch chevron-shaped to triangular (sometimes with convex posterior border), without posterior prolongation; endopterygoids toothless; tongue usually toothless (with teeth in about 40% of specimens greater than about 14 cm standard length). Most of head, including maxilla, covered with scales. Gill rakers on first arch 12 or 13 on upper limb and 27 to 31 on lower limb, total 39 to 44**. Dorsal fin single, not incised at junction of spinous and soft portions; **dorsal fin with 10 spines and 15, occasionally 14, soft rays**. Anal-fin length 32 to 40% standard length; **anal fin with 3 spines and 6 to 8 soft rays**. Caudal fin deeply forked. **Upper caudal-fin lobe 31 to 49% standard length. Lower caudal-fin lobe 29 to 46% standard length. Pelvic-fin length 38 to greater than 46% standard length, in specimens greater than about 13 cm standard length**. Pectoral fin with 18 to 21, usually 19 or 20, rays. **Lateral line continuous, not interrupted; tubed scales in lateral line 31 to 34. Circum-caudal-peduncular scales 17 or 18. Colour:** body rosy dorsally, suffused with yellow or dull brownish yellow; body paler ventrally; upper part of head mainly rosy, suffused with yellow; lower part of head with bright yellow stripe beginning at anterior part of gular, fusing or almost fusing posteriorly with bright yellow of pelvic fins; 2 bright yellow stripes on side of head; iris brightly coloured, outermost pigment usually bright blue, innermost pigment bright yellow; fins, except pectoral, mostly yellow; pectoral fin mostly pallid.

Size: Maximum standard length to about 20 cm, commonly to 15 cm standard length.

Habitat, biology, and fisheries: Known from depths of 55 to 430 m. Observed over clumps of *Oculina* and over large boulders. Consumes pteropods and copepods. Ripe females collected in Gulf of Mexico in April and spent females in April and June. This species is a protogynous hermaphrodite.

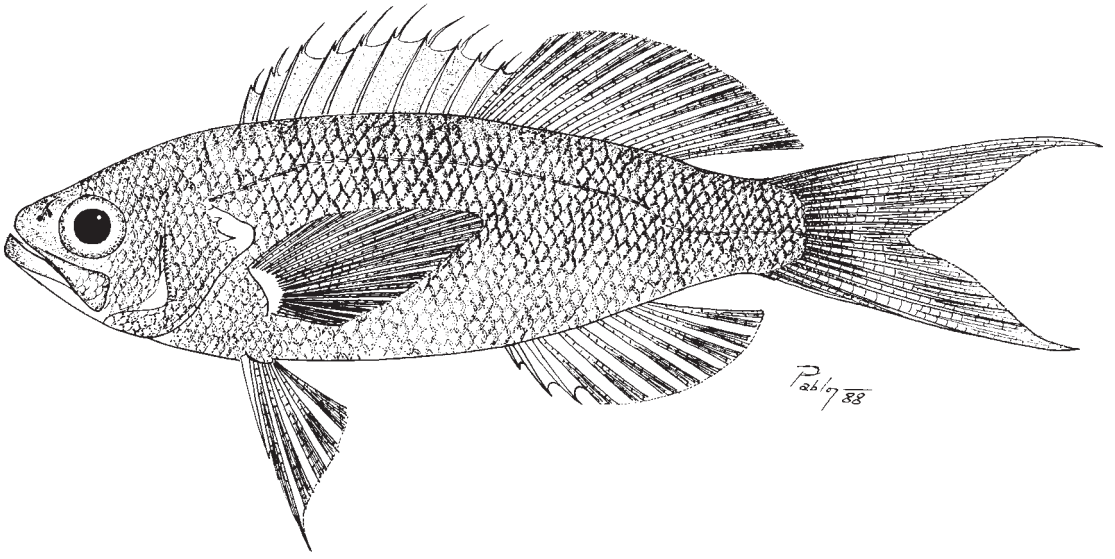
Distribution: Nova Scotia to Straits of Florida, eastern Gulf of Mexico, western Caribbean off Nicaragua, and from Guyana to northeastern Brazil (Pará).



Anthias tenuis Nichols, 1920

Frequent synonyms / misidentifications: None / None.

FAO names: En - Threadnose bass.

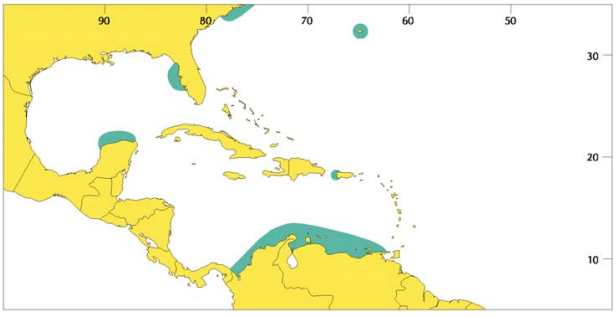


Diagnostic characters: Body comparatively slender, depth of body at first dorsal-fin spine 26 to 32% standard length. Head relatively short, its length 28 to 32% standard length. Orbit longer than snout, horizontal diameter of bony orbit 8 to 11% standard length. **The 2 nostrils on each side of head relatively far apart; internarial distance 4 to 5 times in snout length; posterior border of anterior nostril produced into a long slender filament, usually reaching to or very near orbit when reflected**. Teeth in jaws mostly small, but a few teeth usually enlarged into canines; vomer and palatines with villiform to very small conical teeth; **vomerine teeth in a chevron-shaped patch or in a small patch with as few as 2 or 3 teeth, tooth patch without posterior prolongation; endopterygoids and tongue toothless. Maxilla covered with scales. Gill rakers on first arch 9 to 11 on upper limb and 24 to 28 on lower limb, total 34 to 39.** Dorsal fin single, notched at junction of spinous and soft portions, but not incised to base of fin; **dorsal fin with 10 spines and 15, rarely 14, soft rays**. Anal-fin length 30 to 38% standard length; **anal fin with 3 spines and 7 to 9, almost always 8, soft rays**. Caudal fin deeply forked. **Upper caudal-fin lobe 29 to 46% standard length. Lower caudal-fin lobe 29 to 48% standard length. Pelvic fin relatively short, 21 to 32% standard length**. Pectoral fin with 19 to 21 rays. **Lateral line interrupted beneath soft dorsal fin; tubed scales in lateral line 51 to 57. Circum-caudal-peduncular scales 25 to 28, most frequently 27. Colour:** body red orange to rosy dorsally, purplish pink to yellow posteroventrally, pallid anteroventrally; head mostly red orange to rosy dorsally, mostly pallid ventrally; iris mostly yellow; interradial membranes of dorsal and anal fins with columns of oblong to elliptical greenish spots; posterior 1/3 of upper and lower lobes of caudal fin and posterior 1/2 of middle caudal-fin rays blood red; pectoral and pelvic fins mostly pallid.

Size: Maximum standard length to about 9 cm, commonly to 8 cm.

Habitat, biology, and fisheries: Collected from depths of 55 to 915 m; most specimens examined taken in less than 150 m. No other information available.

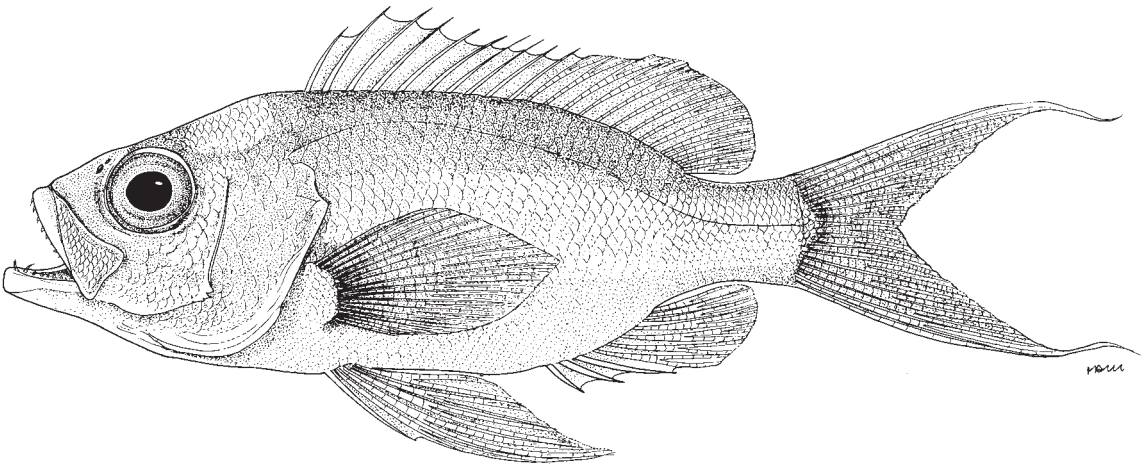
Distribution: Known from off Bermuda and North Carolina, from the Gulf of Mexico (off Florida and Yucatán), from Mona Passage off Puerto Rico, and from the southern Caribbean Sea off Colombia and Venezuela. Very likely more widespread than museum collections suggest.



Anthias woodsi Anderson and Heemstra, 1980

Frequent synonyms / misidentifications: None / None.

FAO names: En - Longtailed jewelfish (AFS: Swallowtail bass).

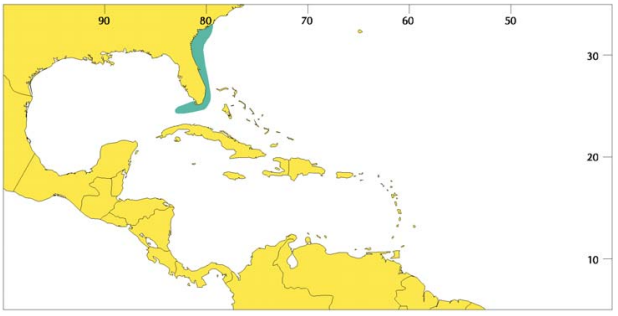


Diagnostic characters: Body moderately deep, depth of body at first dorsal-fin spine 34 to 41% standard length. Head moderate, its length 36 to 40% standard length. Orbit longer than snout, horizontal diameter of bony orbit 11 to 14% standard length. **The 2 nostrils on each side of head close together; internarial distance 9 to 15 times in snout length; posterior border of anterior nostril produced into short flap, but never produced into a long slender filament**. Upper and lower jaws each with a series of conical teeth; canine or canine-like teeth present anteriorly in both jaws; vomer and palatines with mostly granular to villiform teeth; **vomerine tooth patch chevron-shaped, without posterior prolongation; endopterygoids and tongue toothless. Most of head, including maxilla and midline of gular region, covered with scales. Gill rakers on first arch 11 or 12 on upper limb and 26 to 28 on lower limb, total 38 to 40.** Dorsal fin single, not incised at junction of spinous and soft portions; **dorsal fin with 10 spines and 14, occasionally 15, soft rays**. Anal-fin length 27 to 31% standard length; **anal fin with 3 spines and 7, occasionally 8, soft rays**. Caudal fin deeply forked. **Upper caudal-fin lobe 49 to 110% standard length. Lower caudal-fin lobe 41 to 95% standard length. Pelvic fin slightly to well produced, 27 to 41% standard length**. Pectoral fin with 18 rays. **Lateral line continuous, not interrupted; tubed scales in lateral line 42 to 48. Circum-caudal-peduncular scales 21 to 24. Colour:** body mainly rose, darker immediately ventral to dorsal fin; broad yellow (or vermilion) band beginning on opercle, narrowing below end of soft dorsal fin to continue over dorsolateral part of caudal peduncle; head mostly rose with admixture of yellow on snout dorsolaterally; yellow bar posterior to orbit joins yellow region on dorsolateral posterior part of head; iris mostly reddish orange; dorsal fin mostly yellow; dorsalmost and ventralmost caudal-fin rays and proximal halves of filamentous portions of these rays yellow, distal halves dark rose; remainder of caudal fin mainly rose with distal band of yellow or pale yellowish green; pectoral fin pale pink to bright rose.

Size: Maximum standard length to about 25 cm.

Habitat, biology, and fisheries: Known from depths of 175 to 475 m. No other information available.

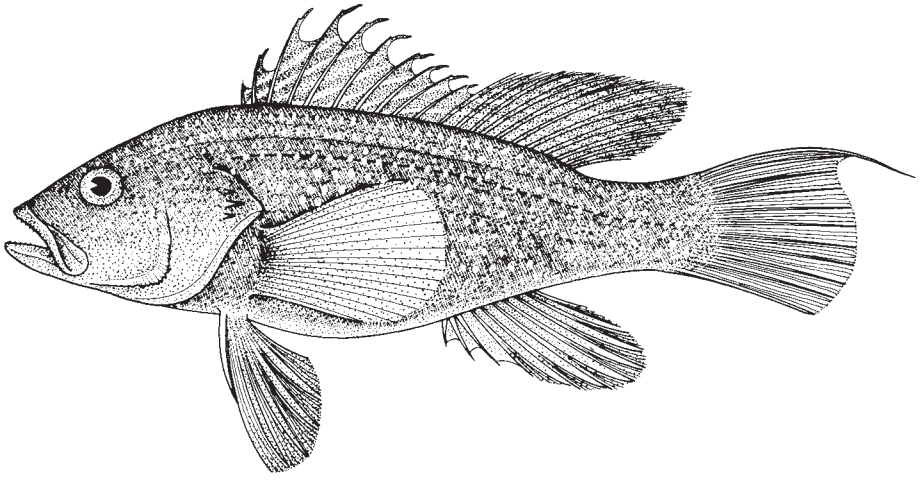
Distribution: South Carolina to the Straits of Florida (off Dry Tortugas).



Centropristis striata (Linnaeus, 1758) BSB

Frequent synonyms / misidentifications: *Centropristis striatus* (Linnaeus, 1758); *Centropristis melana* Ginsburg, 1952 / None.

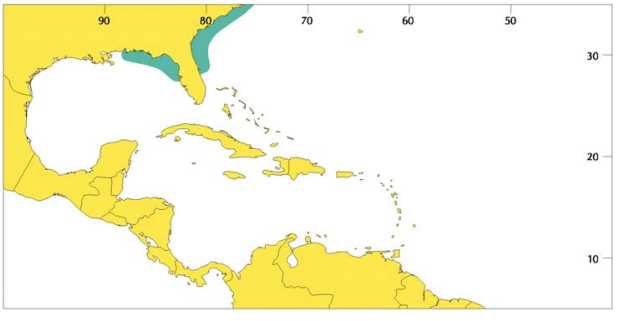
FAO names: En - Black seabass; **Fr** - Fanfre noir; **Sp** - Serrano estriado.



Diagnostic characters: Body oblong, moderately compressed. Mouth large, oblique; maxilla exposed, scaleless, reaching to below middle of eye; no supramaxilla; preopercle finely serrate, evenly rounded; opercle with 3 flat spines. Total gill rakers on first arch 21 to 29. Dorsal and anal fins high; **dorsal fin with 10 spines and 10 to 12 soft rays, the posterior spines shorter than anterior soft rays; dorsal interspinous membranes deeply notched, the spines with fleshy tips; anal fin with 3 spines and 7 soft rays**; caudal fin rounded to trilobate, often with a single upper ray much elongated in adults. Some scales on bases of soft portions of dorsal and anal fins. **Colour:** adults dark, with a pale spot on each scale, forming longitudinal series of silvery spots; dorsal-fin spines silvery blue, the membranes black, with silvery streaks and spots; irregular pale blotches often visible on dorsal part of body. Adult males develop a conspicuous blue hump on the nape during the spawning season. Juveniles mottled with brown blotches and small white spots, a dark brown or black midlateral band from eye to base of caudal fin; large black spot at base of last 3 dorsal-fin spines; turquoise horizontal streaks on lower part of head.

Size: Maximum weight about 5 kg; maximum length about 60 cm.

Habitat, biology, and fisheries: Most common on rocky bottoms and around pilings, seawalls, and jetties. Adults feed mainly on crabs, shrimps, and fish; juveniles eat shrimp, isopods, and amphipods. Spawning occurs off North Carolina in May; and from mid-May to July between Massachusetts and New Jersey. Females become mature in their second year at a length of 20 cm and change sex the following year at a length of 23 cm. Maximum age is supposed to be 20 years, but fish older than 9 years are rare. A 1-year old fish is 13 cm, a 5-year old is 30 cm, and an 8-year old fish is only about 38 cm. Taken in otter trawls, pots and traps, dredges, pound nets, and on hand lines. An important commercial and sportfish north of Area 31 and off the Carolinas. The most intensive fishery is off North Carolina to New Jersey and Long Island. The catch reported from Area 31 between 1995 and 1999 ranged from 295 to 393 t. Marketed fresh or frozen.



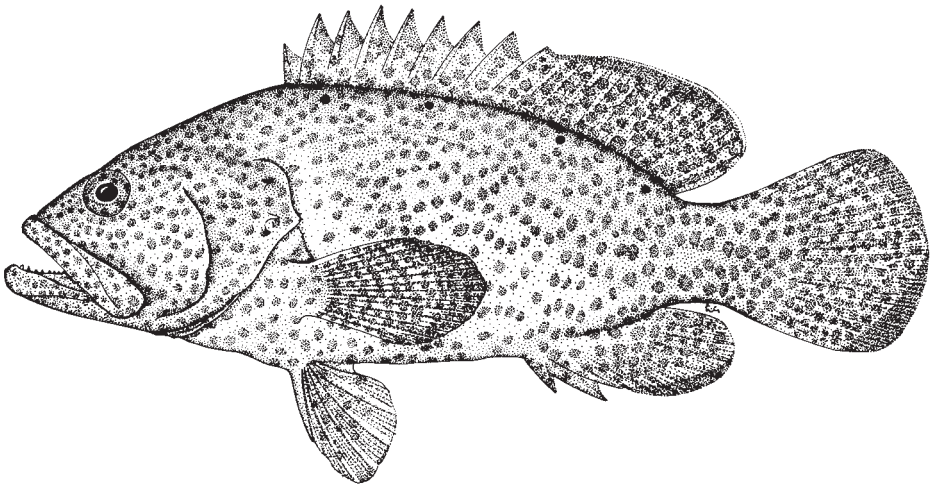
Distribution: From Massachusetts to central Florida and occasionally to the Florida Keys. In the Gulf of Mexico, the black seabass is confined to the West Coast of Florida from Pensacola to Placida.

Remarks: The population from the west coast of Florida differs slightly from the Atlantic population in meristic characters and juvenile coloration, and is considered a separate subspecies (*Centropristis striata melana* Ginsburg, 1952) by some authors.

Cephalopholis cruentata (Lacepède, 1802) CFL

Frequent synonyms / misidentifications: *Petrometopon cruentatus* (Lacepède, 1802); *Epinephelus cruentatus* (Lacepède, 1802) / None.

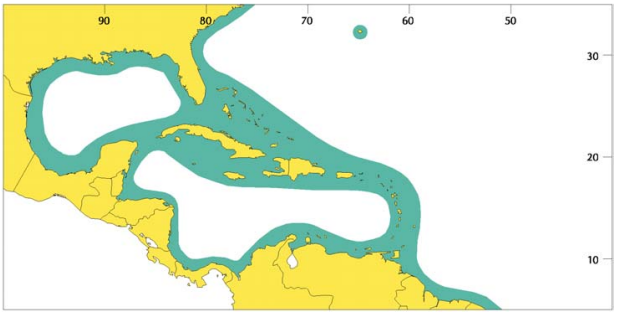
FAO names: En - Graysby; **Fr** - Coné essaim; **Sp** - Cherna enjambre.



Diagnostic characters: Body depth contained 2.5 to 2.9 times in standard length. Preopercle rounded, finely serrate, with shallow notch above angle. Nostrils small, subequal. Interorbital area flat. Maxilla scaly, reaching past vertical at rear edge of eye. Gill rakers on first arch 18 to 21 (total). **Dorsal fin with 9 spines and 13 to 15 soft rays, the fourth or fifth spines longest and the membrane distinctly indented between all the spines; anal fin with 3 spines and 8 soft rays; bases of dorsal and anal fins covered with scales and thick skin; pectoral-fin rays 16**. Caudal fin rounded. Lateral body scales distinctly ctenoid; lateral-line scales 47 to 51; lateral-scale series 69 to 81. **Colour:** head, body and fins pale grey or brown, covered with orange-brown or reddish spots; 4 distinct spots at base of dorsal fin may be either black or white; a mid-dorsal white stripe sometimes present on head from tip of lower jaw to nape.

Size: Maximum about 33 cm; 2 kg.

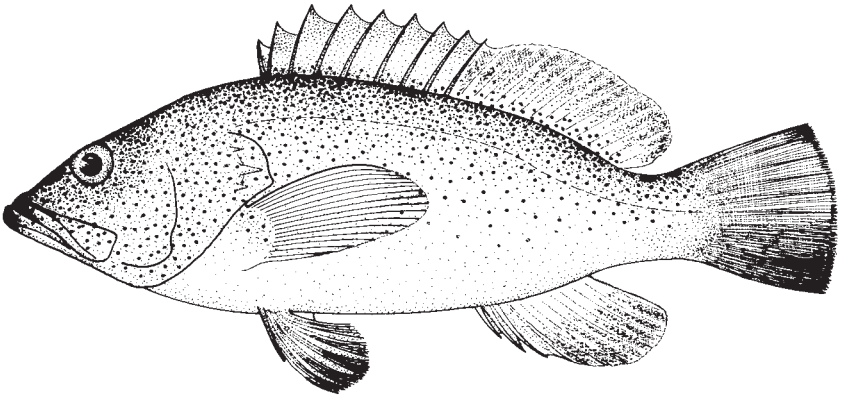
Habitat, biology, and fisheries: In seagrass (*Thalassia*) beds and coral reefs from shore to depths of 170 m. In eastern Gulf of Mexico, graysby occurs on rocky reef in 27 to 50 m. In the Netherland Antilles, the graysby is abundant at the Leeward islands where there are extensive coral reefs; but in the Windward islands, which have only small isolated coral patches, it is scarce. Appears to be more abundant in heavily fished areas than in unexploited areas. It may benefit in some way from reduced competition or predation in exploited areas, or its catchability is significantly less than that of other groupers. An increase in graysby in the absence of predators and competitors occurred after the 1971 red tide killed most of the groupers on shallow-water reefs off the west coast of Florida. One-year old fish are 8 cm (standard length) and females mature at 16 cm (total length). Most females change sex between 20 and 23 cm (ages 4 and 5), with sexual transition occurring immediately after spawning in August and September. Number of eggs per spawning was estimated at 263 000 for a fish of 29 cm total length. A small, secretive fish that usually stays in or near its hiding places in the reef during the day, the graysby is a crepuscular predator, and adults feed mainly on fishes, especially *Chromis multilineata*. After sunset a greater proportion of crustaceans are taken, because of their increased nocturnal availability. Juveniles feed more on shrimps than on fishes. Because of its small size, the graysby is of little commercial importance in the Caribbean, but it undoubtedly represents a significant source of protein for the local people. Caught with hook-and-line and in fish traps.



Distribution: Bermuda, North Carolina to Florida, Gulf of Mexico, Bahamas, and throughout the Caribbean.

Cephalopholis fulva (Linnaeus, 1758) CFJ

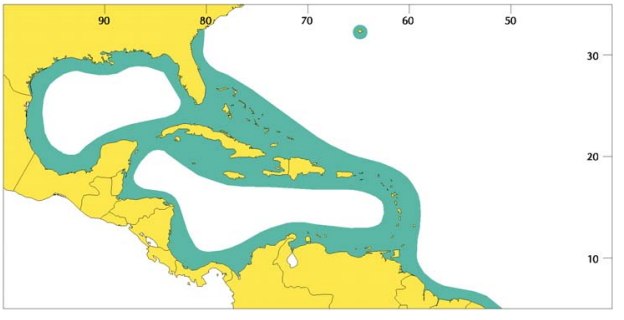
Frequent synonyms / misidentifications: *Epinephelus fulvus* (Linnaeus, 1758) / None.
FAO names: En - Coney; **Fr** - Coné ouatalibi; **Sp** - Cherna cabrilla.



Diagnostic characters: Body depth distinctly less than head length, 2.6 to 2.9 times in standard length (for fish 10 to 25 cm standard length). Nostrils small, subequal. Preopercle rounded, with shallow notch above the angle; upper limb finely serrate, the serrae at angle moderately enlarged. Interorbital region flat. Maxilla scaly, reaching to or beyond vertical at rear edge of eye. Gill rakers on first arch 23 to 27 (total). **Dorsal fin with 9 spines and 14 to 16 soft rays, the membranes distinctly notched between spines; anal fin with 3 spines and 9 soft rays; bases of soft dorsal and anal fins covered with scales and thick skin; pectoral-fin soft rays 17 to 19. Caudal fin convex posteriorly, but corners angular (not rounded)**. Lateral body scales ctenoid (rough to touch); lateral-line scales 46 to 54; lateral scale series 90 to 97. **Colour:** there are 3 colour phases in this species: red (deep water), orange-brown, or bicoloured with upper half of fish dark and lower half abruptly pale (shallow water) and xanthic (an all yellow morph that may be found in shallow or deep water). In all 3 colour morphs, head and body covered with small dark-edged pale blue spots, 2 small black spots on top of caudal peduncle, and another 2 at tip of lower jaw. The bicoloured pattern of the shallow-water morph is apparently an excitement pattern, and it can be turned on or off in a few seconds. The night pattern is generally pale, with irregular vertical bars and a dark tuning-fork mark on interorbital region like that of *Epinephelus striatus*.

Size: Maximum about 39 cm (from La Roques, Venezuela); common to 25 cm.

Habitat, biology, and fisheries: Prefers coral reefs and rocky bottoms to depths of about 40 m. In the Gulf of Mexico it occurs on deep-water reefs in clear water, but is not seen on more silty shallow-water reefs. At Bermuda and in the West Indies, common in shallow water, but it usually hides in caves or under ledges during the day. A protogynous species that spawns in pairs: females mature at 16 cm total length and transform to males at a length of about 20 cm. The spawning season begins Bermuda in May and lasts until at least early August, while in Jamaica the peak spawning period is from January to March. Fecundity estimates range from 150 000 to 282 000 eggs per female. A few specimens that appear to be hybrids of *C. fulva* and *Paranthias furcifer* have been described. Adults feed mainly on small fishes (46% by volume) and crustaceans, and are occasionally seen associating with moray eels in order to feed on the normally inaccessible small fishes and invertebrates that are flushed from the interstices of the reef by the foraging eels. Although its small size precludes it from being of much commercial importance, it is abundant in the West Indies and often sold for food in local markets. Caught with hook-and-line and in traps.

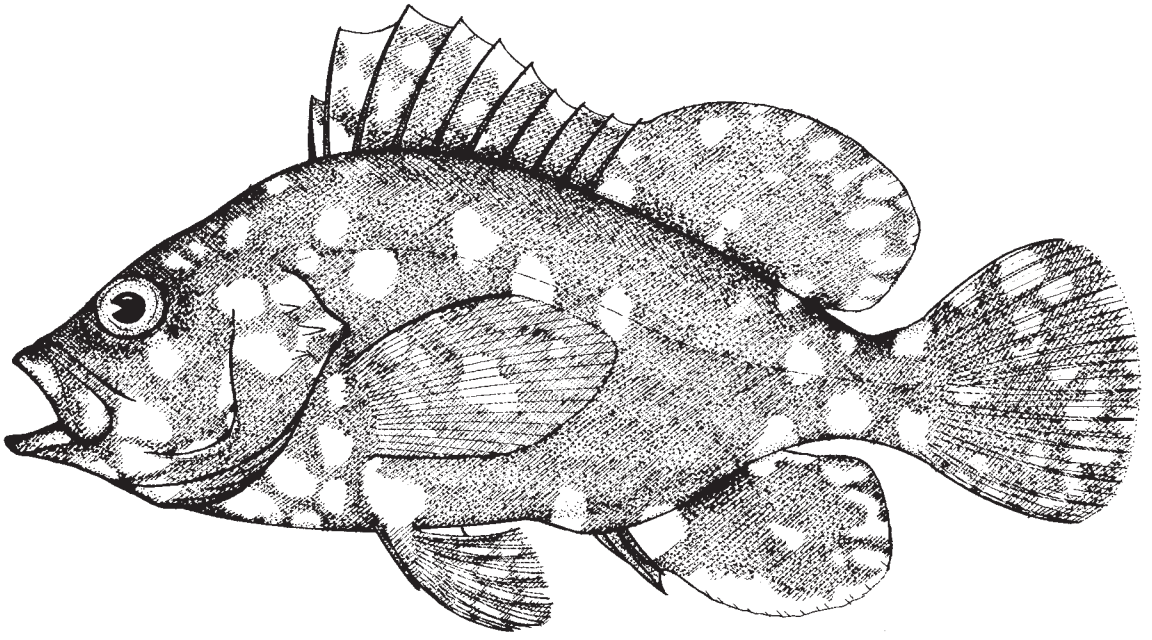


Distribution: Bermuda, South Carolina to Florida, Gulf of Mexico, western Caribbean coast and the West Indies to southern Brazil, including Atol das Rocas; very common at oceanic islands of Venezuela.

Dermatolepis inermis (Valenciennes, 1833)

Frequent synonyms / misidentifications: *Epinephelus inermis* (Valenciennes, 1833) / None.

FAO names: En - Marbled grouper; **Fr** - Méran marbré; **Sp** - Mero marmol.

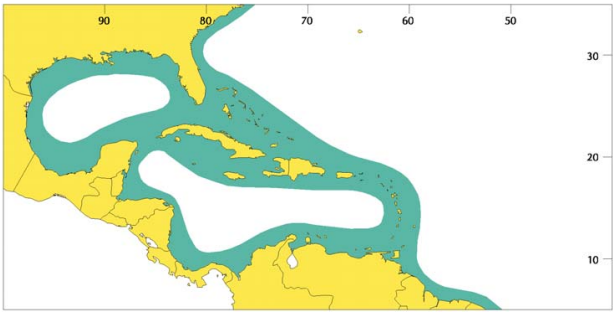


Diagnostic characters: Body deep and compressed, the greatest depth distinctly more than head length, contained 2.2 to 2.5 times in standard length (for fish 15 to 34 cm standard length); body width contained 2.2 to 2.9 times in the depth. No canine teeth. Preopercle finely serrate, the serrae at angle slightly enlarged. Gill rakers on first arch 19 to 22 (total). **Dorsal fin with 11 spines and 18 to 20 soft rays, the membranes incised between the spines, and the third or fourth spine longest; anal fin with 3 spines and 8 to 10 soft rays, the rear margin falcate in large adults**; bases of soft dorsal and anal fins covered with scales and thick skin; caudal fin rounded in juveniles, truncate or concave in adults; **pectoral fins 29 to 35% standard length**; pectoral-fin rays 18 or 19. **Scales smooth, deeply embedded**; accurate scale counts are difficult. **Colour:** juveniles (see above) black or dark brown, covered with irregular white spots and blotches; adults mottled greyish brown with white speckles and small black spots that tend to be arranged in rings.

Size: Maximum total length about 90 cm; maximum weight over 10 kg.

Habitat, biology, and fisheries: A rare, secretive species seldom seen by divers. Depth records range from 21 to 250 m. Virtually nothing is known of its biology. Caught incidentally throughout its range. Rarely seen in markets, but undoubtedly eaten when caught.

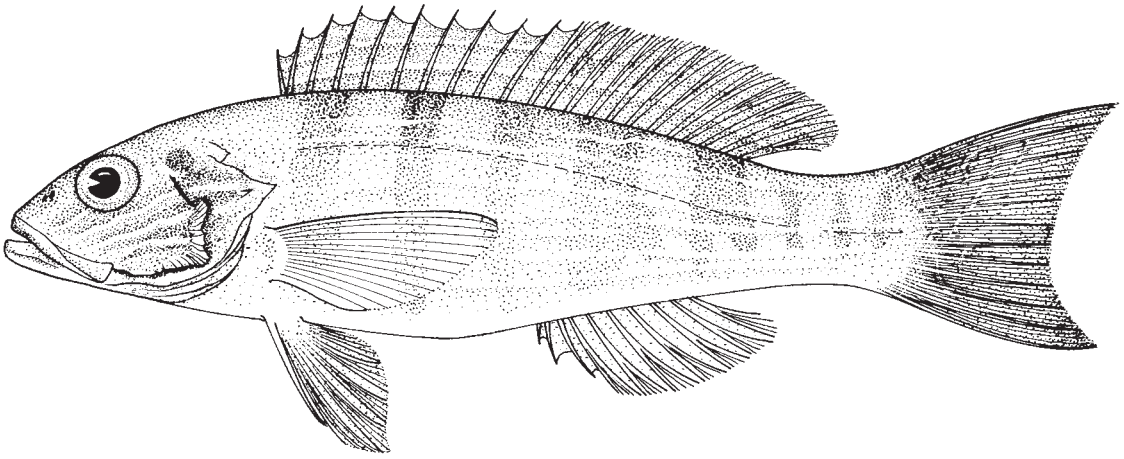
Distribution: From North Carolina to Rio de Janeiro, including the Gulf of Mexico, Bahamas, W.I., and Caribbean. Previous reports from Bermuda are erroneous.



Diplectrum formosum (Linnaeus, 1758) PES

Frequent synonyms / misidentifications: None / None.

FAO names: En - Sand seabass (AFS: Sand perch); **Fr** - Serran de sable; **Sp** - Serrano arenero.



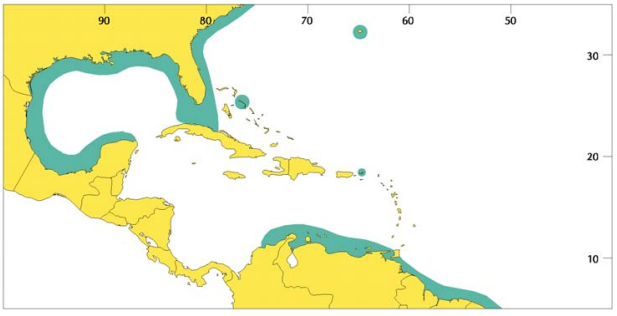
Diagnostic characters: Body slender and elongate; maxilla exposed at its posterior end; **preopercle with 2 clusters of radiating spines; cheek scale rows (from eye to rear lower corner of preopercle) 10 to 15**; opercle with 3 flat spines, the middle one longest. Dorsal and anal fins high; **dorsal fin single, with 10 spines and 11 to 13 soft rays, the interspinous membranes incised**; anal fin with 3 spines and 6 to 8 soft rays; bases of dorsal and anal fins with a few scales on the membranes but not covered with thick scaly skin; caudal fin moderately forked, upper lobe longer than lower lobe, both pointed; pectoral fins blunt, longer than pelvic fins, with 15 to 17 rays; specimens from Atlantic coast of USA and Gulf of Mexico often with upper caudal-fin lobe extended into a filament. Scales rough; lateral scale series 66 to 88; pored lateral-line scales 46 to 55. **Colour:** a complex pattern of diffuse dark bars and lighter background, with alternating narrow blue and orange stripes; dark midlateral band from snout through eye, ending in dark spot at caudal-fin base; narrow blue lines crossing cheek and over top of head.

Size: Maximum about 30 cm total length; common to 25 cm.

Habitat, biology, and fisheries: Occurs from inshore grass flats to offshore depths of 73 m, but most common between 7 and 50 m; found on sand, mud, shell, or rocky rubble bottom near low reefs. A synchronous hermaphrodite, with spawning in the northeastern Gulf of Mexico occurring from March through September. The major prey is crustaceans, mainly mysids and crabs, but it will also take small fishes. Abundant in the Gulf of Mexico and along the coast of Venezuela. The flesh is excellent, but *D. formosum* is not commercially important, because of its small size. The sand seabass is also prey for a variety of piscivorous fishes. Usually caught on handlines and in traps; also with bottom trawls.

Distribution: Mainly continental, from Virginia to Florida, throughout Gulf of Mexico, and from Colombia to São Paulo, Brazil; known from Bermuda, but rare in the West Indies, with single records from Eleuthera Island in the Bahamas, Cuba, and the Virgin Islands.

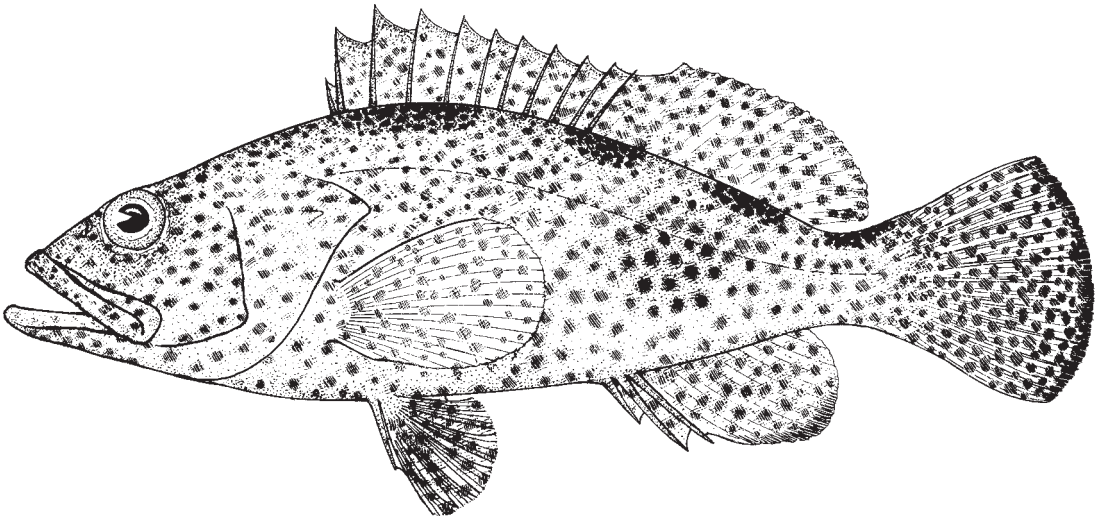
Remarks: The northern subspecies, *D. formosum formosum* (from Virginia to Yucatán) differs significantly in mean number of gill rakers ($\bar{x}$ = 18.8, n = 231, range 17 to 22) from the southern subspecies, *D. formosum radians* (Quoy and Gaimard, 1824) with 19 to 24 gill rakers, $\bar{x}$ = 22.0, n = 108. Other differences are the larger size (max. 22 cm standard length) and the presence of an elongate upper caudal-fin ray of *D. f. formosum*, compared with the 17 cm standard length maximum size and absence of elongate upper caudal ray in *D. f. radians*. In Venezuela, *D. f. radians* is known as 'bolo' or 'guatacare'.



Epinephelus adscenionis (Osbeck, 1765) EFD

Frequent synonyms / misidentifications: None / None.

FAO names: En - Rock hind; **Fr** -Mérou oualioua; **Sp** - Mero cabrilla.

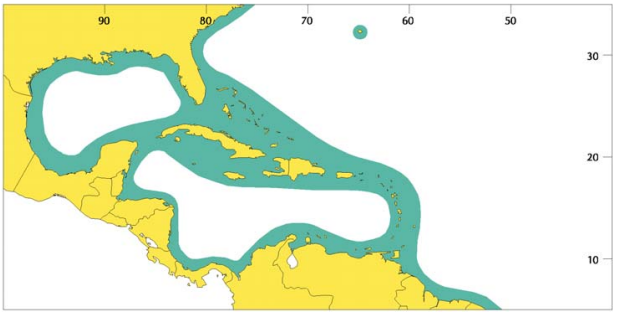


Diagnostic characters: Body depth distinctly less than head length, 2.8 to 3.4 times in standard length (for fish 13 to 27 cm standard length). Nostrils subequal; preopercle evenly serrate, without salient angle. Gill rakers on first arch 7 to 9 on upper limb and 16 to 19 on lower limb, total 23 to 28. **Dorsal fin with 11 spines and 16 to 18 soft rays, the fourth or fifth spine longest, and the interspinous membranes distinctly incised; anal fin with 3 spines and 8 soft rays; rear margin of caudal fin distinctly convex; pectoral-fin rays 18 to 20**. Lateral-line scales about 50; lateral scale series 82 to 95. **Colour:** head, body, and fins generally buff or pale greenish, covered with reddish brown spots and scattered pale blotches; 3 to 5 dark brown blotches (groups of dark spots) at base of dorsal fin and a blackish brown blotch on top of caudal peduncle; rear edge of caudal fin with a row of dark brown spots forming a dark margin; small juveniles with fewer but larger dark spots on head, body, and fins.

Size: Maximum length about 60 cm; maximum weight 4 kg. At Ascension Island, the rock hind is said to attain a length of about 1 m.

Habitat, biology, and fisheries: The rock hind occurs on rocky reefs in depths of 2 to 100 m; it feeds mainly on crabs (67%) and fishes (20%). The growth equation for rock hind from the southeast coast of the USA is $L_t = 499.4(1-e^{-0.167(1+2.495)})$; back-calculated total lengths for rock hind at ages 1, 5, and 10 years are 21, 36, and 44 cm. Females mature at 30 cm (2 years old); ripe females (35 to 44 cm) were noted from January to June at the Florida Middle Grounds. The rock hind is of minor importance to commercial and sport fisheries in the western Atlantic and Caribbean, as it seems to be less common than most other groupers. Caught with hook-and-line, in traps, and with spears.

Distribution: A wide-ranging species known from both sides of the Atlantic Ocean. In the western Atlantic, the rock hind is reported from Bermuda, Massachusetts (1 record), North Carolina to Florida, Gulf of Mexico, and Caribbean (continental coast and West Indies) to southern Brazil. In the eastern Atlantic, it is known with certainty from St. Helena, Ascension Island and São Tomé in the Gulf of Guinea. Records from the Cape Verde Islands, Canary Islands, Azores, and South Africa are unsubstantiated.



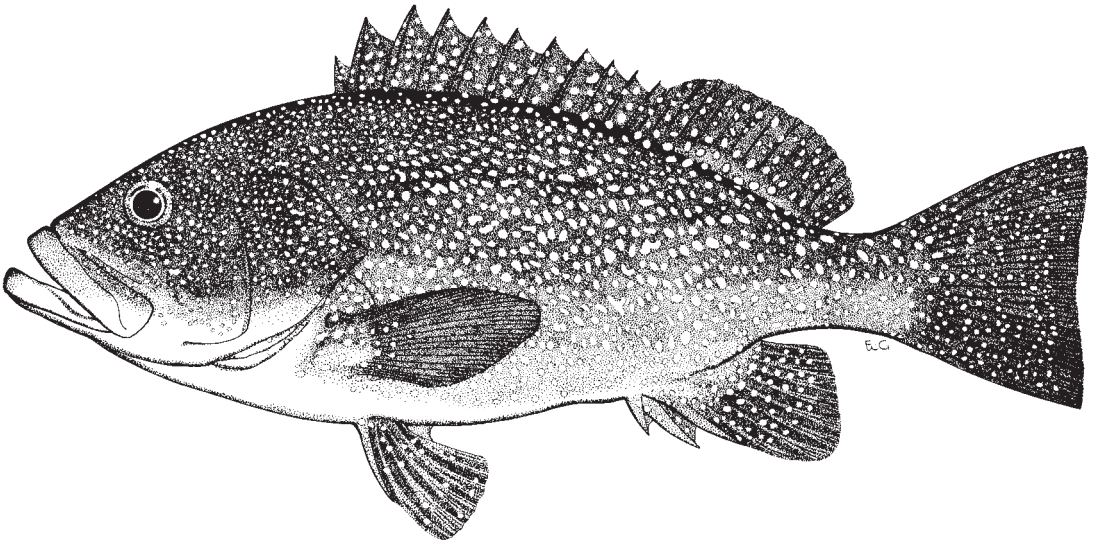
Remarks: At Ascension Island, the diet of the rock hind includes triggerfish (*Melichthys niger*) and young sea turtles.

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Epinephelus drummondhayi Goode and Bean, 1878 EED

Frequent synonyms / misidentifications: None / None.

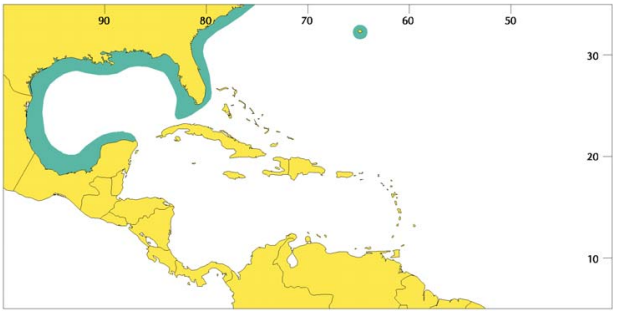
FAO names: En - Speckled hind; **Fr** - Mérou grivelé; **Sp** - Mero pintaroja.



Diagnostic characters: Body depth subequal to head length, 2.4 to 2.6 times in standard length (for fish 20 to 43 cm standard length). Nostrils subequal; preopercle rounded, evenly serrate. Gill rakers on first arch 9 or 10 on upper limb, 17 or 18 on lower limb, total 26 to 28. **Dorsal fin with 11 spines and 15 or 16 soft rays, the membrane incised between the anterior spines; anal fin with 3 spines and 9 soft rays; caudal fin truncate or slightly emarginate, the corners acute**; pectoral-fin rays 18. **Scales strongly ctenoid, about 125 lateral-scale series; lateral-line scales 72 to 76. Colour:** adults (larger than 33 cm) dark reddish brown, densely covered with small pearly white spots; juveniles (less than 20 cm) bright yellow, covered with small bluish white spots.

Size: Maximum about 110 cm; maximum weight 30 kg.

Habitat, biology, and fisheries: Adults inhabit offshore rocky bottoms in depths of 25 to 183 m but are most common between 60 and 120 m. Females mature at 4 or 5 years of age (total length 45 to 60 cm). Spawning occurs from July to September, and a large female may produce up to 2 million eggs at 1 spawning. Back-calculated total lengths for fish aged 1 to 15 years are 19, 32, 41, 48, 53, 57, 61, 65, 68, 71, 74, 77, 81, 84, and 86 cm; the maximum age attained is at least 25 years, and the largest specimen measured was 110 cm. The weight/length relationship is $W = 1.1 \times 10^{-8} L^{3.073}$ for W in kg and L (total length) in mm. The von Bertalanffy growth equation is $L_t = 967(1-e^{-0.13(t+1.01)})$. Adults feed on a variety of fishes and invertebrates, including shrimps, crabs, squid, and octopus. An important species in the recreational and commercial fisheries of the southeastern USA and also in the grouper fishery of the Campeche Bank off Yucatán. Mainly caught with hook-and-line, but some might also be taken in traps, trawls, and on bottom-set longlines.



Distribution: Bermuda, North Carolina to Florida Keys, Gulf of Mexico. Reports of speckled hind from Cuba and the Bahamas are unsubstantiated.

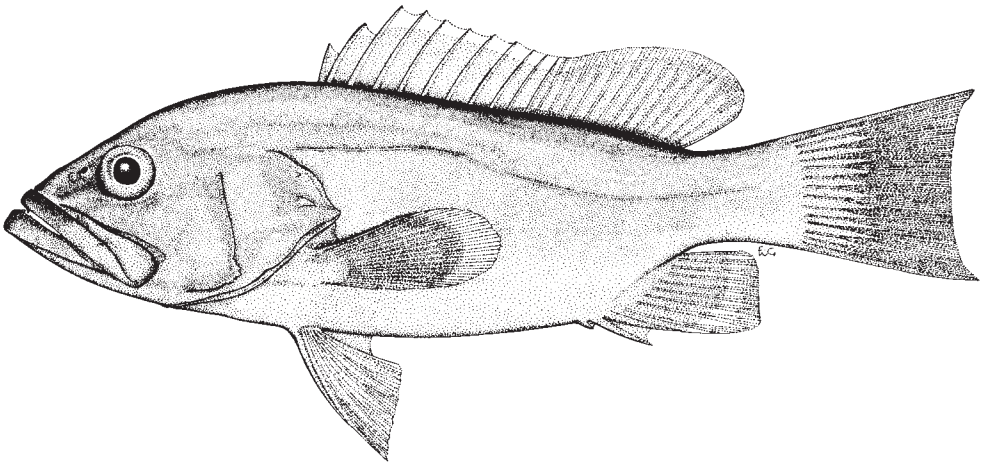
Remarks: The speckled hind is also known as 'Kitty Mitchell' in the Gulf of Mexico region; and the Mexican name is 'lenteja'.

Epinephelus flavolimbatus Poey, 1865

EEL

Frequent synonyms / misidentifications: None / None.

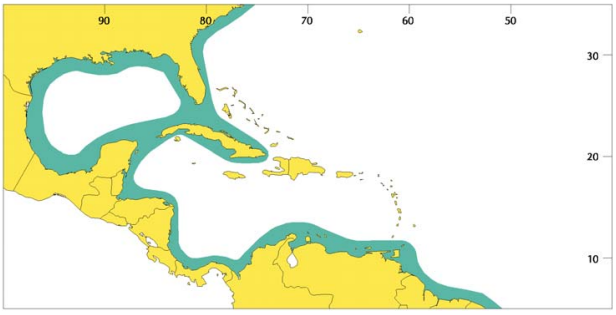
FAO names: En - Yellowedge grouper; **Fr** - Mérou aile jaune; **Sp** - Mero aleta amarilla.



Diagnostic characters: Body depth distinctly less than head length, 2.7 to 2.9 in standard length (for fish 13 to 64 cm standard length). Eye diameter equal to or greater than interorbital width in fish less than 45 cm standard length. **Nostrils subequal**. Gill rakers on first arch 8 or 9 on upper limb, 15 to 17 on lower limb, total 23 to 25. **Dorsal fin with 11 spines and 13 to 15 soft rays, third or fourth spine longest, and fin membrane slightlly incised between anterior spines; anal fin with 3 spines and 9 soft rays; rear margin of caudal fin convex in fish less than 30 cm standard length, truncate or even slightly concave in larger fish**; pectoral-fin rays 18. **Preopercle angular, with serrae at angle distinctly enlarged and, in large fish, coalesced into a flat serrate lobe**. Lateral body scales ctenoid (rough); lateral scale series 82 to 99; lateral-line scales about 65. **Colour:** head and body buff or greyish brown, whitish ventrally; margins of dorsal and pectoral fins, and sometimes anal and caudal fins yellow; a prominent blue line from eye to corner of preopercle. Juveniles less than 20 cm standard length, with pearly spots arranged in a grid of 4 longitudinal rows and 7 vertical columns and a dark brown saddle blotch on caudal peduncle; dorsal fin with broad yellow margin; caudal fin white; anal and pelvic fins blackish; black saddle on peduncle (if present) ending abruptly at lateral line; this spotted juvenile pattern gradually disappears with growth and is faint to absent in fish larger than 30 cm standard length. Adults generally immaculate, but sometimes (momentarily) they display the white-spotted grid pattern.

Size: Maximum about 115 cm; maximum weight 20 kg.

Habitat, biology, and fisheries: A deep-water species occurring in rocky areas and on sand/mud bottoms in depths of 64 to 370 m. On soft bottoms, often seen in or near trenches or burrow-like excavations. Females attain maturity at 53 to 60 cm total length and are thought to change sex at about 75 cm. Spawning occurs in the Gulf of Mexico from May to September. The maximum age is at least 20 years. The relationship of weight to length for yellowedge grouper in the eastern Gulf of Mexico is $W = 5.37 \times 10^{-8}$ standard length$^{2.872}$ ($n = 472$, $r^2 = 0.99$) where W is whole weight in kg and standard length is in millimetres. This species feeds on a wide variety of invertebrates (mainly brachyuran crabs) and fishes. One of the 2 most important species of groupers in the deep-water longline fishery in the eastern Gulf of Mexico; also of some importance in sport and commercial fisheries off the southeastern coast of the USA and along the coast of Central and South America.



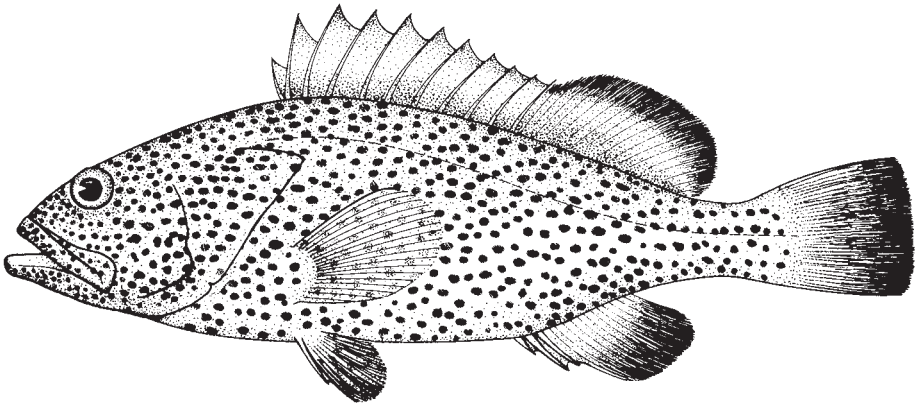
Distribution: North Carolina to southern Brazil, including Gulf of Mexico and Caribbean; not reported from Bermuda.

Remarks: The local name in Mexico is "'cherna del alto'.

Epinephelus guttatus (Linnaeus, 1758) EEU

Frequent synonyms / misidentifications: None / None.

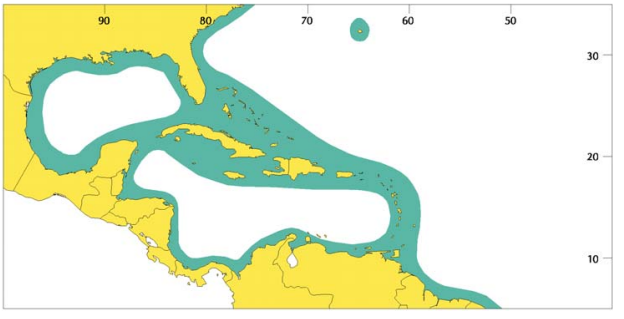
FAO Names: En - Red hind; **Fr** - Mérou couronné; **Sp** - Mero colorado.



Diagnostic characters: Body depth distinctly less than head length, 2.7 to 3.1 in standard length (for fish 17 to 38 cm standard length). Gill rakers on first arch 8 or 9 on upper limb and 16 to 18 on lower limb, total 24 to 26. **Dorsal fin with 11 spines and 15 or 16 soft rays, the third or fourth spine longest, the interspinous membranes incised and produced into a short flag behind tip of each spine; anal fin with 3 spines and 8 soft rays; pectoral-fin rays 16 to 18; rear edge of caudal fin convex. Preopercle rounded, evenly serrate; rear nostril larger than front nostril**. Scales ctenoid, lateral scale series 92 to 104. **Colour: ground colour buff, greenish white, or pale reddish brown, the head and body covered with bright red spots which become reddish brown dorsally**; spinous dorsal fin olive, with yellow flags at tips of spines; soft dorsal, caudal, and anal fins olivaceous, with a broad blackish submarginal band and narrow pale edge; pectoral fins pale orange-red with darker red spots on base; pelvic fins coloured like body but darker distally and along leading edge.

Size: Maximum 76 cm; maximum weight 8.3 kg.

Habitat, biology, and fisheries: Shallow reefs and rocky bottoms in depths of 2 to 100 m. Red hind feed mainly on crabs (40%) and fishes (21%). Females mature at 22 to 24 cm total length, and change sex at 28 to 38 cm total length. On the outer reef in 20 m off the south coast of Puerto Rico, spawning of fish in aggregations occurred during the full moon in January and February. Ripe females were recognized by their swollen abdomens and colour pattern of dark spots on a white background; males displayed a darker mottled pattern, with an area of dark vertical bars or squares on the body above the anal fin. Females rested on or close to the bottom, while males patrolled an area that included 1 to 5 females and defended this territory from other males. On 2 occasions, spawning was initiated by a female swimming about 0.5 m up off the bottom and being joined by a male; gametes were released without any upward rush or rapid movement. In one case, another female joined the pair above the bottom and spawned with them. The transparent eggs are buoyant and usually contain a single oil globule. For larvae reared in the laboratory, hatching occurred 27 h after fertilization at 26.5° C; mortality increased greatly after 6 to 7 days, and no larva survived through metamorphosis. Fecundity varies from 90 000 eggs for a 26 cm (total length) fish to over 3 million eggs in a 45 cm (total length) female. Although not as large as some other groupers, it is the most important species in the Caribbean grouper fishery. Caught with hook-and-line, traps, and spears.



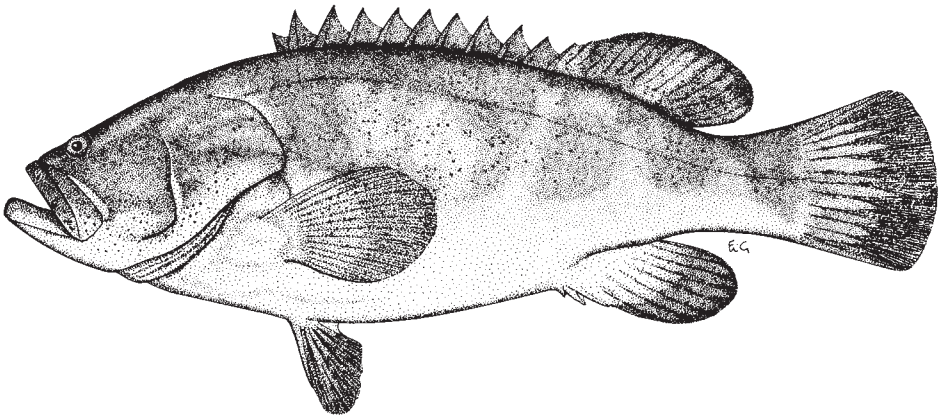
Distribution: Bermuda, North Carolina to Brazil, including Gulf of Mexico and the West Indies.

Remarks: In the West Indies, the red hind is also called 'cabrilla morja' or 'strawberry grouper'; in Venezuela, it is known as 'tofia'.

Epinephelus itajara (Lichtenstein, 1822) EET

Frequent synonyms / misidentifications: *Promicrops itajara* (Lichtenstein, 1822) / None.

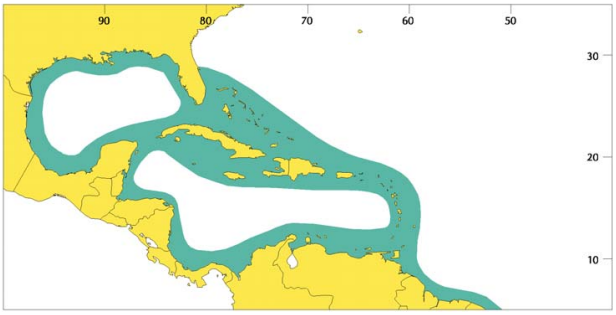
FAO names: En - Goliath grouper (AFS: Jewfish); **Fr** - Mérou géant; **Sp** - Mero guasa.



Diagnostic characters: Body robust, oblong, the greatest width equals half or more of body depth, which is less than head length (in fish 15 to 160 cm). Head extremely broad; interorbital flat and very wide, its width equals eye diameter in fish 10 to 15 cm standard length, is distinctly greater than eye diameter in fish 18 to 30 cm standard length, and 2 to 5 times greater than eye diameter in fish 30 to 160 cm standard length. Eye small, its diameter contained 5 to 9 times in head length for fish 10 to 30 cm standard length and 12 times in head of 160 cm standard length fish. Preopercle subangular, finely serrate; nostrils subequal. Maxilla reaching well past eye. Gill rakers 8 or 9 on upper limb, 13 to 15 on lower limb, total 21 to 24. **Dorsal fin with 11 spines and 15 or 16 soft rays, third to eleventh spines subequal and distinctly shorter than longest dorsal rays; anal fin with 3 spines and 8 soft rays; caudal fin rounded**; pectoral-fin rays 18 or 19. Body scales strongly ctenoid, 89 to 110 lateral-scale series; lateral-line scales 61 to 64. **Colour:** generally brownish yellow, grey or greenish; dorsal part of head, body, and fins with small black spots. Fish less than about 1 m have 5 irregular oblique bars on body; large adults darker and more uniformly coloured than juveniles.

Size: The largest Atlantic grouper, attaining 250 cm and a weight of at least 400 kg.

Habitat, biology, and fisheries: Large adults often found in shallow water, and also offshore on wrecks and in areas of high relief; juveniles common in mangrove swamps and both juveniles and adults occur in bays and harbours. In the eastern Gulf of Mexico, spawning occurred from July through September. Males mature at 110 to 115 cm, at age 4 to 6 years and live at least 26 years; females mature at 120 to 130 cm, at age 6 or 7 and live at least 37 years. The weight/length relationship $W = 1.31 \times 10^{-8}$ total length$^{3.056}$ where W (whole weight) is in kilograms and length is in millimetres. Unlike most other groupers, there is no evidence for hermaphroditism. Adults appear to occupy limited home ranges with little inter-reef movement, and the same individuals were seen at specific reef sites for more than a year. Adults and juveniles feed heavily on crustaceans (shrimps, crabs, and lobsters), and in the Caribbean region it is an important predator of lobsters, also fishes and young sea turtles. With their slow growth, longevity, site specific spawning aggregations, and vulnerability to spearfishing, jewfish are very susceptible to overfishing. Consequently, catching of jewfish in USA Exclusive Economic Zone waters is now prohibited. Reported as very common in Venezuela. Caught with hook-and-line, spears, traps, and trawls.

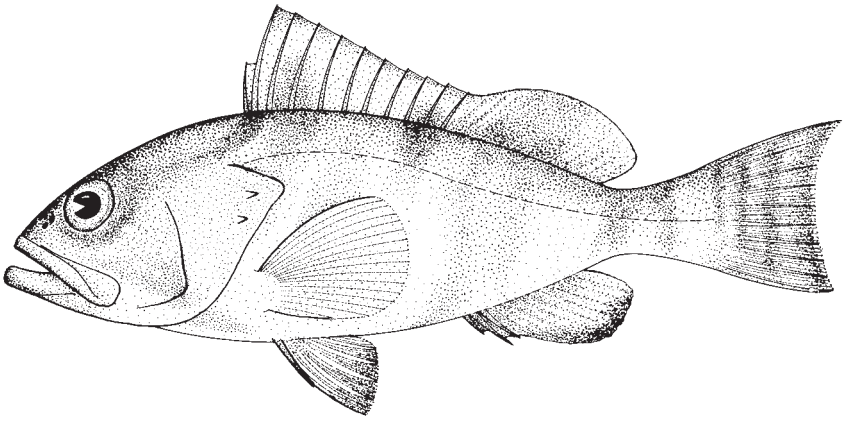


Distribution: Tropical and subtropical waters of Atlantic and eastern Pacific oceans. In the western Atlantic, from Florida and Gulf of Mexico to southern Brazil, including most of the West Indies and probably Bermuda; in the eastern Atlantic, reported (as *Epinephelus esonue*) from Senegal to the Congo; in the eastern Pacific, from Gulf of California to Peru.

Epinephelus morio (Valenciennes 1828) GPR

Frequent synonyms / misidentifications: None / None.

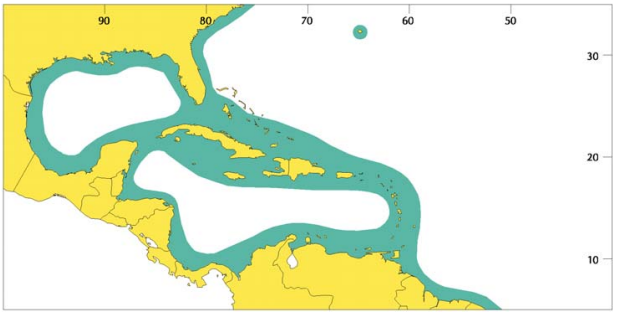
FAO names: En - Red grouper; **Fr** - Mérou rouge; **Sp** - Mero americano.



Diagnostic characters: Body depth less than head length, 2.6 to 3.0 times in standard length (for fish 13 to 26 cm standard length). Gill rakers on first arch 8 or 9 on upper limb, 15 or 16 on lower limb, total 23 to 25. **Dorsal fin with 11 spines and 16 or 17 soft rays, the interspinous membranes not incised, the second or third spine longest, giving the fin a triangular sail-like aspect**. Anal fin with 3 spines and 8 to 10 soft rays; pectoral-fin rays 16 to 18. **Caudal fin convex in fish less than 15 cm standard length, truncate, or slightly concave in larger fish.** Preopercle subangular, the serrae at angle slightly enlarged; upper edge of operculum straight. Nostrils subequal. Scales ctenoid (rough), about 60 lateral-line scales and 112 to 128 lateral-scale series. **Colour:** head and body dark reddish brown, shading to pink or reddish below; soft dorsal, caudal, and anal fins dark distally, with a narrow white edge; a few dark dots on snout and/or cheeks; body often with irregular white spots and/or large pale blotches; inside of mouth bright reddish orange.

Size: Maximum at least 90 cm and 20 kg.

Habitat, biology, and fisheries: Juveniles (20 to 40 cm standard length) commonly found in crevices and under ledges on rocky reefs in 5 to 25 m. At 40 to 50 cm standard length (4 to 6 years of age), become mature females and begin to migrate to deeper water (50 to 300 m) where they also occur over sandy or mud bottoms. Most females transform to males between ages 7 and 14, and maximum age is at least 25 years. The von Bertalanffy growth equation is $L_t = 672(1\text{-}e^{-0.179\,(t+0.449)})$. The length-weight function for Gulf of Mexico fish is $W = 5.42 \times 10^{-8} L^{2.897}$ where W is whole weight in kilograms and L is standard length in millimetres. The eastern Gulf of Mexico population spawns during April and May, and fecundity ranged from 312 000 to 5 735 700 eggs per female. After 30 to 40 days (20 to 25 mm standard length), the pelagic postlarvae transform to the benthic juvenile stage. Juveniles of 3 to 20 cm standard length are occasionally found on shallow grass beds and inshore reefs. Adults feed on a wide variety of fishes and invertebrates. Red groupers are particularly susceptible to the toxin of red tide (*Ptychodiscus brevi*) blooms, and in 1971 the species was exterminated on reefs in 12 to 15 m off Sarasota, Florida. The red grouper is the most important of the commercial reef fishes caught off the coast of Florida. On the Campeche Bank off the Yucatán Peninsula, red grouper made up 90% of the total catch of Cuban otter trawl fisheries. FAO statistics report landings of 86 to 276 t between 1995 and 1999. Also of some commercial importance on the coast of Venezuela, where it is known as 'mero paracamo'. The species is caught with hook-and-line, bottom set longlines, traps, and trawls.



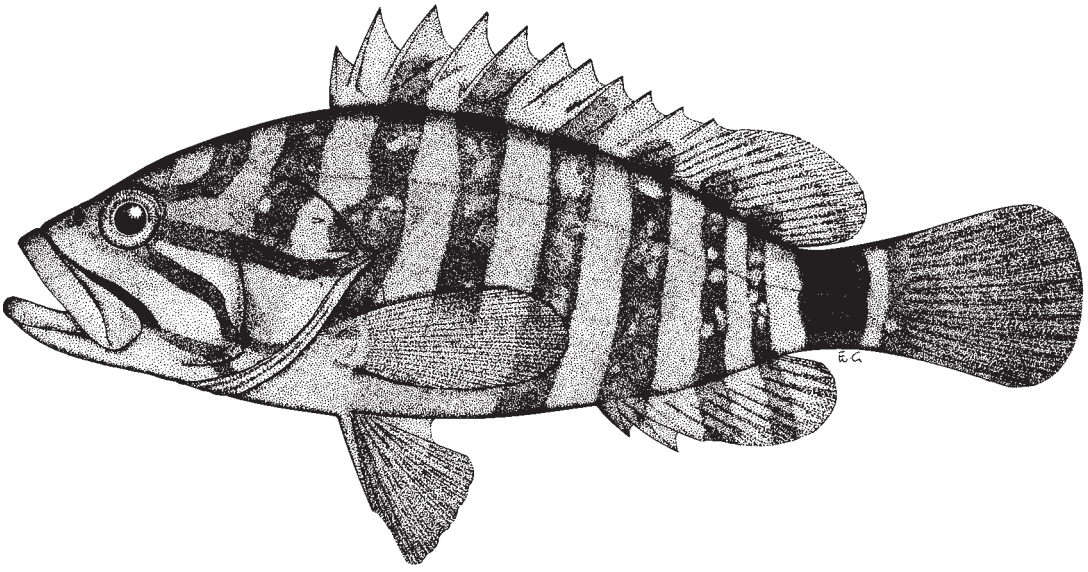
Distribution: Bermuda, North Carolina to southern Brazil, including the Gulf of Mexico and Caribbean; stray juveniles occur north to Massachusetts.

Remarks: In Mexico, the red grouper is known as 'cherna americana' or 'cherna de vivero'.

Epinephelus mystacinus (Poey, 1852) EEY

Frequent synonyms / misidentifications: None / *Epinephelus octofasciatus* Griffin, 1926.

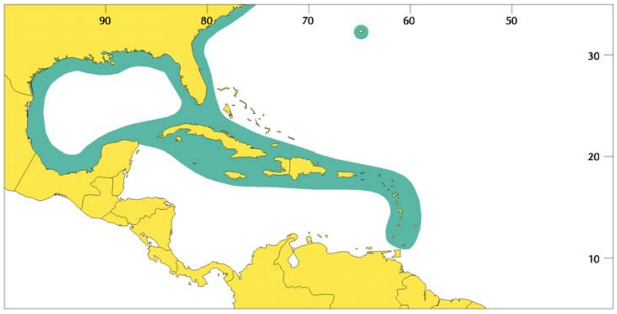
FAO names: En - Misty grouper; **Fr** - Mérou brouillard; **Sp** - Mero listado.



Diagnostic characters: Body depth contained 2.4 to 2.9 times, head length 2.3 to 2.5 times in standard length (for fish 14 to 40 cm standard length). Eye diameter greater than interorbital width for fish less than 30 cm standard length, but less than interorbital in fish larger than 40 cm standard length. **Posterior nostrils greatly enlarged, their diameter 4 or more times that of anterior nostrils**. Preopercle angular, but the corner rounded. **Dorsal fin with 11 spines and 14 or 15 soft rays, third spine longest and fin membrane distinctly incised between spines; anal fin with 3 spines and 9 soft rays**; rear margin of caudal fin convex or truncate with rounded corners; pectoral-fin rays 18 or 19; pelvic fins shorter than pectorals and inserted anterior to lower end of pectoral-fin base. Body scales distinctly ctenoid (rough), without auxiliary scales (minute scales atttached to base of main body scales); lateral-line scales 58 to 69; lateral-scale series 99 to 112. Pyloric caeca very numerous. Gill rakers on first arch 8 or 9 on upper limb, 14 to 16 on lower limb, total 22 to 25. **Colour:** head and body buff, with 8 or 9 dark, subvertical bars on body, the first on nape, the last 2 (which are darker than other bars) may be fused to form a wide dark band around caudal peduncle. Prominent blackish brown moustache mark on cheeks at upper edge of maxilla.

Size: Maximum at least 115 cm; and over 54 kg.

Habitat, biology, and fisheries: A deep-water species reported from depths of 100 to 500 m; juveniles occasionally found in water as shallow as 30 m. Generalized carnivore feeding on fishes, crustaceans, and squid. Virtually nothing is known of the growth or reproduction of this species; females attain at least 100 cm. *E. mystacinus* is the dominant grouper in the deep-water sport and commercial fisheries of the Virgin Islands.



Distribution: Bermuda, North Carolina to Florida, Gulf of Mexico, the West Indies to Trinidad; probably northern coast of South America.

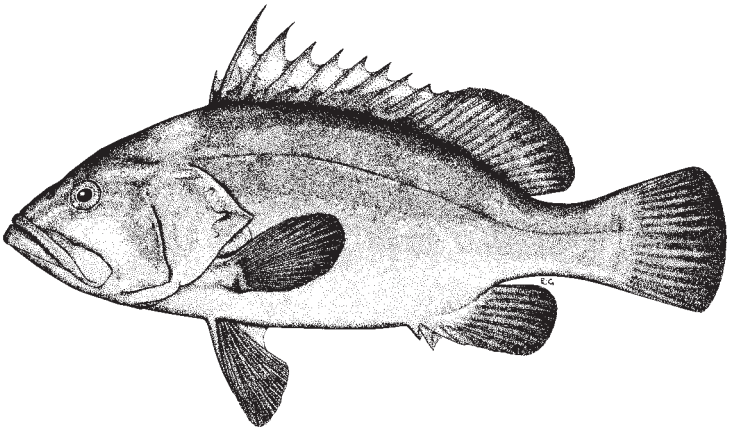
Remarks: Reports of '*Epinephelus mystacinus*' from Japan were based on the Indo-Pacific species *Epinephelus octofasciatus*.

Remarks: In Puerto Rico this grouper is called 'cherna del alto'.

Epinephelus nigritus (Holbrook, 1855) ELG

Frequent synonyms / misidentifications: None / None.

FAO names: En - Warsaw grouper; **Fr** - Mérou varsovie (= Mérou polonais); **Sp** - Mero negro.

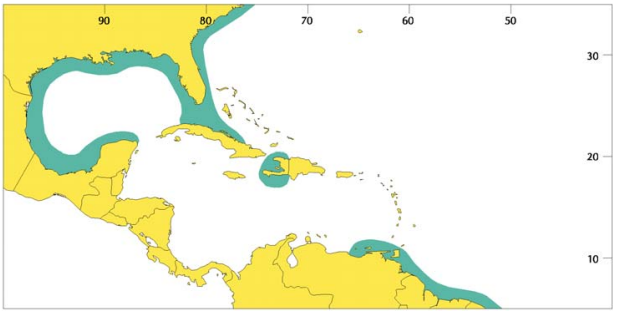


Diagnostic characters: Body depth less than head length, 2.4 to 2.6 times in standard length (for fish 11 to 58 cm standard length); head length 2.1 to 2.5 times in standard length. Nostrils subequal, or rear nostril slightly larger; maxilla reaches well past eye; adults with 4 or 5 rows of teeth at midside of lower jaw; juveniles with 2 or 3 rows. Interorbital area distinctly convex, wider than eye diameter for fish larger than 15 cm standard length; preopercle corner rounded, with slightly enlarged serrae and 1 or 2 small spines on lower edge just in front of corner; interopercle and subopercle smooth. Gill rakers on first arch 9 to 11 on upper limb, 14 to 16 on lower limb; total 23 to 25. **Dorsal fin with 10 spines and 13 to 15 soft rays, the second spine distinctly elongated (in fish greater than 40 cm standard length) and the interspinous membranes deeply incised; anal fin with 3 spines and 9 soft rays**; rear margin of caudal fin convex or truncate with rounded corners; pectoral-fin rays 18 or 19; **pelvic fins longer than pectoral fins in fish 7 to 58 cm standard length and inserted in front of vertical from lower end of pectoral-fin base**. Midlateral body scales distinctly ctenoid (rough), with auxiliary scales in adults; lateral-line scales 62 to 71; lateral scale series 99 to 107. Pyloric caeca very numerous, in a large dendritic mass. **Colour: dark reddish brown or brownish grey to almost black dorsally, dull reddish grey below. Juveniles with yellow caudal fin and a few randomly scattered whitish spots on body; no dark saddle blotch on peduncle.**

Size: Maximum total length about 235 cm; maximum weight 200 kg.

Habitat, biology, and fisheries: Adults usually on rough, rocky bottom in depths of 55 to 525 m; juveniles occasionally seen on jetties and shallow-water reefs. Adults feed on a variety of crabs, shrimps, lobsters, and fishes. A long-lived, slow-growing species that may reach an age of 41 years. Average total lengths for fish aged 1, 5, 10, 25 and 41 years are 30 cm, 92 cm, 119 cm, 188 cm, and 233 cm respectively. The von Bertalanffy growth equation is $L_t = 2394(1\text{-}e^{-0,0544\,(t+3616)})$ where L_t is total length in mm at age t. Because of its large size, of considerable importance in the sport fishery for bottom fishes, but it contributes less than 1% by weight of commercial grouper landings on the southeast USA coast. In the 1983 and 1984 Florida west coast commercial fishery, warsaw grouper landings were about 55 t. The species is also common in the western Gulf of Mexico and southern Caribbean (from Venezuela to French Guiana). Caught mainly with hook-and-line and bottom longlines.

Distribution: Massachusetts to Gulf of Mexico, Cuba, Haiti, Trinidad, Venezuela to Rio de Janeiro; also known (but rare) on the coast of France. Reports of *E. nigritus* from the eastern Pacific are apparently based on misidentifications of *Epinephelus exsul* (Fowler, 1944).



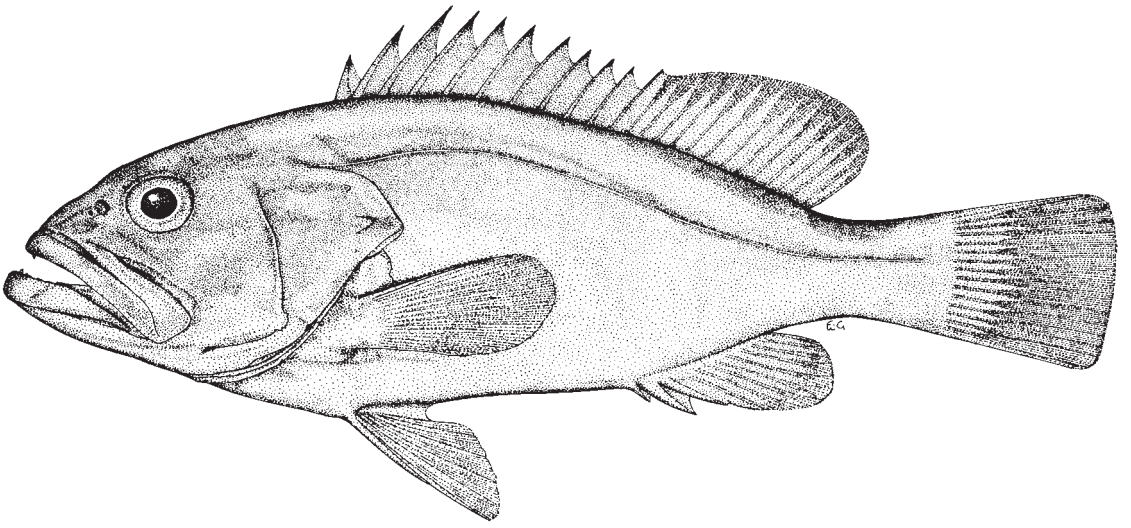
Remarks: *Epinephelus exsul* differs from *E. nigritus* in having 8 anal-fin rays, 87 to 92 lateral-scale series, body depth 2.3 times in standard length, and pelvic fins equal to or shorter than pectoral fins.

Epinephelus niveatus Valenciennes, 1828

EFV

Frequent synonyms / misidentifications: *Alphestes scholanderi* Walters, 1957 / None.

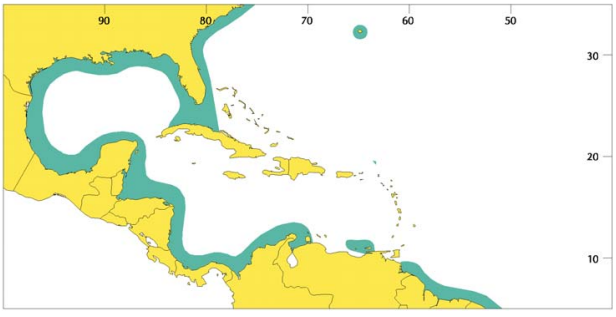
FAO names: En - Snowy grouper; **Fr** - Mérou neige; **Sp** - Cherna pintada.



Diagnostic characters: Body depth 2.5 to 2.8, head length 2.2 to 2.4 times in standard length (for fish 15 to 27 cm standard length). Preopercle with enlarged serrae at the angle; upper edge of operculum very convex; posterior nostril 2 to 5 times larger than anterior nostril. **Dorsal fin with 11 spines and 13 to 15 soft rays, the membrane distinctly incised between spines; anal fin with 3 spines and 9 soft rays**. Rear margin of caudal fin convex in juveniles (5 to 30 cm standard length), straight or concave in adults; pectoral-fin rays 18 or 19; juveniles with pelvic fins longer than pectoral fins. Midlateral body scales rough; lateral-line scales about 65. Gill rakers on first arch 7 to 10 on upper limb, 15 to 17 on lower limb, total 22 to 26. Pyloric caeca numerous. **Colour:** adults dark brown, with margin of spinous dorsal fin black; juveniles dark brown with conspicuous white spots in vertical series usually extending onto head and dorsal fin, the caudal and pectoral fins pale yellow, and a black saddle-blotch on caudal peduncle reaching below lateral line.

Size: Maximum total length about 120 cm; maximum weight 30 kg.

Habitat, biology, and fisheries: Adults occur on rocky bottoms at depths of 30 to 400 m, but are most common between 100 and 200 m. Juveniles occur inshore and often reported from northeast coast of USA. Off the southeast coast of the USA, most females are mature by age 4 or 5 (40 to 50 cm); as expected for a protogynous species, males less than 6 years old (55 to 60 cm) were not found, and 40% of all fish 8 years or older (70 cm) were males. Spawning occurs off the Florida Keys from April to July. Age and growth parameters of this relatively unexploited population in the lower Florida Keys in 1983 were $L_t = 1320(1\text{-}e^{-0.087\ (t\text{-}1.013)})$ where L_t is total length at age t; the maximum age attained was at least 27 years. The weight/length relationship is $W = 2.45 \times 10^{-8} L^{2.93}$ where weight (W) is in kilograms and total length (L) is in millimetres. Adults feed mainly on fishes, gastropods, cephalopods, and brachyuran crustaceans. Commercially important stocks occur from North Carolina to Georgia, off Florida west coast, lower Florida Keys, Honduras/Nicaraguan shelf, Panama, and Colombia. Caught with hook-and-line, bottom longlines, and traps.



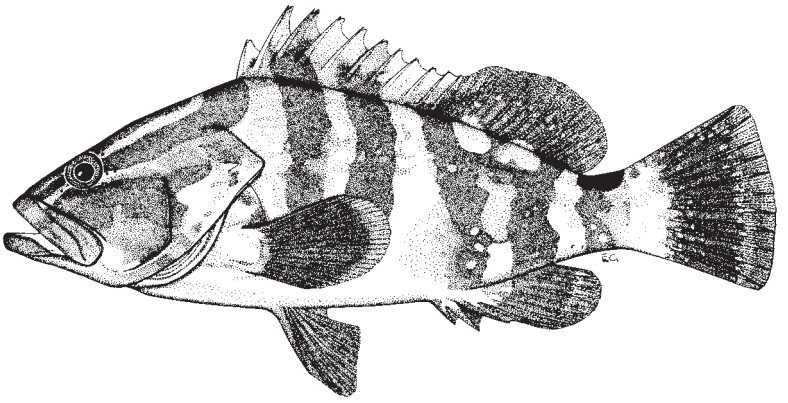
Distribution: Mainly continental: Massachusetts to Gulf of Mexico, Bermuda, Caribbean (mainland coast, but rare in Venezuela) and southern Brazil; not known from West Indies, except Cuba and Bimini.

Remarks: The eastern Pacific species *Epinephelus niphobles* is very similar to *E. niveatus*; juvenile *niphobles* (5 to 10 cm standard length) have smaller eyes, pelvic fins not longer than pectoral fins, and more pectoral-fin rays (modally 19).

Epinephelus striatus (Bloch, 1792) GPN

Frequent synonyms / misidentifications: None / None.

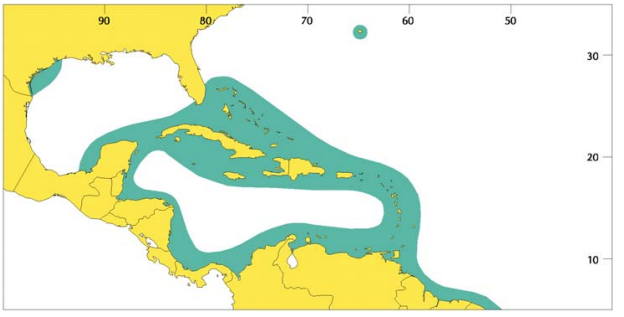
FAO names: En - Nassau grouper; **Fr** - Mérou rayé; **Sp** - Cherna criolla.



Diagnostic characters: Body depth less than head length, 2.6 to 2.9 times in standard length (for fish 16 to 33 cm standard length). Preopercle rounded and evenly serrate. Gill rakers on first arch 8 or 9 on upper limb, 15 to 17 on lower limb, total 23 to 26. **Dorsal fin with 11 spines and 16 to 18 soft rays, third or fourth spine longest, interspinous membranes distinctly incised; anal fin with 3 spines and 8 soft rays**; caudal fin rounded in juveniles, convex (corners angular) in adults; pectoral-fin rays 17 to 19. Scales ctenoid, about 50 lateral-line scales and 98 to 106 lateral-scale series. **Colour: body generally buff, with 5 dark brown vertical bars; large black saddle-blotch on caudal peduncle; a row of black dots below and behind eye. Distinctive dark tuning fork beginning at front of upper jaw, extending dorsally along interorbital region, and bifurcating on top of head**; another dark band from tip of snout through eye and then curving upward to meet its fellow just before dorsal-fin origin. Some fish have irregular pale spots and blotches all over head and body; fish from deep water usually pinkish or reddish ventrally. As in many groupers, the colour pattern can change in less than a minute from almost white to uniformly dark brown depending on the mood of the fish.

Size: Maximum total length about 100 cm and 25 kg.

Habitat, biology, and fisheries: Coral reefs from 5 to 100 m; juveniles occur on seagrass beds. Feeds mainly on fishes (54%) and crabs (23%), with lesser amounts of other crustaceans and molluscs. Spawning aggregations of 50 to perhaps 100 000 fish have been reported from the Bahamas, Belize, Jamaica, Cayman, and Virgin Islands. These aggregations occur in depths of 20 to 40 m at the outer reef shelf edge in January and February at or near the time of the new moon. During spawning, most fish (males and females) display the bicoloured (dark dorsally, pale ventrally 'non-aggressive') pattern and circle above the bottom. Some females remained in the barred pattern, becoming very dark as mating approached and were closely followed by bicoloured fish during courtship. Spawning occurs at sunset, in groups of 3 to about 25 fish and is preceded by various movements of the courting group: vertical spirals, vertical runs followed by rapidly crowding together then rapidly dispersing, and horizontal runs near the bottom. Mating is initiated by a dark phase fish (presumed female) dashing forward and upward, followed closely by bicoloured males releasing a white cloud of sperm, and other bicoloured fish (presumed females) apparently shedding eggs. The larvae metamorphose to pelagic juveniles after 37 to 45 days. In Bermuda, spawning lasts from early May to August. Based on studies of settlement of pelagic juveniles, spawning in Exuma Sound (Bahamas) occurs near the full moon of December. An important foodfish throughout the Caribbean. Caught with hook-and-line and in traps.



Distribution: Bermuda, Florida (Tortugas and off Key West), northwestern Gulf of Mexico, Campeche Bank throughout Caribbean and southwards to Bahia, Brazil.

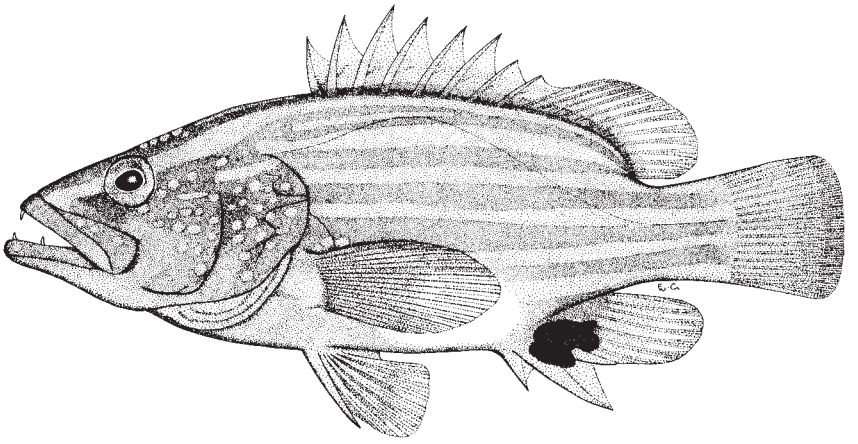
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Gonioplectrus hispanus (Cuvier, 1828) GOH

Frequent synonyms / misidentifications: None / None.

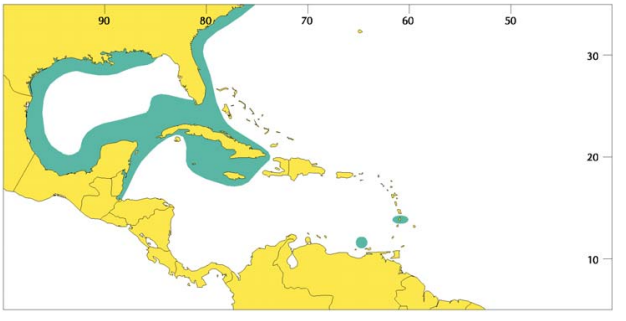
FAO Names: En - Spanish flag; **Fr** - Pavillon espagnol; **Sp** - Bandera español.



Diagnostic characters: Body depth subequal to head length, contained 2.3 to 2.5 times in standard length (for fish 13 to 20 cm standard length), the body width 2.3 to 2.4 times in body depth; head length 2.2 to 2.4 times in standard length. Nostrils small, subequal. Jaws with a band of minute, slender, depressible teeth, the inner teeth near symphysis enlarged; a short, curved, fixed canine tooth on each side of symphysis of both jaws and 1 to 3 similar fixed canines at midside of lower jaw; 2 rows of minute teeth on vomer and palatines; maxilla with a well-developed supramaxilla and prominent bony knob (hidden by upper lip) on lower rear corner. Interorbital area convex, the dorsal head profile convex; top of head rugose; preorbital depth about 12 times in head length. Preopercle rounded, with a large, curved (antrorse) spine at the angle, the lower edge fleshy; middle opercle spine very large, extending to or beyond rear edge of opercular membrane; subopercle and interopercle with a few minute serrae. Gill rakers on first arch 5 to 7 on upper limb, 14 to 16 on lower limb, the longest slightly longer than longest gill filaments. **Dorsal fin with 8 spines and 13 soft rays, the fin origin over upper end of pectoral-fin base, third or fourth spine longest; interspinous membranes deeply incised, their proximal part fleshy, covered with scales; base of spinous part of fin longer than soft-rayed part**; anal fin with 3 well-developed spines and 7 soft rays; caudal fin truncate or rounded, with 8+7 branched rays and 7+7 procurrent rays; pectoral fins symmetrically rounded, with 16 or 17 rays, the middle rays longest; pelvic fins reach anus. Scales on body large, distinctly ctenoid, and without auxiliary scales; lateral line curved distinctly upward below spinous dorsal fin; lateral-line scales 47 to 49; 5 rows of scales between lateral line and base of sixth dorsal-fin spine; lateral-scales series 78 to 83; no scales on top of head, preorbital, snout, maxilla, or lower jaw. **Colour:** head, body, dorsal, and caudal fins yellow; 6 or 7 salmon-coloured stripes from head to soft dorsal and caudal fins; blood red blotch on front half of anal fin; white blotch on side of belly; pelvic fins pinkish purple.

Size: Attains at least 27 cm.

Habitat, biology, and fisheries: Reported from rocky bottoms in depths of 60 to 365 m. A 170 mm standard length fish was reported as a mature male; no other information is available on the biology of this species. Not important as a foodfish because of its rarity and small size. With its beautiful colours, the Spanish flag could be a valuable fish in the aquarium trade, but its deep habitat would make it difficult to keep alive after capture.



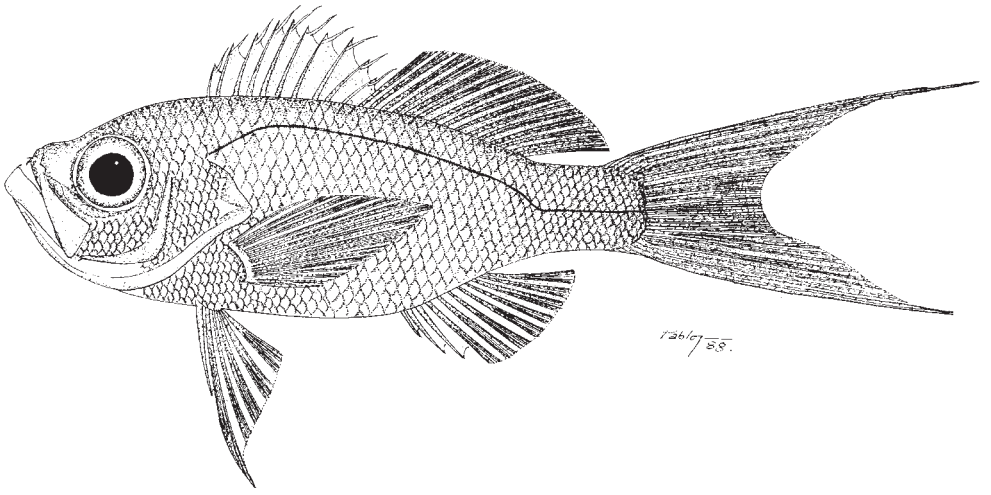
Distribution: Off North Carolina (pelagic postlarva, possibly drifted north from Florida or the Bahamas) to Gulf of Mexico, Caribbean (Cuba, Martinique, Isla Blanca, Venezuela), and south to Vitoria, Brazil.

Remarks: In Mexico, this species is known as 'biajaiba'.

Hemanthias aureorubens (Longley, 1935) HNE

Frequent synonyms / misidentifications: None / None.

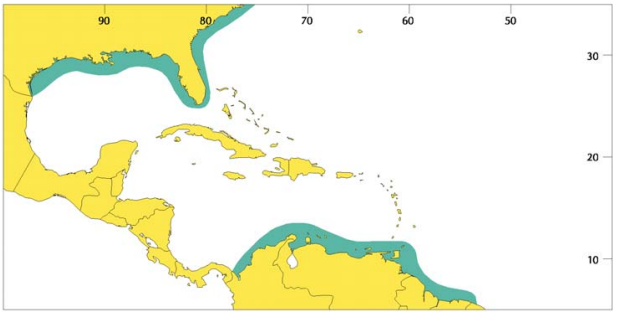
FAO names: En - Streamer bass; **Fr** - Coné doré; **Sp** - Cachucho.



Diagnostic characters: Depth of body at first dorsal-fin spine 31 to 40% standard length. Head length 31 to 41% standard length. Orbit longer than snout, horizontal diameter of bony orbit 11 to 19% standard length, 11 to 15% standard length in specimens greater than about 13 cm standard length. Upper and lower jaws each with a series of conical teeth; canine or canine-like teeth present anteriorly in both jaws; vomer and palatines with teeth; **vomerine tooth patch chevron-shaped to triangular, almost always without posterior prolongation**; endopterygoids and tongue toothless. The 2 nostrils on each side of head close together; internarial distance 7 to 17, usually 9 to 12, times in snout length; posterior border of anterior nostril never produced into a long slender filament. **Much of head covered with scales, but snout, lachrymal region, maxilla, anterior portion of interorbital, anterior 1/2 or more of lower jaw, gular, branchiostegals, and branchiostegal membranes without scales. Preopercle serrate, but without spines or spine-like processes at angle. Gill rakers on first arch 10 to 13 on upper limb and 26 to 31on lower limb, total 36 to 43, usually 37 to 41**. Dorsal fin single, not divided to base at junction of spinous and soft portions; **dorsal spines without long filaments, but usually with tabs or short filaments**. Anal-fin length 26 to 36% standard length. **Caudal fin deeply forked; upper lobe 40 to 126% standard length; lower 37 to 116% standard length. Pelvic-fin length 24 to 36% standard length. Dorsal fin with 10 spines and 15 (occasionally 13, 14, or 16) soft rays. Anal fin with 3 spines and 8, occasionally 7 or 9, soft rays. Pectoral fin with 15 to 19 rays**. Lateral line continuous, not interrupted; **tubed scales in lateral line 42 to 50, usually 44 to 47. Circum-caudal-peduncular scales 22 to 27, usually 23 to 26. Colour:** body and head reddish orange dorsally, silvery laterally and ventrally; iris mostly yellow, but with considerable red; dorsal fin and caudal-fin lobes yellowish; anal, midcaudal, and pelvic fins pallid; pectoral fins pink.

Size: Maximum standard length to about 22 cm, commonly to 17 cm standard length.

Habitat, biology, and fisheries: Specimens examined from depths of 145 to 440 m (the literature reports 91 to 610 m). Females (116 to 151 mm standard length) with vitellogenic oocytes have been collected off the east coast of Florida in May.

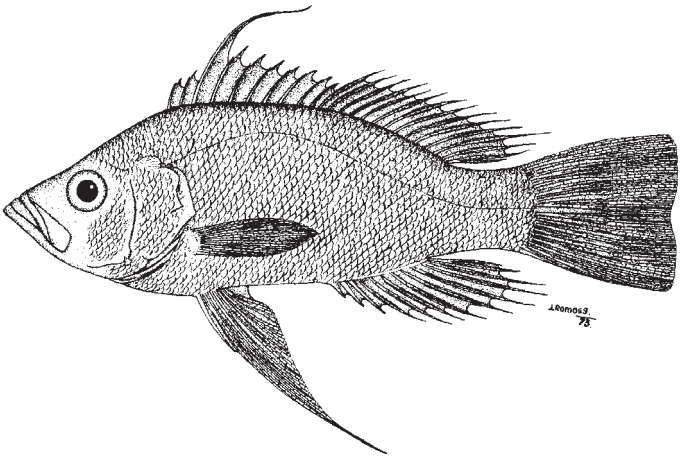


Distribution: New Jersey to the Straits of Florida, Gulf of Mexico, southern Caribbean off Colombia and Venezuela, and off the Atlantic coast of South America from Venezuela to Suriname. A juvenile has been taken well off the coast of Massachusetts. Reported to be moderately common south of Dry Tortugas, Florida, and off Guyana and Suriname. Probably more widespread.

Hemanthias leptus (Ginsburg, 1952)

Frequent synonyms / misidentifications: None / None.

FAO names: En - Longtail bass; **Fr** - Coné grand veil; **Sp** - Cachucho ojón.

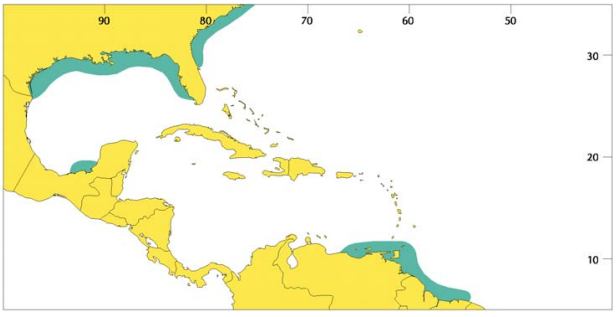


Diagnostic characters: Depth of body at first dorsal-fin spine 27 to 38% standard length, 31 to 38% standard length in specimens greater than about 8 cm standard length. Head length 30 to 36% standard length. Horizontal diameter of bony orbit 6 to 13% standard length, 6 to 9% standard length in specimens greater than about 26 cm standard length. Canine or canine-like teeth present anteriorly in both jaws; vomer and palatines with teeth; vomerine tooth patch chevron-shaped; endopterygoids and tongue toothless. The 2 nostrils on each side of head fairly close together; internarial distance 7 to 13 times in snout length; posterior border of anterior nostril never produced into long slender filament. **Snout, lachrymal region, maxilla, most of interorbital, lower jaw, gular, branchiostegals, and branchiostegal membranes without scales**. Upper limb of preopercle finely serrate; lower limb more coarsely serrate, roughened, or largely smooth; angle roughened, with enlarged serrae, spinous processes, or one or more spines. **Gill rakers on first arch 9 to 12 on upper limb and 24 to 28 on lower limb, total 34 to 39**. Dorsal fin single; **filament of third dorsal-fin spine elongated in larger individuals; longest dorsal spine the third in specimens greater than about 15 cm standard length, third dorsal spine plus its filament 14 to 46% standard length, in specimens 15 to 45 cm standard length**. Anal-fin length 32 to 45% standard length. **In specimens less than about 20 cm standard length caudal fin deeply forked; in those greater than about 31 cm standard length caudal fin truncate (or nearly so) with a median notch. Upper caudal-fin lobe 23 to greater than 55% standard length, 23 to 33% standard length in specimens greater than about 31 cm standard length. Lower caudal-fin lobe 24 to 62% standard length, 24 to 34% standard length in specimens greater than about 31 cm standard length. Pelvic-fin length 24 to 76% standard length, 40 to 76% standard length in specimens greater than about 19 cm standard length. Dorsal fin with 10 spines and 14, rarely 13, soft rays. Anal fin with 3 spines and 8, rarely 7, soft rays**. Pectoral fin with 17 to 20 rays. Lateral line continuous; **tubed scales in lateral line 54 to 62. Circum-caudal-peduncular scales 40 to 46. Colour:** body and head reddish dorsally, pink to silvery laterally and ventrally; yellow or golden stripe from tip of snout to level of pectoral-fin base; fins predominantly yellow and red.

Size: Maximum standard length to about 46 cm, commonly to 35 cm standard length.

Habitat, biology, and fisheries: Known from depths of 35 to 640 m. Ripe females collected in August, spent ones in May and August, ripe males in January, February, and April through July; larvae obtained off Louisiana in January. This species may be protogynous with both primary and secondary males.

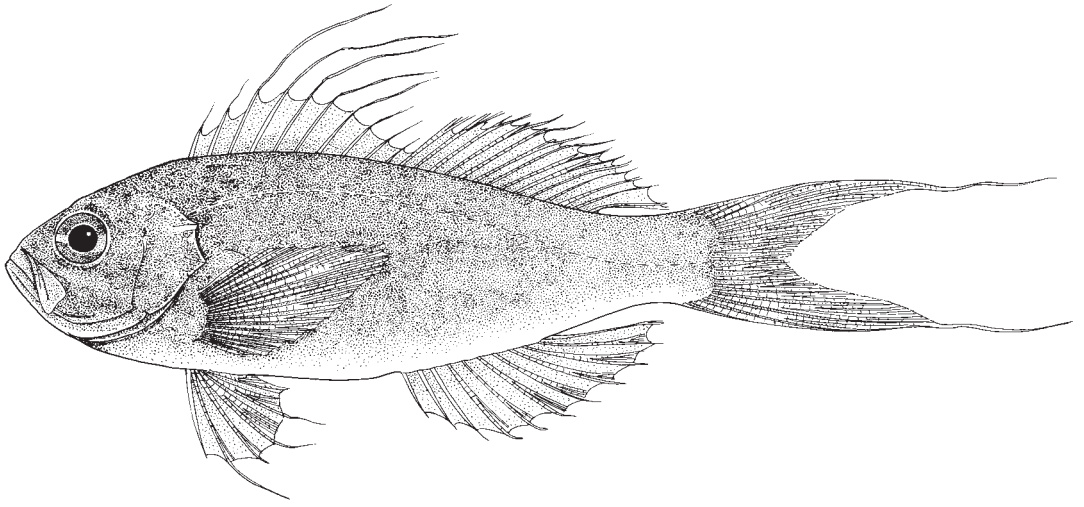
Distribution: North Carolina to central east coast of Florida, Gulf of Mexico, and Venezuela to Suriname. Probably more widespread.



Hemanthias vivanus (Jordan and Swain, 1885)

Frequent synonyms / misidentifications: None / None.

FAO names: En - Red barbier.

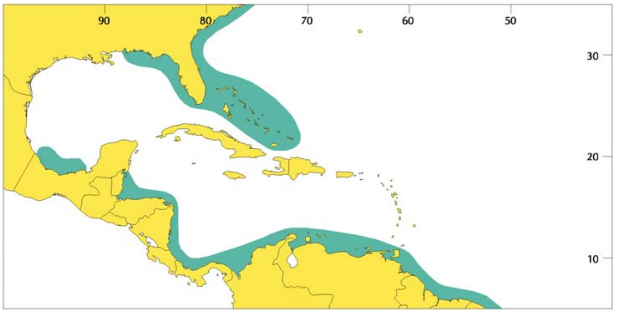


Diagnostic characters: Body comparatively slender, depth of body at first dorsal-fin spine 26 to 35% standard length, usually 28 to 32% standard length. Head relatively short, 28 to 32% standard length. Orbit usually longer than snout, horizontal diameter of bony orbit 7 to 11% standard length. Upper and lower jaws each with a series of conical teeth; canine or canine-like teeth present anteriorly in both jaws; vomer and palatines with teeth; **vomerine tooth patch chevron-shaped to triangular, without posterior prolongation**; endopterygoids and tongue toothless. The 2 nostrils on each side of head fairly close together; internarial distance 5 to 9 times in snout length; posterior border of anterior nostril produced into short flap, but never produced into a long slender filament. **Much of head covered with scales, but snout, lachrymal region, maxilla, interorbital (all to almost all), lower jaw, gular, branchiostegals, and branchiostegal membranes without scales. Preopercle serrate, 1 to several serrae usually enlarged into spines or spine-like processes at angle. Gill rakers on first arch 10 to 13 on upper limb and 27 to 31 on lower limb, total 38 to 43**. Dorsal fin single, not divided to base at junction of spinous and soft portions; **fin membrane extending into filament at distal tip of each dorsal spine, filaments often quite elongated; filament of fourth dorsal-fin spine up to 65% standard length; filaments of dorsal fin relatively short in females, becoming elongated in males**. Anal-fin length 35 to 45% standard length. **Caudal fin deeply forked; upper caudal-fin lobe 40 to greater than 70% standard length; lower caudal-fin lobe 31 to 68% standard length. Pelvic-fin length 28 to 38% standard length. Dorsal fin with 10 spines and 14, occasionally 13, soft rays. Anal fin with 3 spines and 8, occasionally 9, soft rays. Pectoral fin with 16 to 21, usually 18 or 19, rays**. Lateral line continuous, not interrupted; **tubed scales in lateral line 44 to 53, usually 46 to 51. Circum-caudal-peduncular scales 24 to 29, rarely 24 or 25. Colour:** body and head reddish dorsally, lighter ventrally; anal fin mottled with blue and olive in females, bright yellow in males; pelvic fins pink in females, blood red in males.

Size: Maximum standard length to about 15 cm, commonly to 11 cm standard length.

Habitat, biology, and fisheries: Known from depths of 20 to 430 m. Observed from submersibles off North Carolina, usually in large fast-moving schools. Consumes copepods, amphipods, and ostracods. This species is a protogynous hermaphrodite.

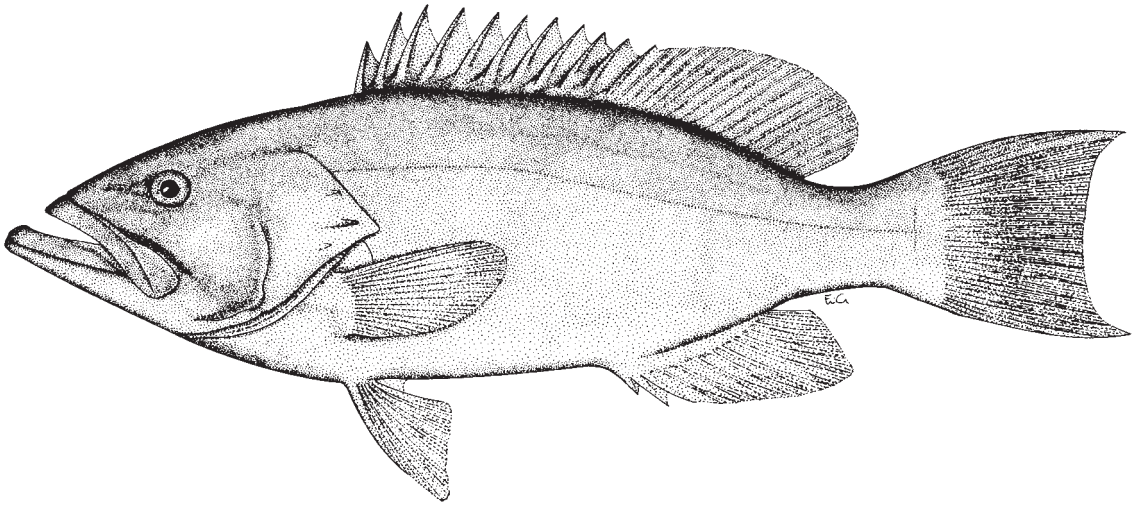
Distribution: New Jersey to the Straits of Florida, Bahamas, Gulf of Mexico, western and southern Caribbean Sea, and Atlantic coast of South America from Venezuela to southern Brazil.



Mycteroperca acutirostris (Valenciennes, 1828) MTI

Frequent synonyms / misidentifications: None / *Mycteroperca rubra* (Bloch, 1793).

FAO names: En - Comb grouper (AFS: Western comb grouper); **Fr** - Badèche peigne; **Sp** - Cuna negra.

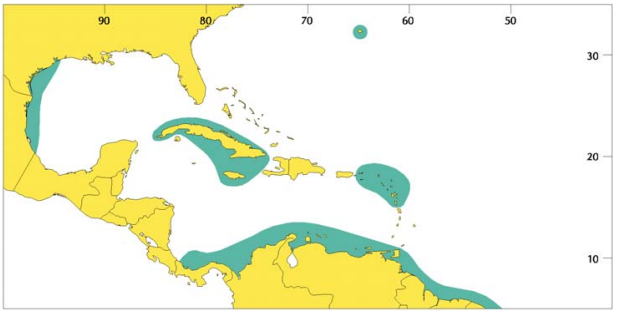


Diagnostic characters: Body oblong, compressed, the depth contained 2.7 to 3.2 times, head length 2.5 to 2.7 times in standard length (for 13 fish 10 to 34 cm standard length); maxilla width 4.4 to 5.8% standard length. Interorbital area convex; preopercle angular, with serrae at the angle enlarged, forming a weak lobe; nostrils subequal. Gill rakers on first arch 16 to 20 on upper limb, 32 to 36 on lower limb, total 48 to 55. **Dorsal fin with 11 spines and 15 to 17 soft rays, interspinous membranes indented, the fin margin rounded posteriorly; anal fin with 3 spines and 10 to 12 soft rays, fin margin distinctly pointed in adults**; pectoral-fin rays 15 to 17. Lateral-line scales 67 to 77; lateral-scale series 85 to 106. **Colour:** head and body greyish brown, covered with irregular white spots and blotches; 3 or 4 dark brown stripes radiating posteriorly from eye and continuing along ventral half of body as wavy dark stripes; another dark brown stripe continuing backwards from maxillary streak to edge of preopercle; median fins darker than body and also with white spots and streaks; juveniles less than 15 cm with a small black saddle on caudal peduncle; large adults mostly uniform greyish.

Size: Maximum total length 80 cm; maximum weight probably around 4 kg.

Habitat, biology, and fisheries: Juveniles occur in turtle grass beds, mangrove areas, and in shallow water amongst soft corals and coral reefs; adults are found on rocky bottoms with high relief. Probably feeds on zooplankton, but no information is available on the food of *M. acutirostris*. Of considerable commercial importance in the Venezuelan fishery where it is the most abundant species of *Mycteroperca*. Caught mainly with traps. Flesh excellent.

Distribution: Northwestern Gulf of Mexico (where it is rare), Cuba, Jamaica, Virgin Islands, Leeward Islands, Panama, Colombia, Venezuela (abundant at Isla Margarita and adjacent islands), Curaçao, and Brazil (common along south coast). Reports of *Mycteroperca acutirostris* (as '*Mycteroperca rubra*') from Bermuda are unsubstantiated. Valenciennes' (1837: 11; 1843: Pl. 3, Fig. 1) reference to '*Serranus acutirostris*' at the Canary Islands is probably a misidentification of *Mycteroperca fusca* (Lowe, 1836).

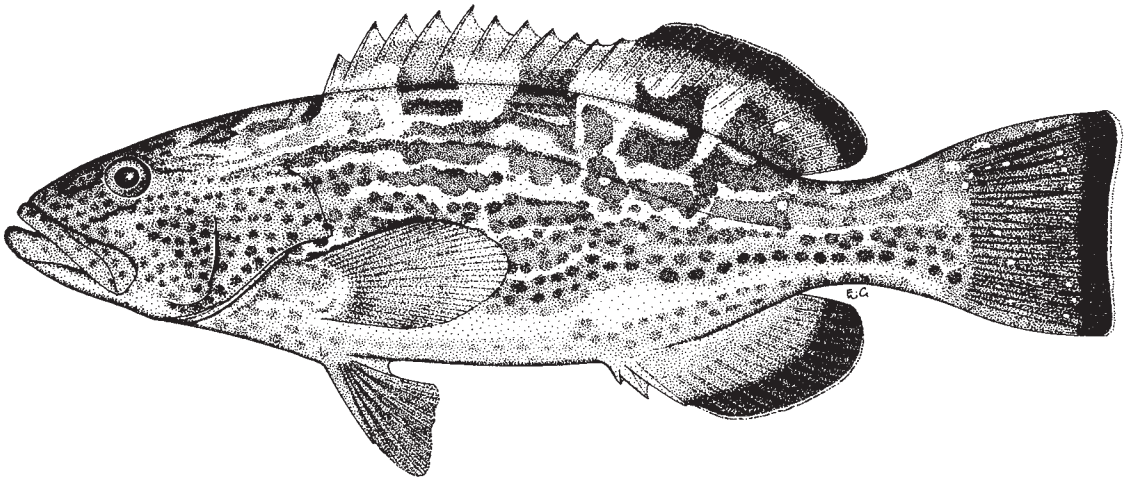


Note: The Venezuelan name for *Mycteroperca acutirostris* is 'cuna negra'. Mycteropterca rubra is confined to the eastern Atlantic and Mediterranean.

Mycteroperca bonaci (Poey, 1860) MAB

Frequent synonyms / misidentifications: None / None.

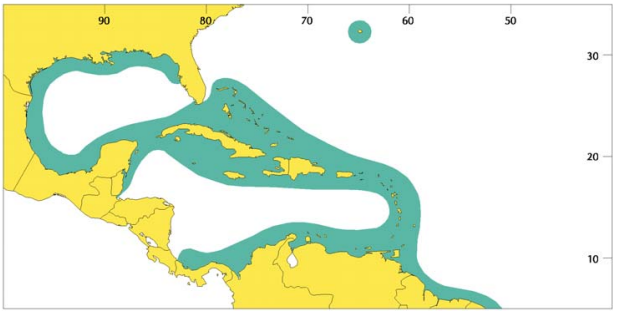
FAO names: En - Black grouper; **Fr** - Badèche bonaci; **Sp** - Cuna bonací.



Diagnostic characters: Body depth distinctly less than head length, contained 3.3 to 3.5 times in standard length (for fish 15 to 59 cm standard length); head length contained 2.5 to 2.8 times in standard length. **Nostrils subequal. Preopercle evenly rounded, without distinct notch or projecting bony lobe at angle**. Developed gill rakers on first arch 2 to 5 on upper limb, 8 to 12 on lower limb, total (including 2 or 3 rudiments on each limb) 19 to 27. **Dorsal fin with 11 spines and 15 to 17 soft rays, interspinous membranes distinctly incised; anal fin with 3 spines and 11 to 13 soft rays; caudal fin truncate (convex if widely spread) to slightly emarginate; no median fin rays exserted; margin of dorsal and anal fins rounded; pectoral-fin rays 16 or 17**. Lateral-line scales 78 to 83; lateral scale series 119 to 126. **Colour:** head and body greyish or dark brown, with close-set, irregular, bronze, or brassy spots separated by a bluish white reticulum (some brassy spots join to form chain-like horizontal streaks); dorsolateral part of body sometimes with 7 or 8 columns of rectangular dark blotches, the first above opercle and the last on caudal peduncle. Pectoral fins dusky brown, gradually becoming orange at the margin; soft dorsal and anal fins and leading edges of pelvic fins with dark margin.

Size: Attains at least 133 cm and a weight of 65 kg; an 81 kg black grouper was reported from Bermuda in the 1940's, but this record is unsubstantiated.

Habitat, biology, and fishery: Occurs on rocky bottom and coral reefs in depths of 10 to 100 m, but in the eastern Gulf of Mexico usually found deeper than 30 m. Juveniles are found in mangrove areas. Adults feed primarily on fishes, and juveniles prey mainly on crustaceans. A protogynous hermaphrodite, with ripe females of 50 to 100 cm and ripe males of 96 to 116 cm. Specimens in spawning condition were caught on the Campeche Bank in July and August. The weight/length relationship is $W = 5.548 \times 10^{-6} L^{3.141}$, where weight is in grams and total length in millimetres. The von Bertalanffy growth equation is $L_t = 1.325(1-e^{-0.1156\,(t+.927)})$, where L_t is total length in millimetres at age t. Average total lengths at ages 1, 5, 10, and 14 are 26, 66, 98, and 111 cm, respectively; and maximum age was estimated to be 17 to 19 years. Important in fisheries of the southern Gulf of Mexico, West Indies, and east coast of Venezuela. Caught with hook-and-line and in traps. In the 1950's *M. bonaci* was one of the most important species in the fishery at Bermuda, but now all groupers are scarce in Bermuda.

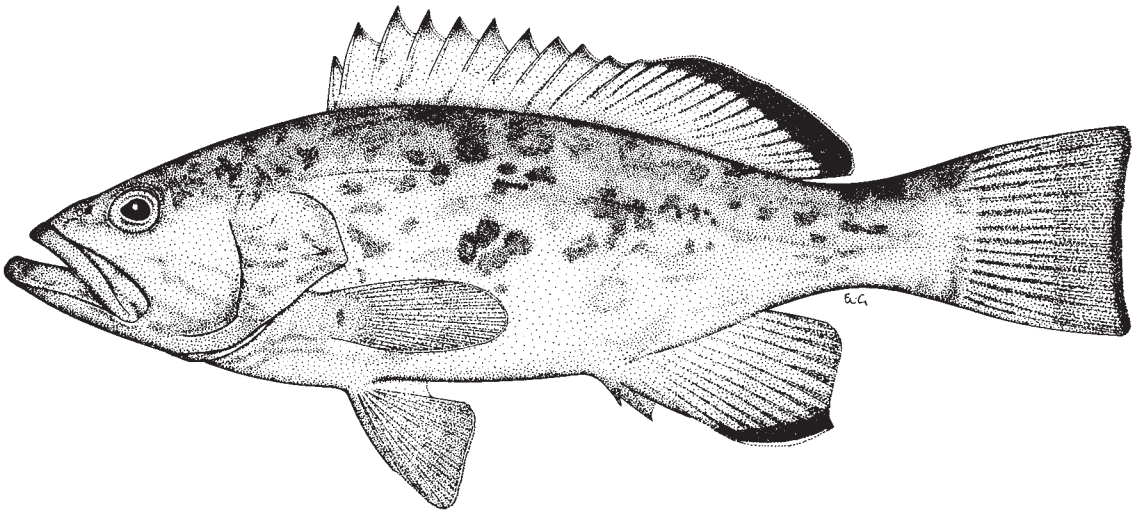


Distribution: Bermuda, Florida Keys, Gulf of Mexico, Bahamas, and throughout the Caribbean; small juveniles occasionally found as far north as Massachusetts, but adults are not known from the east coast of the USA.

Mycteroperca cidi Cervigón, 1966 MKC

Frequent synonyms / misidentifications: None / None.

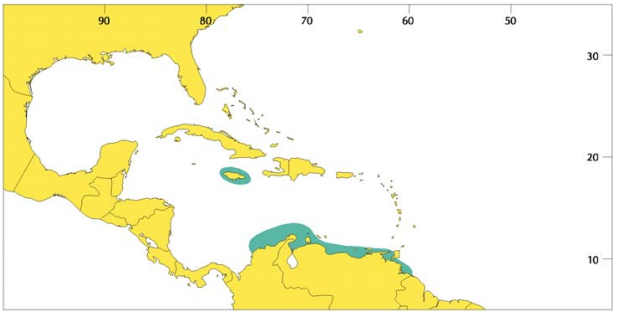
FAO names: En - Venezuelan grouper; **Fr** - Badèche blanche; **Sp** - Cuna blanca.



Diagnostic characters: Body depth less than head length, 3.1 to 3.3 times in standard length (for fish 14 to 93 cm standard length). **Nostrils subequal in fish less than 25 cm, but rear nostril much larger than front one in adults (larger than 40 cm total length)**. Interorbital convex. **Preopercle with distinct lobe bearing enlarged serrae at angle.** Gill rakers on first arch well developed, the longest longer than eye diameter, 9 to 13 on upper limb, 18 to 23 on lower limb, including 2 or 3 rudiments on each limb. **Dorsal fin with 11 spines and 15 to 17 soft rays, posterior fin margin angular in adults, with ninth to eleventh rays elongated; anal fin with 3 spines and 10 to 12 soft rays, the fin margin pointed in adults, with fourth to sixth rays elongated; caudal fin truncate to slightly emarginate, with greatly exserted rays in adults**; pectoral-fin rays 15 to 17. Lateral body scales smooth; lateral scale series 120 to 126; lateral-line scales 75. **Colour:** dark brownish grey, darker dorsally with greenish iridescent colours in live fish; body scattered with irregular dusky brown spots of similar size to the pupil; head usually with dark longitudinal bands including one on cheek at upper edge of maxilla; front of snout dark brown. Spinous dorsal fin dark translucent grey, soft dorsal fin darker, with white edge and submarginal black band; anal fin similar to soft dorsal fin, with conspicuous white edge. Pectoral fins translucent greyish yellow, with narrow terminal border colourless and a dusky submarginal area in the upper part; pelvic fins dusky becoming blackish distally, with narrow white edge. Dark spots and bands on head less distinct on fish larger than 40 cm, and large adults (greater than 80 cm) are pale greyish brown, with lower part of head white.

Size: Maximum total length at least 114 cm; maximum weight about 14.5 kg.

Habitat, biology, and fisheries: Juveniles (10 to 15 cm) are common on soft coral reefs in 5 to 8 m; subadults (20 to 40 cm) occur on reefs in 18 to 36 m, and adults (over 50 cm) are usually caught in 80 to 160 m. This species is of commercial importance on the east coast of Venezuela, where it is one of the 3 most abundant groupers in shallow water. It is usually caught in fish traps, and the largest specimens are caught with hook-and-line.



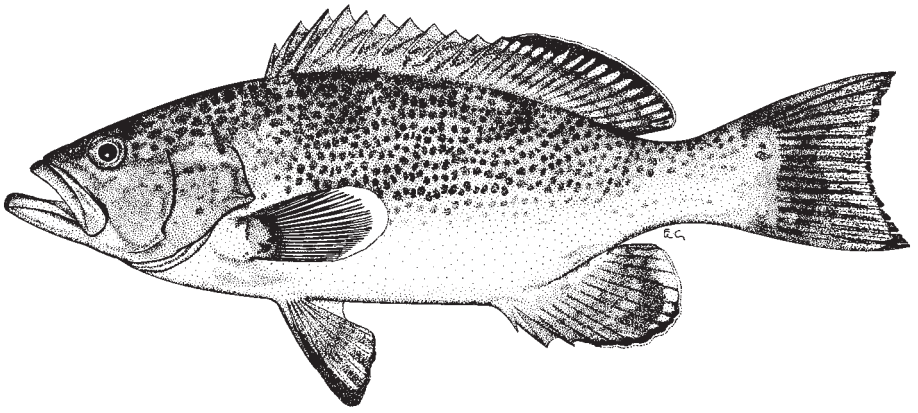
Distribution: Coast of Colombia and Venezuela. Three specimens reported from the Port Royal reefs off Jamaica.

Remarks: The local names for *M. cidi* are 'cuna rabo rajao' for large adults, and 'cuna blanca' for juveniles.

Mycteroperca interstitialis (Poey, 1860) MKN

Frequent synonyms / misidentifications: *Mycteroperca roquensis* Martin, 1956 / None.

FAO names: En - Yellowmouth grouper; **Fr** - Badèche gueule jaune; **Sp** - Cuna amarilla.



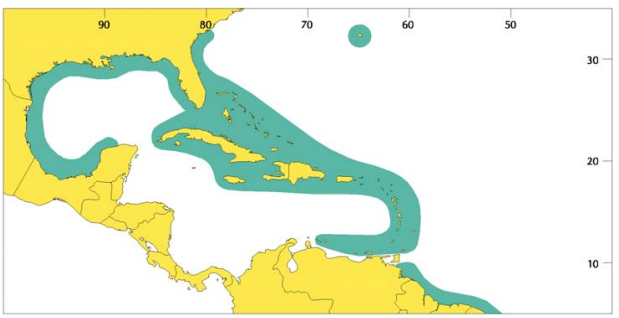
Diagnostic characters: Body depth less than head length, 3.0 to 3.4 times in standard length (for fish 22 to 65 cm standard length). **Posterior nostrils greatly enlarged in adults; preopercle with prominent lobe bearing enlarged serrae at angle**. Gill rakers on first arch 4 to 6 on upper limb, 11 to 15 on lower limb, plus 3 to 5 rudiments on each limb, total 23 to 27. **Dorsal fin with 11 spines and 16 to 18 soft rays, posterior fin margin pointed in adults, with ninth to eleventh rays elongated; anal fin with 3 spines and 11 or 12 soft rays, fin margin pointed in adults, with sixth to eighth rays elongated; caudal fin emarginate, with exserted rays in adults**; pectoral-fin rays 16 or 17. Lateral body scales ctenoid (weakly so in large adults); lateral-scale series 112 to 119; lateral-line scales 70 to 74. **Colour:** pale brownish grey, with **close-set small brown spots on dorsal part of head and body; spinous dorsal-fin margin and mouth yellowish; pectoral-fin membrane clear, rays dark, edge of fin white**; dark moustache streak above maxilla. Some fish uniform brown dorsally, and others may have faint, irregular vertical bars. **Juveniles bicoloured**: head and body dark brown dorsally (dark dorsal colour may be broken into broad dark bars or saddle blotches) and abruptly white below; black spot at base of upper caudal-fin rays.

Size: Maximum total length 74 cm, maximum weight 7 kg.

Habitat, biology, and fisheries: Usually found on coral reefs and rocky bottoms in 20 to 150 m. Spawning occurs on the Florida Middle Grounds in December, March to July, and September; and in Jamaica in April. Batch fecundity estimates ranged from 351 x 10^3 to 2 459 x 10^3 oocytes/ovary for Gulf of Mexico fish of 37 and 46 cm standard length respectively. Adults almost exclusively piscivorous. *M. interstitialis* and its continental 'replacement' *M. phenax* are common in the algal-sponge zone of the Flower Garden Banks in the northwestern Gulf of Mexico. *M. interstitialis* is important in grouper fisheries of the Gulf of Mexico and Caribbean. Caught with traps, hook-and-line, and spears.

Distribution: Bermuda, Gulf of Mexico, West Indies, Venezuela (offshore islands) and southern Brazil.

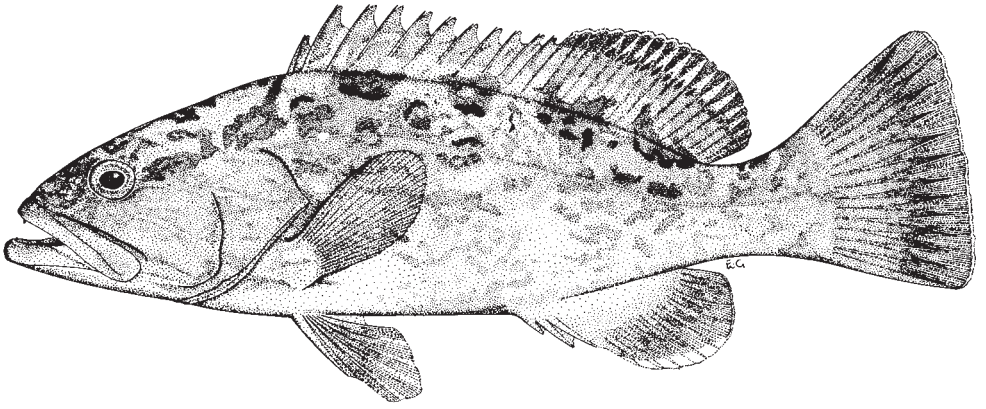
Remarks: *M. interstitialis* is very similar to *M. phenax*; adults of both species have a projecting lobe at corner of preopercle, similar colour pattern, similar numbers of fin rays, enlarged posterior nostrils, and exserted median fin rays. *M. interstitialis* of 20 to 57 cm standard length usually has shorter pelvic fins and a shorter head (15 to 17% and 30 to 36% of standard length, versus 18 to 20% and 36 to 38% respectively in *M. phenax*). *M. interstitialis* lacks dark spots on the dorsal and anal fins, and the exserted caudal-fin rays are of similar length; whereas *M. phenax* has small brown spots on these fins and the exserted caudal rays are more uneven. Juveniles of *M. interstitialis* are distinctly bicoloured, but juveniles of *M. phenax* are coloured much like adults. In Venezuela the yellowmouth grouper is known as 'cuna chulinga' or 'cuna amarilla', and large yellowmouth are called 'cuna raba rajao'; the Cuban name is 'abadejo'.



Mycteroperca microlepis (Goode and Bean, 1879) MKM

Frequent synonyms / misidentifications: None / *Mycteroperca bonaci*.

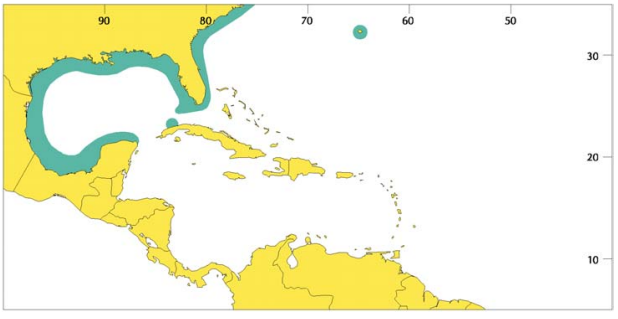
FAO names: En - Gag grouper (AFS: Gag); **Fr** - Badèche baillou; **Sp** - Cuna aguaji.



Diagnostic characters: Body depth distinctly less than head length, 3.0 to 3.5 times in standard length (for fish 12 to 26 cm standard length). Interorbital convex. **Adults (larger than 60 cm) with posterior nostrils much larger than anterior ones; preopercle corner of adults with rounded lobe bearing enlarged serrae. Dorsal fin with 11 spines and 16 to 18 soft rays, third or fourth spines longest, interspinous membranes distinctly incised. Anal fin with 3 spines and 10 to 12 soft rays; dorsal and anal fins rounded at all sizes; no exserted fin rays. Caudal fin truncate in juveniles, emarginate in large adults. Pectoral-fin rays 16 to 18**. Lateral body scales smooth, except those covered by pectoral fin; lateral-scale series 128 to 146; lateral-line scales 88 to 96. **Colour:** variable, adult females and juveniles generally brownish grey with darker vermiculations; a resting or 'camouflage phase' shows 5 dark brown saddles separated by short white bars below the dorsal fin; this pattern is characteristic of fish that are sitting on the bottom. Unlike the camouflage phase, the 'black-belly' and 'black-back' phases are not ephemeral and are displayed only by large adults (males). The black-belly phase is mostly pale grey, with faint dark reticulations below soft dorsal fin; the belly and ventral part of body above anal fin are black, as are the margin of the soft dorsal fin, central rear part of caudal fin, and rear margins of pectoral and pelvic fins. The black-back phase is similar to the black-belly phase but with more black pigment on rear part of body, dorsal half of peduncle, all of soft dorsal and anal fins, and also over snout and front of jaws; the caudal fin is white with a black margin posteriorly.

Size: Maximum length about 120 cm; maximum weight 39 kg.

Habitat, biology, and fisheries: Juveniles occur in estuaries and seagrass beds; adults usually offshore on rocky bottoms in 40 to 80 m, and inshore (away from heavily fished areas) on rocky or grassy bottoms. Females mature at 5 or 6 years (67 to 75 cm total length) and most change sex between 10 and 11 years (95 to 100 cm). Transient spawning aggregations are formed in 50 to 120 m in the eastern Gulf of Mexico from late December to April. Fecundity of a 95 cm female was estimated at 1.5 million eggs. Artificial spawning was accomplished with males produced by induced sex inversion of females. Adults are solitary or in groups of 5 to 50 fish, 5 to 15 m above the bottom; they feed mainly on fishes and also take some crabs, shrimps, and cephalopods; juveniles (less than 20 cm) feed mainly on crustaceans (primarily shrimps) that live in shallow grass beds. The weight/length relationship for gag from the eastern Gulf of Mexico is $W = 2.68 \times 10^{-8}$ standard length$^{2.958}$ where W is in kilograms and standard length is in millimetres. One of the most important groupers in the sport and commercial fisheries of the southeast coast of the USA and in the Gulf of Mexico. Caught with hook-and-line, longlines, and occasionally in trawls.

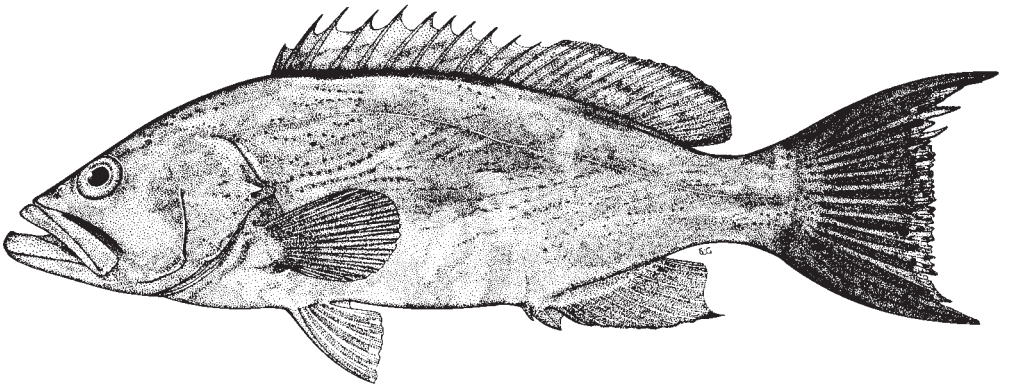


Distribution: Mainly continental, from North Carolina to Yucatán Peninsula; juveniles occur as far north as Massachusetts; rare in Bermuda; not known in the Caribbean except for one record from Cuba; also reported from southern Brazil.

Mycteroperca phenax Jordan and Swain, 1884 MKH

Frequent synonyms / misidentifications: None / None.

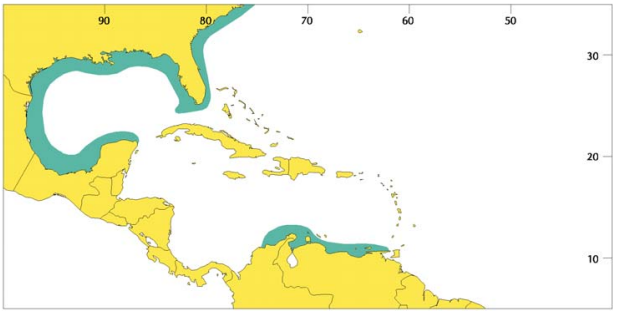
FAO names: En - Scamp; **Fr** - Badèche galopin; **Sp** - Cuna garopa.



Diagnostic characters: Body depth contained 3.0 to 3.4 times, head length 2.6 to 3.0 times in standard length (for fish 20 to 57 cm standard length). **Posterior nostrils of adults 2 to 4 times larger than anterior nostrils. Preopercle of adults (larger than 40 cm standard length) with projecting bony lobe at angle**. Gill rakers on first arch 8 to 10 on upper limb, 17 to 21 on lower limb, 26 to 31 total (including 3 or 4 rudiments on each limb); longest raker is longer than the longest gill filament. Adults with unevenly exserted rays in dorsal, anal, and caudal fins; **dorsal fin with 11 spines, 16 to 18 soft rays; anal fin with 3 spines, 10 to 12 soft rays; caudal fin concave**; pectoral-fin rays 15 to 17. Lateral body scales ctenoid; lateral-line scales 76 to 82; lateral-scale series about 124. **Colour:** Gilmore and Jones (1992) described 4 colour patterns: the usual pattern is the brown phase, with head and body pale brownish grey, covered (except ventrally) with **closely-set, small dark spots (1 on each scale) which extend onto the median fins; angle of mouth yellowish**. The 'cat's paw' phase is pale brown, the dorsolateral parts of body with several clusters of dark brown spots resembling the paw print of a cat. Large adults (50 to 70 cm standard length) displayed a grey-head phase, with rear 2/3 of body dark, the head and body anterior to sixth dorsal-fin spine silvery grey with dark reticulations, belly and ventral part of body above anal fin with several white spots; fins white except for black margin of pectoral fins. A bicolour phase (seen once) was pale brown anteriorly and abruptly dark brown posterior to origin of soft dorsal fin.

Size: Maximum total length (not including exserted caudal rays) is 90 cm, maximum weight about 15 kg.

Habitat, biology, and fisheries: In the eastern Gulf of Mexico, usually found over ledges and high-relief rocky bottoms; but the preferred habitat from North Carolina to Georgia is low-profile bottoms in depths of 30 to 100 m. Off the east coast of Florida, the most abundant grouper in areas of living *Octolina* coral formations at depths of 70 to 100 m. Because of their relatively small size, they may be restricted to areas of topographic complexity where they can find shelter from predators such as sharks and large *Seriola dumerili*. Juvenile scamp have been found at jetties and in mangrove areas. Off the Carolinas, scamp grow slowly and attain an age of 21 years (89 cm fork length); maturity is attained at 3 years (40 cm). The weight/length relationship for scamp in the eastern Gulf of Mexico is $W = 1.10 \times 10^{-7}$ standard length$^{2.74}$ where W is in kilograms and standard length is in millimetres. Feed mainly on fishes, but crustaceans and octopus are also occasionally eaten. The most highly prized grouper in fisheries of the Gulf of Mexico, southeastern USA, and Venezuela.



Distribution: Mainly continental: North Carolina to Key West, Gulf of Mexico and along southern shore of Caribbean; juveniles occasionally found as far north as Massachusetts.

Remarks: Although adult *M. phenax* and *M. interstitialis* are very similar (see Remarks in account of *M. interstitialis* above), the juveniles of *M. phenax* are not bicoloured like those of *M. interstitialis*.

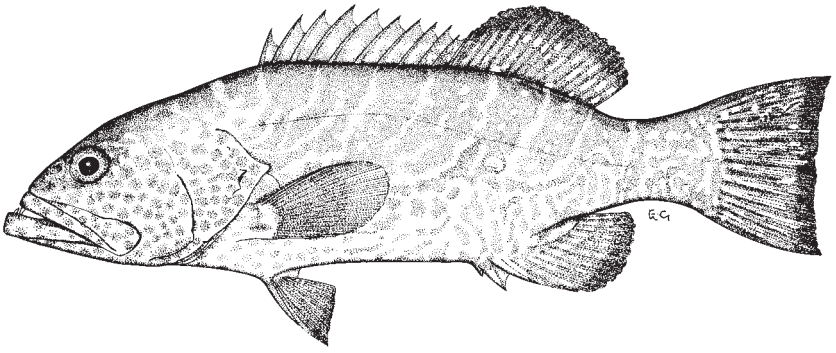
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Mycteroperca tigris (Valenciennes, 1833) MKT

Frequent synonyms / misidentifications: None / None.

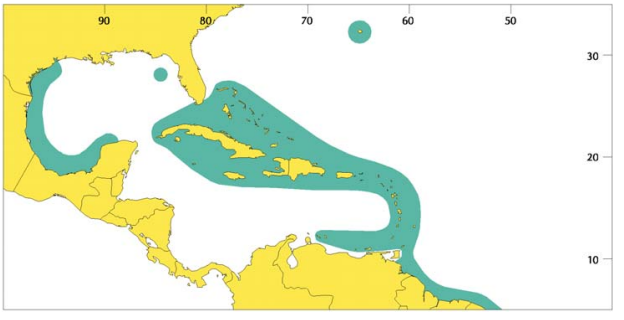
FAO names: En - Tiger grouper; **Fr** - Badèche tigre; **Sp** - Cuna gata.



Diagnostic characters: Body depth contained 3.1 to 3.6 times, head length 2.5 to 2.8 times in standard length (for fish 19 to 43 cm standard length). **Rear nostrils of adults 3 to 5 times larger than front nostrils**. Teeth large, canines well developed. **Preopercle without a projecting bony lobe at 'corner'**. Gill rakers on first arch short, 8 (including 5 or 6 rudiments) on upper limb, 15 to 17 (including 7 to 9 rudiments) on lower limb, total 23 to 25. **Dorsal fin with 11 spines and 15 to 17 soft rays, the interspinous membranes distinctly indented; anal fin with 3 spines and 11 soft rays; soft dorsal and anal fins pointed, with middle rays elongate in large adults; caudal fin rounded in juveniles, truncate to emarginate with exserted rays in fish 60 to 80 cm**; pectoral-fin rays 17. Midlateral body scales ctenoid in juveniles, smooth in adults; lateral-line scales 82 or 83; lateral-scale series about 120. **Colour:** adults greenish brown to brownish grey with close-set, small, brown or orange-brown spots, the interspaces forming a pale green or whitish network; head and body darker dorsally, with 9 to 11 alternating oblique pale stripes and broader dark bars; median fins with irregular pale spots and stripes; pectoral fins pale yellow distally; inside of mouth reddish orange or dusky orange-yellow. Live coloration of small juveniles (3 to 10 cm standard length) yellow, with blackish brown midlateral stripe from tip of lower jaw through eye and along body almost to caudal fin, the stripes of left and right sides do not meet on lower jaw, and become fainter with growth, being mostly obscured by the dark oblique dorsal bars on the body of fish larger than 20 cm standard length. Small juveniles may show the oblique dark bars of adults as a stress pattern.

Size: Maximum total length 100 cm; maximum weight at least 10 kg.

Habitat, biology, and fisheries: On coral reefs and rocky bottom in 10 to 40 m. The size/sex distribution of Bermuda and Puerto Rican fish indicates that *M. tigris* is a protogynous hermaphrodite: all fish less than 37 cm were females, and all fish larger than 45 cm were males. A spawning aggregation was observed at Puerto Rico in February 1992. Males in courtship displayed a pale yellow to bronze head, pectoral fins black with yellow tip, anal-fin base and area on body above anal fin white. Females exhibited the usual colour and pattern, but a white blotch like that of males was displayed at the time of spawning, when the female rose off the bottom to join a male hovering 1 to 2 m above the bottom and displaying an intensely pale head and white ventral area. Gametes were released as the fish came together a few metres above the bottom. Annual fecundity estimates for 13 females 255 to 375 mm standard length ranged from 154 030 to 986 217 oocytes per fish. Sexual maturity is estimated to be attained at 2 years (25 cm standard length) and a fish of 42 cm standard length is 9 years old. A sedentary ambush predator that feeds almost exclusively on a wide variety of fishes. Of commercial interest in the Caribbean. Caught with traps, hook-and-line, and with spears.

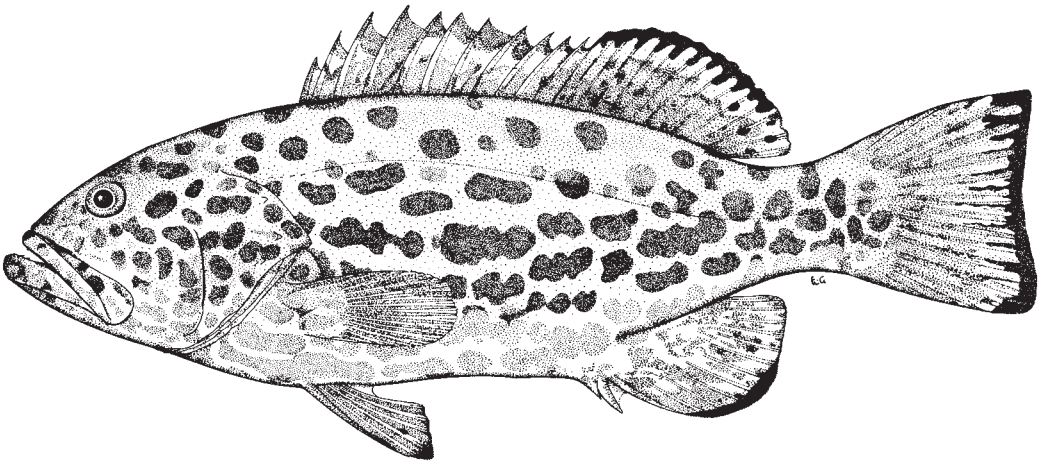


Distribution: Bermuda; south Florida, Gulf of Mexico (common on the Flower Garden Banks off Texas), West Indies, Venezuela (oceanic islands but not known from the mainland) to southern Brazil.

Mycteroperca venenosa (Linnaeus, 1758) MKV

Frequent synonyms / misidentifications: None / None.

FAO Names: En - Yellowfin grouper; **Fr** - Badèche de roche; **Sp** - Cuna de piedra.



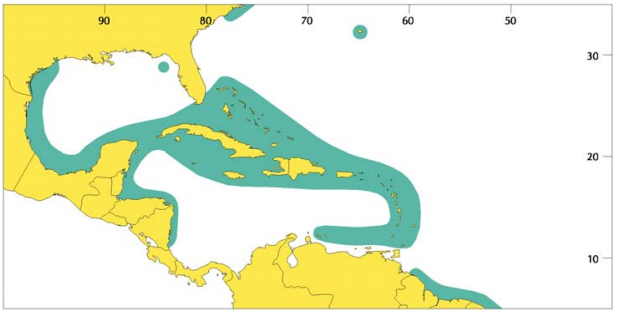
Diagnostic characters: Body depth contained 2.9 to 3.2 times, head length 2.6-2.9 times in standard length (for fish 15 to 54 cm standard length); in standard length. **Nostrils subequal or rear nostrils about twice diameter of anterior nostrils**. Interorbital area convex; **preopercle evenly rounded or with a slight notch, but no projecting bony lobe at angle**. Gill rakers on first arch 8 to 10 on upper limb, 17 to 18 on lower limb, including 4 to 7 rudiments on each limb, total 24 to 27. **Dorsal fin with 11 spines and 15 or 16 soft rays, the interspinous membranes distinctly indented; anal fin with 3 spines and 10 to 12 soft rays; soft dorsal- and anal-fin margins rounded; no exserted fin rays; caudal fin truncate in juveniles, concave in adults**; pectoral-fin rays 16 to 18. Midlateral body scales ctenoid in juveniles, smooth in adults, with numerous auxiliary scales; lateral-line scales 72 to 81; lateral-scale series 111 to 125. **Colour:** 2 colour morphs: a deep-water reddish form and a shallow-water greenish form; head and body with oblong dark blotches overlying groups of small black spots; ventral part of head and body with dark red spots; soft dorsal, anal, and caudal fins with dark margin and white edge; distal third of pectoral fins abruptly yellow, the basal part of fin with small irregular dark spots.

Habitat, biology and fisheries: Juveniles occur in shallow turtle grass beds; adults usually found on rocky and coral reefs in depths of 2 to 137 m, but has also been taken in trawls over mud bottoms in the northern Gulf of Mexico. Spawning occurs at Bermuda in July, in the Florida Keys during March, in the eastern Gulf of Mexico from March to August, at Jamaica from February to April and off Puerto Rico in April. Batch fecundity estimates of vitellogenic eggs for 2 fish, 696 and 725 mm standard length, are 2.0 X 10^6 and 2.8 X 10^6 respectively. Ripe males as small as 54 cm standard length were found in the Florida Keys population. The food at 18 to 75 cm standard length was 95% fishes (mainly coral reef species) and 4% squids. One of the most abundant groupers in the Caribbean. Although often implicated in ciguatera poisonings (as its name implies), a desirable foodfish; and even large fish (5 to 10 kg) from localities considered safe are readily sold in markets. Caught with traps, spears, and hook-and-line.

Size: Attains at least 100 cm total length. The 2002 all-tackle record of the International Game Fish Association is a 18.48 kg fish caught off Texas.

Distribution: Bermuda, North Carolina, south Florida, Gulf of Mexico (rare), West Indies, Honduras, Nicaragua, Venezuela (common at Islas Los Roques and Blanquilla) to São Paulo, Brazil.

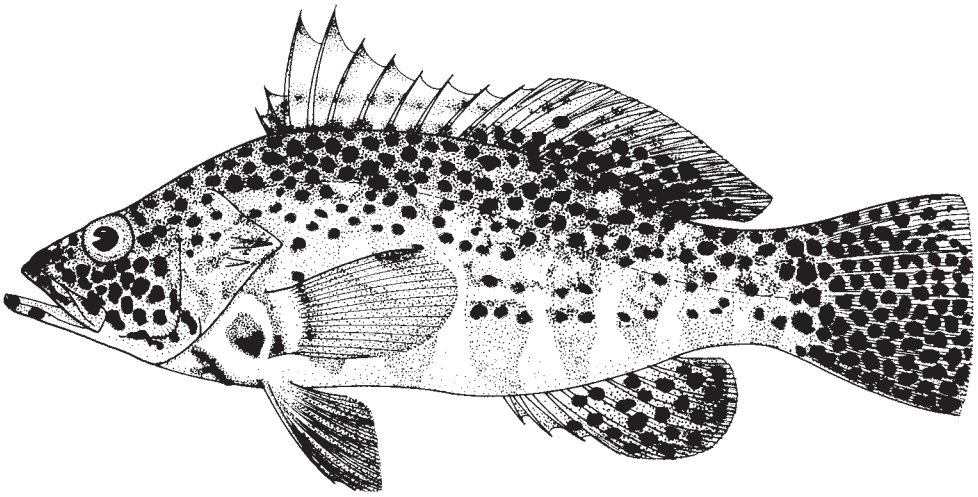
Remarks: Local Names: Bermuda: red rockfish, princess rockfish; Cuba: bonaci cardenal, arigua, bonaci de piedra; Venezuela: cuna cucaracha, cuna cabrilla.



Paralabrax dewegeri (Metzelaar, 1919)

Frequent synonyms / misidentifications: *Serranus dewegeri* Metzelaar, 1919 / None.

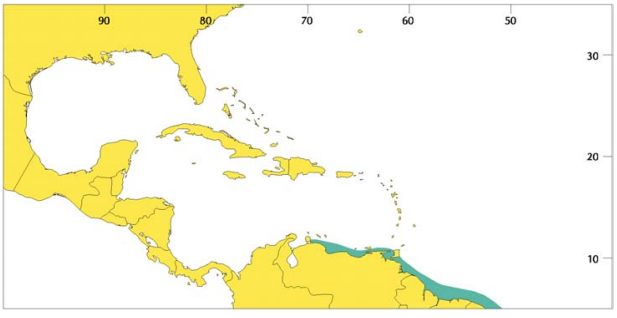
FAO names: En - Vieja; **Fr** - Serran vieux; **Sp** - Mero viejo.



Diagnostic characters: Body depth contained 2.3 to 2.9 times, head length 2.2 to 2.6 times in standard length (for fish 12 to 35 cm standard length). Anterior nostril a short tube with fimbriate flap posteriorly; posterior nostril with a low fimbriate flange. **Interorbital area flat; preopercle evenly rounded, finely serrate**; upper spine on opercle blunt and inconspicuous, middle and lower spines sharp and exposed. Maxilla naked, reaching vertical at centre of eye; no supramaxilla; jaws with short, conical teeth; villiform teeth on vomer and palatines. Gill rakers on first arch on upper limb 7, lower limb 14 (including 4 rudiments), total 21. **Dorsal fin with 10 spines and 13 or 14 soft rays, the third and fourth spines distinctly longer than others and about equal to longest dorsal rays**; the interspinous membranes distinctly indented; anal fin with 3 spines and 7 soft rays; soft dorsal and anal fin margins rounded; caudal fin truncate, with 15 branched rays; pectoral-fin rays 17. Midlateral body scales ctenoid; **lateral-line scales 55 to 58; lateral-scale series 75 to 85**. **Colour:** dorsal part of head and body mottled with irregular spots of dark brown and greenish white; ventral part of body with 6 or 7 dark brown or blackish vertical bars that reach almost to the ventral midline and are wider than the greenish white interspaces. Sides of head with rounded, brownish orange spots (some joined) on a pale greenish background. A row of small, rounded, blackish spots from rear end of maxilla to base of pelvic fins. Throat dusky yellow. Pectoral fin greyish brown, the base with a round dark brown spot followed by a white area and 4 spots forming a dark brown semicircle. Rear margin of caudal fin orange dorsally, the rest of fin with round greyish spots; margin of soft dorsal fin orange, rest of fin with round greyish spots like the spinous dorsal and anal fin. The colours of juveniles more vivid and more distinctly contrasting.

Size: Maximum about 40 cm and a weight of 1.3 kg.

Habitat, biology, and fisheries: Found in a variety of habitats from shore to 50 m; juveniles occur in seagrass beds; adults are common in 10 to 25 m among soft corals. Feeds mainly on crustaceans (crabs and shrimps) and also fishes, molluscs, worms, and brittle stars. A protogynous hermaphrodite, with females mature at 11 cm standard length. Flesh excellent, but not of much commercial importance because of its relatively small size (compared to most groupers), and it is usually caught in small numbers. Caught with traps and hook-and-line.

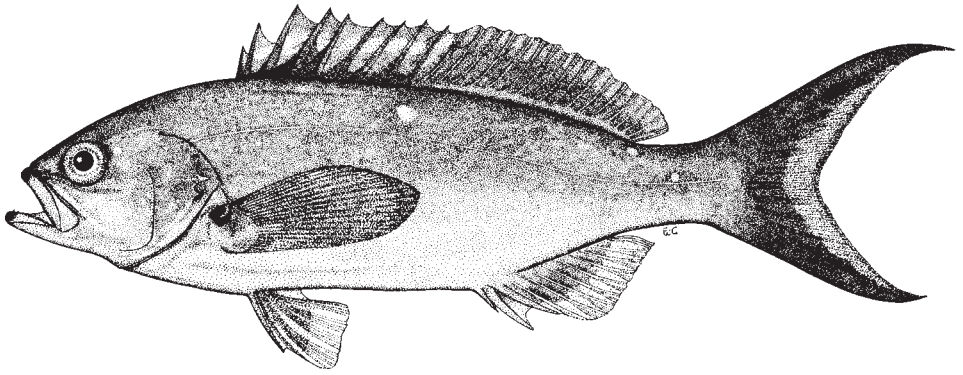


Distribution: Venezuela to northeast Brazil (Fortaleza). Most abundant on the northeast shelf of Venezuela and nearby islands (Margarita, Coche, and Cubagua); not known from the offshore islands.

Paranthias furcifer (Valeciennes, 1828) TIF

Frequent synonyms / misidentifications: None / None.

FAO names: En - Creolefish (AFS: Atlantic creolefish); **Fr** - Badèche créole; **Sp** - Cuna lucero.

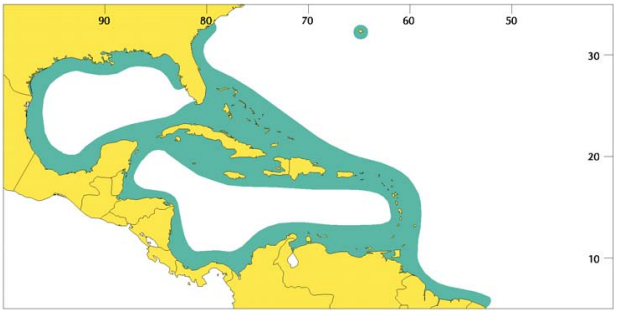


Diagnostic characters: Body oblong, fusiform, the depth contained 2.9 to 3.4 times, head length 3.4 to 3.98 times in standard length (for fish 12 to 28 cm standard length). Mouth small, the maxilla not reaching past vertical at centre of eye; upper jaw more protrusile than in other groupers; supramaxilla rudimentary or absent; no knob or step on lower edge of maxilla; teeth on jaws small, the canines rudimentary; palatines and vomer with villiform teeth. Interorbital convex; preopercle subangular, the vertical edge and rear half of lower edge finely serrate; nostrils subequal. Gill rakers on first arch long, no rudiments, 12 to 14 on upper limb, 24 to 26 on lower limb, total 37 to 38. **Dorsal fin with 9 spines and 17 to 19 soft rays, interspinous membranes only slightly indented**; anal fin with 3 spines and 8 to 10 soft rays; **caudal fin deeply forked, the middle rays less than half length of upper or lower caudal lobes**; pectoral fin about equal to head length and distinctly longer than pelvic fins; pectoral-fin rays 19 to 21. Lateral body scales ctenoid (rough); lateral-line scales 69 to 77; lateral-scale series120 to 129. **Colour:** head and body reddish brown, paler ventrally; bright orange-red spot at upper end of pectoral-fin base; 3 widely-spaced white spots between lateral line and dorsal-fin base; 2 blue lines on cheek, one approximately horizontal and tangent to lower edge of eye, the other along upper edge of maxilla and continued onto lower part of cheek; yellow-green spot on each interspinous dorsal-fin membrane and continued onto soft-rayed part of fin as a dark green submarginal line.

Size: Maximum about 35 cm fork length.

Habitat, biology, and fisheries: Coral reefs and hard bottom areas in depths of 10 to 64 m. Usually observed in feeding aggregations well above the reef. Feeds on zooplankton, mainly copepods, pelagic tunicates, shrimps and shrimp larvae. Ripe fish were found at Bermuda in May and June, at Jamaica in January and March, and at the Florida middle grounds from April to October. Batch fecundity estimates for 2 females 218 and 289 mm standard length were 177 378 and 640 066 oocytes respectively. Because of its small size, not of much interest as a foodfish, but commonly used for bait. In Venezuela, usually caught in traps, which is surprising for a fish that feeds on zooplankton.

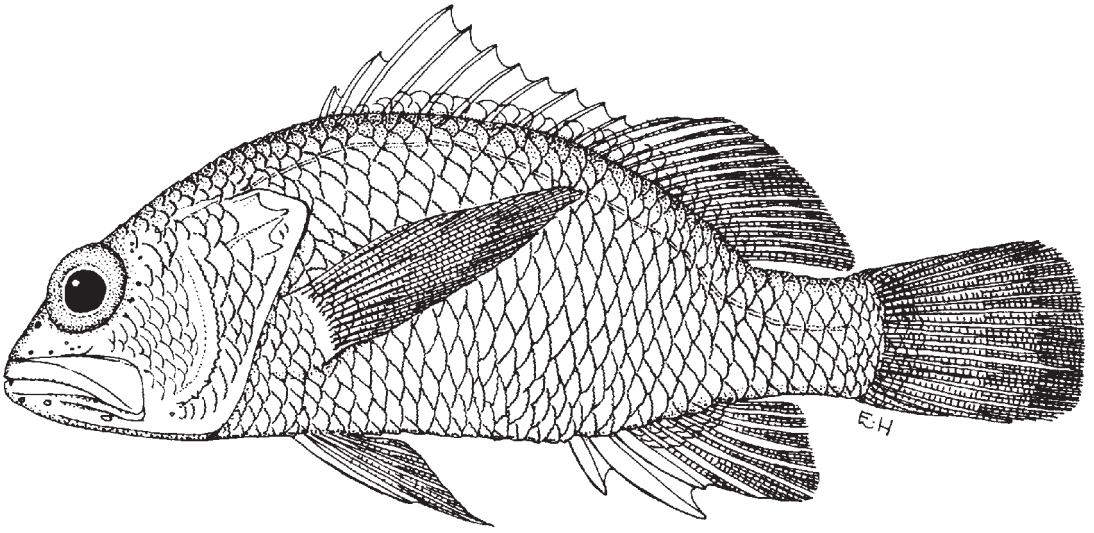
Distribution: Bermuda, South Carolina, Florida, Gulf of Mexico, throughout West Indies and from Panama to Brazil. The eastern Pacific species, *Paranthias colonus* (Valenciennes, 1855) was synonymised with *P. furcifer* by C.L. Smith (1971), but Heemstra and Randall (1993) showed significant differences in the mean numbers of dorsal- and anal-fin rays for these two taxa. Johnson and Keener (1984) compared the configuration of the spinelets on the elongated second dorsal- and pelvic-fin spines of Atlantic and Pacific larvae and found notable differences that 'seem to offer morphological evidence for taxonomic separation of the Atlantic and Pacific populations of *P. furcifer*'.



Plectranthias garrupellus Robins and Starck, 1961

Frequent synonyms / misidentifications: None / None.

FAO names: En - Apricot bass.

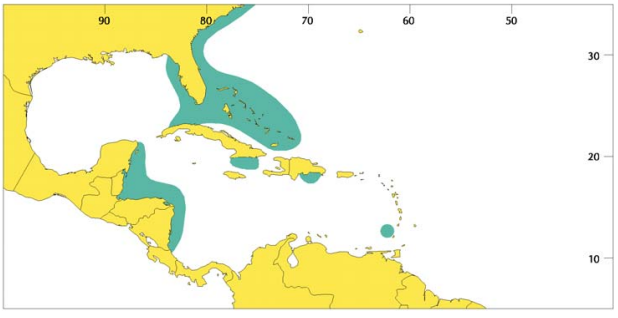


Diagnostic characters: Depth of body at first dorsal-fin spine 29 to 42% standard length. Head relatively large, its length 40 to 44% standard length. In specimens greater than about 4 cm standard length, orbit longer than snout, horizontal diameter of bony orbit 10 to 12% standard length. **Lower limb of preopercle with 1 to 3 antrorse spines**. Jaws with mostly conical teeth; canine or canine-like teeth present anteriorly in both jaws; vomer and palatines with teeth; **vomerine teeth in a chevron-shaped patch without a posterior prolongation**; endopterygoids and tongue toothless. The two nostrils on each side of head close together; internarial distance 7 to 14 times in snout length; anterior nostril at distal end of short tube, posterior border of tube not produced into a long slender filament. **Snout and most of lower jaw without scales**; maxilla with or without scales which may be embedded and difficult to see. **Gill rakers on first arch 4 to 6 on upper limb and 10 to 13 on lower limb, total 14 to 18**. Dorsal fin single, not divided to base at junction of spinous and soft portions, but fin may appear notched at junction. **Dorsal fin with 10 spines and 15 to 17, rarely 17, soft rays**. Anal-fin length 27 to 37% standard length. **Anal fin with 3 spines and 7 soft rays. Caudal fin truncate or nearly so. Pelvic fin relatively short, 22 to 30% standard length. Pectoral fin with 12 to 14 rays**. Lateral line continuous, not interrupted; **tubed scales in lateral line 28 or 29. Circum-caudal-peduncular scales 12 to 14, usually 14. Colour:** dorsal parts of body and head red-orange; lateral and ventral parts of body and head mostly rosy; lateral aspect of body with numerous flecks of dull yellow-orange; considerable dull yellow-orange on cheek; iris of eye mostly rosy; spinous dorsal fin red-orange; soft dorsal, anal, and caudal fins yellow; pelvic fins mostly pallid, but with some yellow.

Size: Maximum standard length to about 7 cm.

Habitat, biology, and fisheries: Known from depths of 13 to 375 m. Consumes crustaceans. Females with vitellogenic oocytes have been taken off the east and west coasts of Florida during August to September. This species is probably a protogynous hermaphrodite.

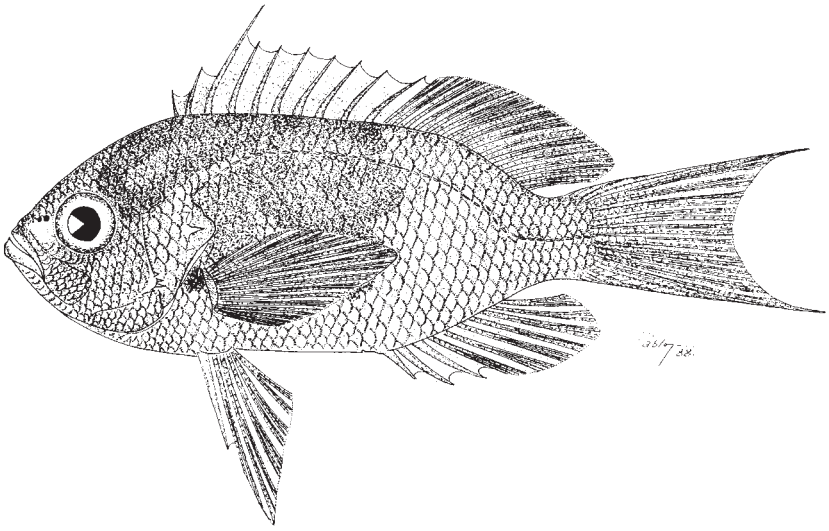
Distribution: North Carolina to the Straits of Florida, off the Bahamas and Cuba, and from the eastern Gulf of Mexico and the eastern and western Caribbean Sea. Probably more widespread than museum collections suggest.



Pronotogrammus martinicensis (Guichenot, 1868)

Frequent synonyms / misidentifications: *Holanthias martinicensis* (Guichenot, 1868) / None.

FAO names: En - Roughtongue bass; **Fr** - Coné langue rugueuse; **Sp** - Cachucho lengua rasposa.

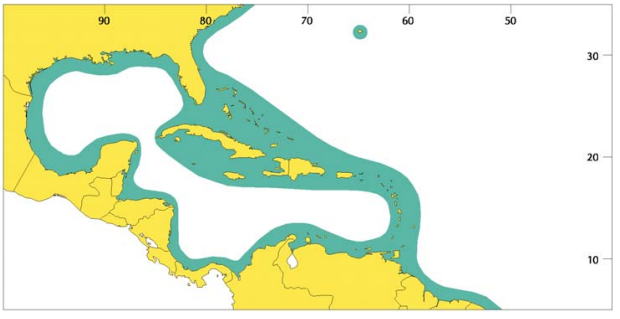


Diagnostic characters: Body moderately deep, depth of body at first dorsal-fin spine 33 to 42% standard length. Head moderate, its length 31 to 37% standard length in specimens greater than about 5 cm standard length. Orbit longer than snout, horizontal diameter of bony orbit 9 to 13% standard length in specimens greater than about 5 cm standard length. Each jaw with a series of conical teeth; canine or canine-like teeth present anteriorly in both jaws; vomer and palatines with teeth; **vomerine tooth patch with a well-developed posterior prolongation**; endopterygoids with teeth in about 30% of specimens examined; **tongue with large oval patch of teeth**. The 2 nostrils on each side of head fairly close together; internarial distance 5 to 8 times in snout length; **posterior border of anterior nostril produced into slender filament (usually falling well short of orbit when reflected). Most of head, including maxilla, heavily covered with scales. Gill rakers on first arch 9 to 13 on upper limb and 24 to 29 on lower limb, total 34 to 41**. Dorsal fin single, not incised at junction of spinous and soft portions. **Dorsal fin with 10 spines and 13 to 16, usually 15, soft rays**. Anal-fin length 30 to 39% standard length. **Anal fin with 3 spines and 7, very rarely 8, soft rays. Caudal fin crescentic**, outer principal rays of both upper and lower lobes slightly to fairly well produced. **Upper caudal-fin lobe 28 to greater than 51% standard length. Lower caudal-fin lobe 28 to greater than 58% standard length. Pelvic fin relatively short, 25 to 35% standard length**. Pectoral fin with 16 to 18, usually 17, rays. Lateral line continuous, not interrupted; **tubed scales in lateral line 35 to 41, usually 38 to 40. Circum-caudal-peduncular scales 18 to 22. Colour:** body and head red-orange to rosy; iris of eye red-orange, orange, yellow, or greyish green; yellow or greenish yellow stripe from anterior end of snout running ventral to eye out onto opercle; 2 yellow-green stripes radiating posteriorly from orbit in some specimens; body may have golden or yellow stripes and yellow-green bars; dorsal, anal, and caudal fins mainly orange to red-orange, often with some greenish yellow admixture.

Size: Maximum standard length to about 17 cm, commonly to 10 cm standard length.

Habitat, biology, and fisheries: Known from depths of 55 to 230 m. Often found in association with clumps of *Oculina* or *Madrepora*. Consumes ostracods, copepods, and pteropods. Ripe females collected in Gulf of Mexico in February, March, April, and July. This species is a protogynous hermaphrodite.

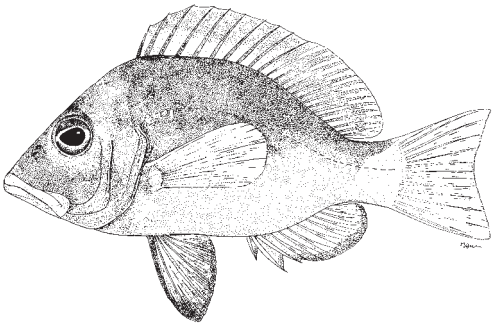
Distribution: Bermuda and North Carolina to southern Brazil, including West Indies, Gulf of Mexico, and Caribbean Sea.

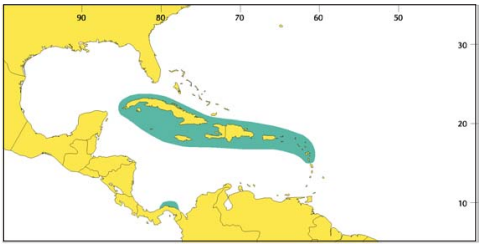


Hypoplectrus aberrans Poey, 1868

En - Yellowbellied hamlet.

Maximum size about 13 cm. Widespread in Florida Keys and West Indies, occasional elsewhere in Caribbean, not in Bahamas.

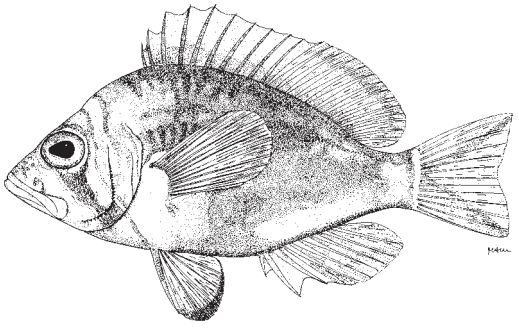


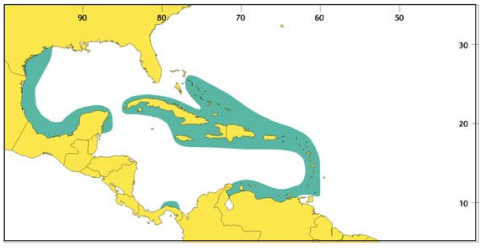


Hypoplectrus chlorurus (Cuvier, 1828) HCO

En - Yellowtail hamlet; **Fr** - Hamlet queue jaune.

Maximum size about 13 cm. Widespread but not common in Caribbean from West Indies to Venezuela and into the Gulf of Mexico to Texas.

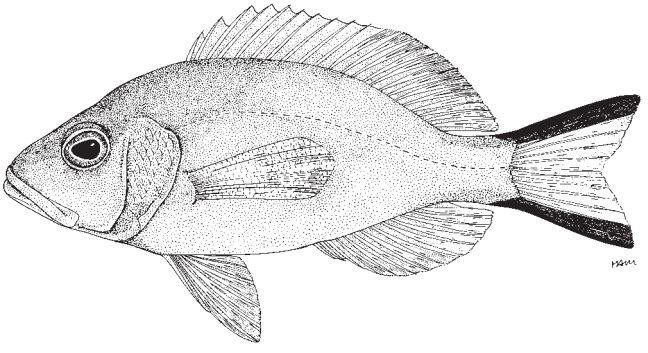


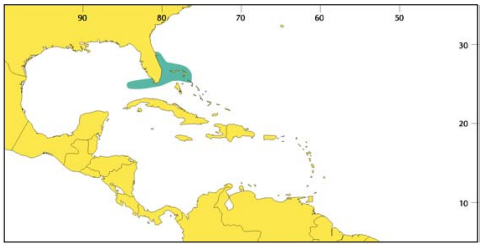


Hypoplectrus gemma (Goode and Bean, 1882)

En - Blue hamlet.

Maximum size about 13 cm. Common in south Florida and the Florida Keys and rare in the Bahamas. Not found elsewhere.





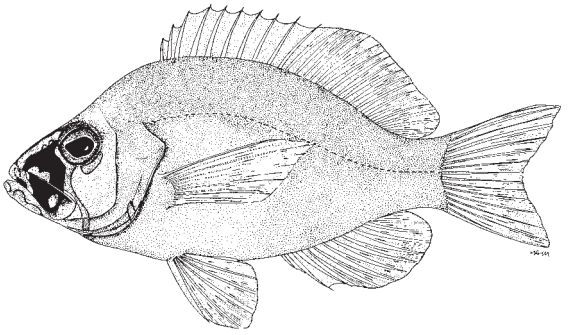
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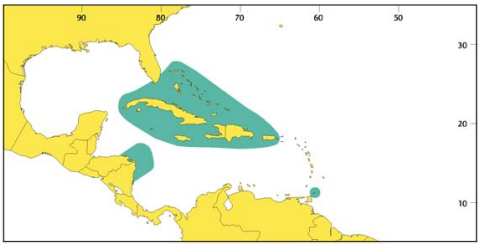
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Hypoplectrus gummigutta (Poey, 1851)

En - Golden hamlet.

Maximum size about 13 cm. Found in mainly in southern Florida, Bahamas, Cuba, Jamaica, Nicaragua, and Honduras; rare in Puerto Rico and Dominican Republic.

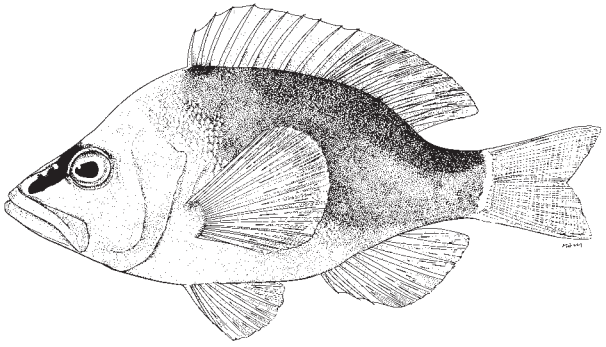


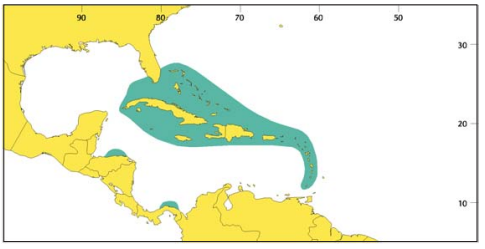


Hypoplectrus guttavarius (Poey, 1852)

En - Shy hamlet; **Fr** - Hamlet timide; **Sp** - Vaca medioluto.

Maximum size about 13 cm. Widespread from Florida, Bahamas, West Indies, and Jamaica, throughout Caribbean. Most common in the West Indies.

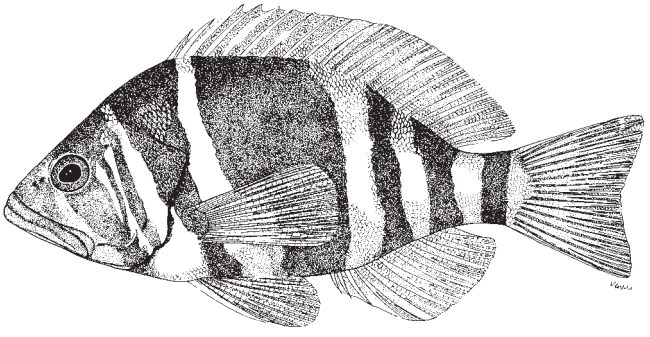


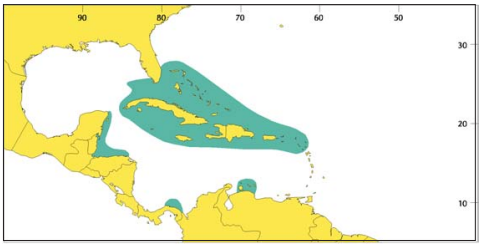


Hypoplectrus indigo (Poey, 1851)

En - Indigo hamlet; **Sp** - Vaca añil.

Maximum size about 15 cm. Found in Florida, Bahamas, and throughout the Caribbean. It is the largest fish in this species complex.

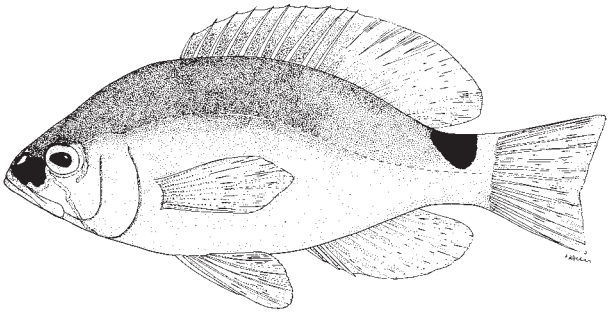


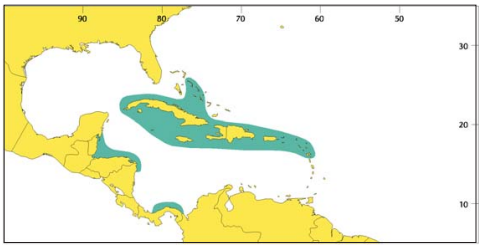


Hypoplectrus* cf. *maculiferus Poey, 1871

En - Bicolour hamlet.

Maximum size about 13 cm. Found mainly in Central America. Some authors consider this species a synonym of *H. aberrans*. Domeier (1994) suggested that it may be genetically different and that Poey's original description is valid. Until further data clarifies the issue, the name *Hypoplectrus* cf. *maculiferus* appears applicable.

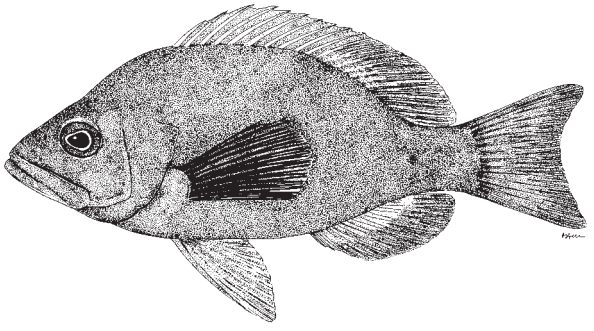


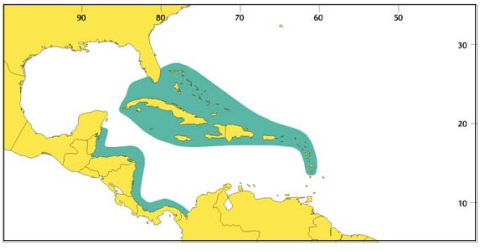


Hypoplectrus nigricans (Poey, 1852) HNP

En - Black hamlet; **Fr** - Hamlet nègre.

Maximum size about 13 cm. From Florida and Bahamas and throughout the Caribbean. The colour of this fish varies from very dark to light tan, it differs from the tan hamlet by not having a black spot on the snout, base of pectoral fin, or caudal peduncle. The fins may vary in colour from black to clear.

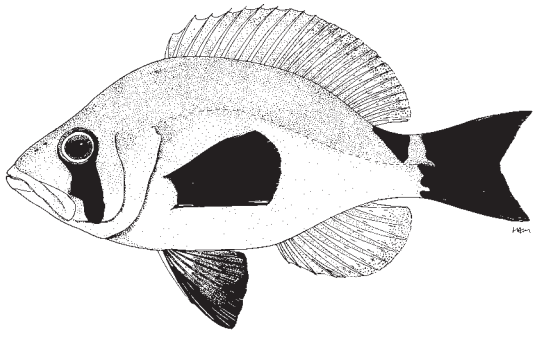


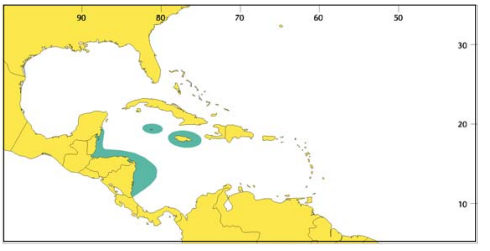


Hypoplectrus providencianus Acero and Garzón-Ferreira, 1994

En - Masked hamlet.

Maximum size about 13 cm. Rare in Jamaica, Caymans, Belize, Honduras, Nicaragua, San Andrés, Providencia Island (Colombia).

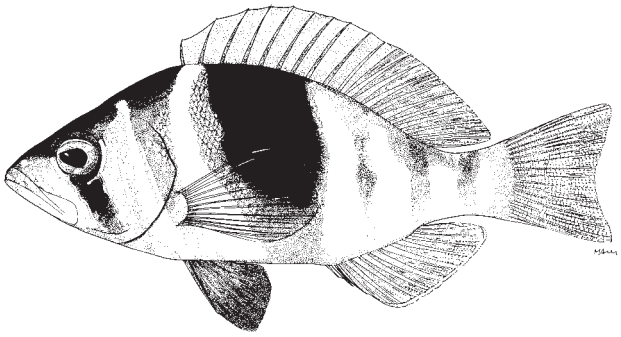


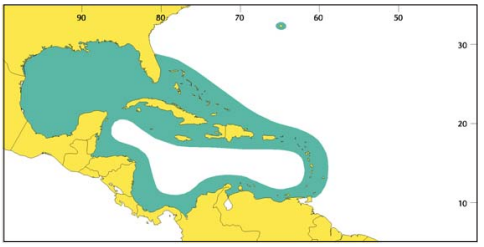


Hypoplectrus puella (Cuvier and Valenciennes, 1828)

En - Barred hamlet; **Fr** - Hamlet marbré.

Maximum size about 13 cm. Common from Bermuda, Florida, and Bahamas to throughout the Caribbean and Gulf of Mexico. This species is the most abundant and widespread of all the hamlets.

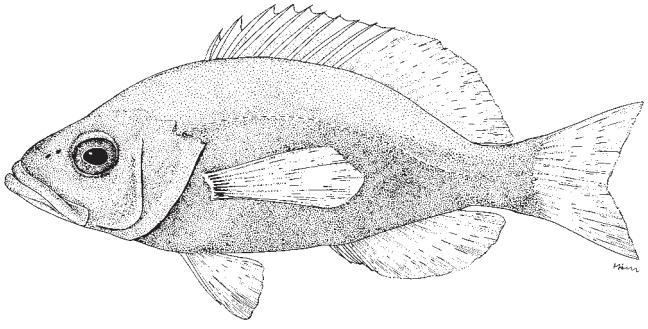


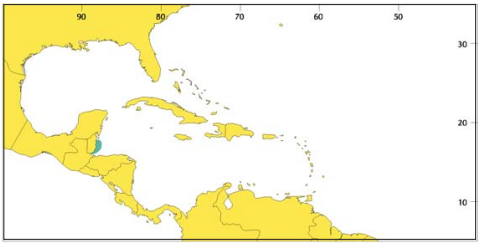


***Hypoplectrus* sp. 'Belize'**

En - Belizean blue hamlet.

Maximum size about 13 cm. Only in Belize. Occupies reefs only inside barrier reef system, not observed on Glovers Atoll outside the reef barrier system. It is distinct from *H. gemma* by not having black on the upper and lower caudal-fin margin or pectoral-fin rays. Description of this species is in preparation (Lobel).

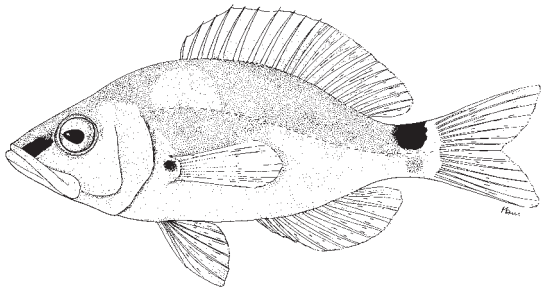


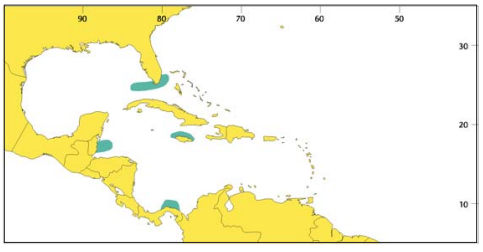


***Hypoplectrus* sp. 'tan'**

En - Tan hamlet.

Maximum size about 13 cm. Rare at Jamaica, south Florida, Florida Keys, Panama, and Belize. Differs from *H. nigricans* by having a distinct black spot on the snout, base of pectoral fins, and caudal peduncle. Various authors have recognized this species as a distinct form. Description of this species is in preparation (Lobel).

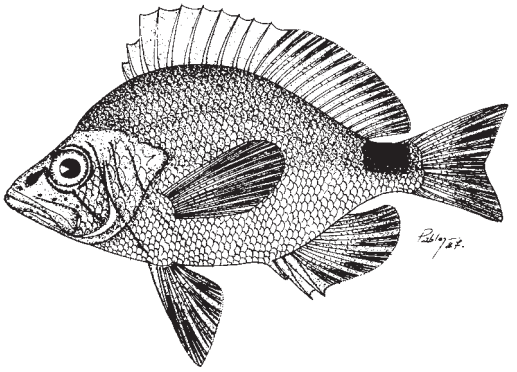


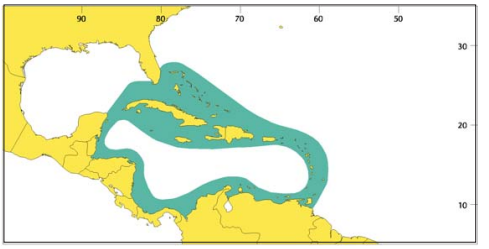


Hypoplectrus unicolor (Walbaum, 1792) HUN

En - Butter hamlet; **Fr** - Hamlet unicolour; **Sp** - Vaca amarilla.

Maximum size about 13 cm. Common from Florida and Bahamas to throughout the Caribbean.





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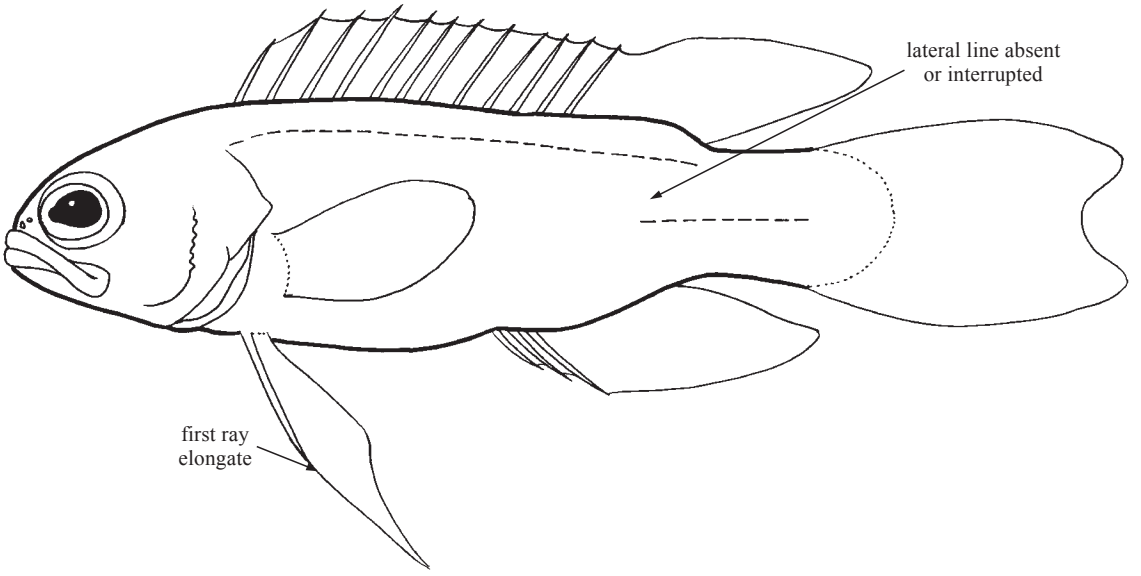
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GRAMMATIDAE

Basslets

by R.D. Mooi, Milwaukee Public Museum, Wisconsin, USA and A.C. Gill, British Museum, London, UK

Diagnostic characters: Small (up to 100 mm total length), body elongate to stout, compressed. Eye large and relatively far forward. Snout short. Mouth terminal, small to large. Teeth on jaws, vomer, and palatines mostly villiform with lateral or symphyseal canines on premaxilla and dentary. Preopercle serrated or smooth. **Opercle with 2 or fewer flattened, short spines**. Gill rakers on first arch long, 12 to 35. Branchiostegal rays 6. **Single dorsal fin with 11 to 14 spines** and 6 to 10 soft rays. Anal fin long with 3 spines and 6 to 10 soft rays. Caudal fin rounded to strongly emarginate or lunulate, sometimes with lower lobe longer. Pectoral fins rounded with 14 to 19 soft rays. **Pelvic fins with first ray slightly to very elongate, sometimes reaching to end of anal fin or beyond**, with 1 spine and 5 soft, branched rays. Scales mostly ctenoid. **Lateral line absent or lateral line interrupted with a dorsal line ending at about the last dorsal-fin ray and a midlateral line on the caudal peduncle**. Lateral-scale rows 20 to 48. **Adductor mandibulae muscle with separate, medial A1beta section that originates from the lateral surface of the metapterygoid, quadrate, and levator arcus palatini and inserts on to the medial surface of the maxilla via a tendon. Colour:** usually with bright and/or very contrasting colour combinations, sometimes with ocellus on dorsal fin.



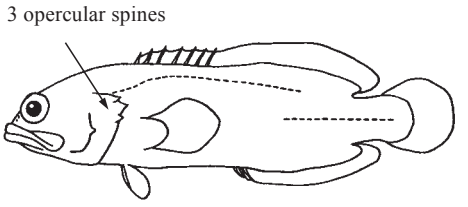
Habitat, biology, and fisheries: Primarily on coral reefs and on deep rocky ledges and drop-offs where plankton is abundant. From shallow reef crest to at least 350 m depth. Common species (in *Gramma*) usually associated with small caves and coral ledges, often in small groups with belly oriented to substrate, hence often upside down under ledges. Pick plankton from the water column but also recorded as cleaning ectoparasites off larger fishes. Being small and colourful, members of the family are ideally suited for the aquarium trade. Some shallow-water species are very popular and important (e.g., *Gramma loreto, G. brasiliensis*), but others occur too deep for conventional capture and will likely remain rare in the aquarium trade unless breeding programs are developed.

Remarks: The family originally included several taxa, but has been redefined to include only *Gramma* Poey and *Lipogramma* Böhlke. Distribution is restricted to the western Atlantic. Of 12 species recognized, all but 1 has been recorded from our area (*Gramma brasiliensis* Sazima, Gasparini, and Mourra, 1998). *Gramma* and *Lipogramma* have been collected throughout Area 31 excluding Bermuda. Most species are known from very few specimens (collected by submersibles) so appear to have restricted distributions, but are likely to have much wider ranges.

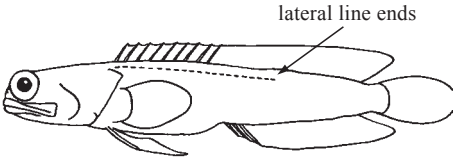
Similar families occurring in the area

Serranidae: 3 opercular spines; lateral line complete, except some members of the tribe Grammistini (*Pseudogramma)*. The latter differ in having 8 or fewer dorsal-fin spines (excluding a small rudimentary spine anteriorly visible only in x-radiographs or following dissection), 18 to 25 dorsal-fin segmented rays, short pelvic fin, 3 opercular spines, 1 preopercular spine, 7 branchiostegal rays.

Opistognathidae: lateral line high on body, close to dorsal-fin base but ending below middle of fin; otherwise easily distinguished from grammatids by absence of ctenoid scales, head and mouth large, with maxilla extending well beyond eye, dorsal fin with 10 to 12 weak spines (usually 11 spines), pelvic fin with 1 spine and 5 segmented rays with the first 2 being stout and unbranched.



Serranidae



Opistognathidae

Key to the species of Grammatidae occurring in the area

1a. Lateral line in 2 parts, the anterior part high on body and ending at the last soft ray of the dorsal fin, the posterior part midlateral on caudal peduncle; preopercular margin serrated; outer procurrent caudal-fin rays not thickened or spinous . . . . . → *2*

1b. Lateral line absent; preopercular margin smooth; outer procurrent caudal-fin rays thick and spinous . . . . . → *4*

2a. Head bluish grey with yellow stripes from snout over cheek and opercle; body bluish grey, each scale with a dull yellow spot; no black in dorsal-fin or black cap on head (Fig. 1) . . . . . *Gramma linki*

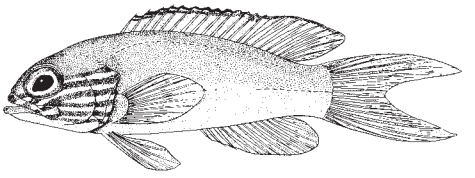


Fig. 1

2b. Head magenta or purplish; anterior dorsal fin black or with a black spot; with or without a black cap on head . . . . . → *3*

3a. Head magenta with a black cap from tip of snout through eye and over nape, with black continuing onto first half of dorsal fin; caudal fin lunate with black upper and lower lobes; pelvic-fin rays relatively short, reaching to origin of anal fin; dorsal-fin spines 13 or 14, almost always 13; dorsal-fin soft rays 8 or 9, almost always 9; pectoral-fin soft rays 16 to 18, almost always 17 (Fig. 2) . . . . . *Gramma melacara*

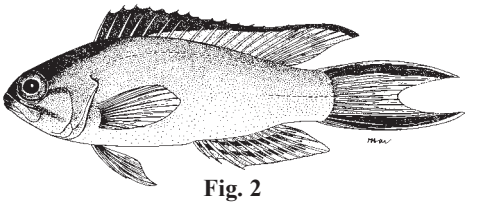


Fig. 2

3b. Head, pelvic fins, and anterior half of body and dorsal fin violet, posterior half of body and median fins yellow; 2 narrow yellow stripes on head, 1 through and the other below the eye to opercular margin; caudal fin emarginate to forked, solid yellow; pelvic-fin rays elongate reaching well beyond origin of anal fin; dorsal-fin spines 11 to 13, usually 12; dorsal soft rays 9 to 11, usually 10; pectoral-fin soft rays 14 to 17, usually 16 (Fig. 3) . . . . . *Gramma loreto*

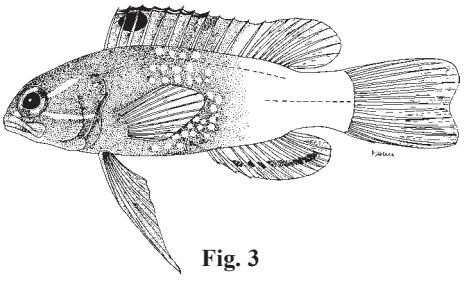


Fig. 3

4a. Base of the soft dorsal fin with prominent dark spot, ocellus, or band . . . . . → ***5***

4b. Soft dorsal fin without prominent markings . . . . . → ***9***

5a. Without orbital bar . . . . . → ***6***

5b. With orbital bar . . . . . → ***8***

6b. Body without bars or bands; dorsal-fin spines 12 to 14, usually 13 (Fig. 4) . . . . . ***Lipogramma anabantoides***

6a. Body banded or barred, dorsal-fin spines 12 . . . . . → ***7***

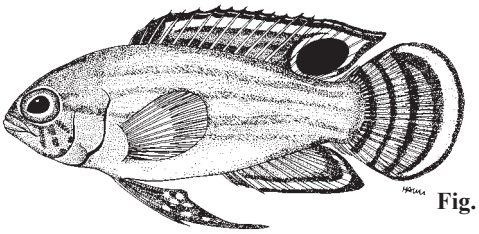


Fig. 4

7a. Body with 6 bars, fourth and fifth extending onto dorsal-fin soft rays and curving around dorsal-fin ocellus; dorsal and anal fin with yellow stripes; no yellow cap on head and nape (Fig. 5) . . . . . ***Lipogramma regium***

7b. Body with 10 to 12 bars, none curving around dorsal-fin ocellus; median fins dotted with small yellow spots; yellow cap on head and nape to dorsal-fin origin (Fig. 6) . . . ***Lipogramma robinsi***

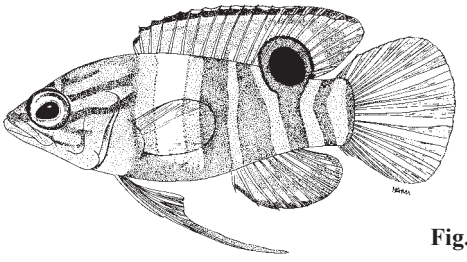


Fig. 5

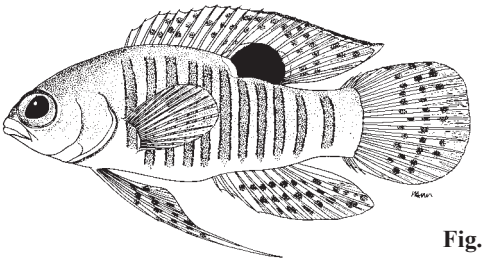


Fig. 6

8a. Body without bars, bright yellow in life (Fig. 7) . . . . . ***Lipogramma flavescens***

8b. Body with 2 dark bars, 1 from anterior dorsal-fin spines, the other from posterior dorsal-fin rays and merging with dorsal-fin ocellus, bars pronounced and extending far ventrally in small specimens (<20 mm standard length), but narrow, faint, and not extending far ventrally in larger specimens (>30 mm standard length) (Fig. 8) . . . . . ***Lipogramma evides***

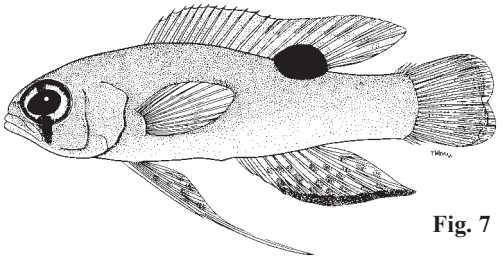


Fig. 7

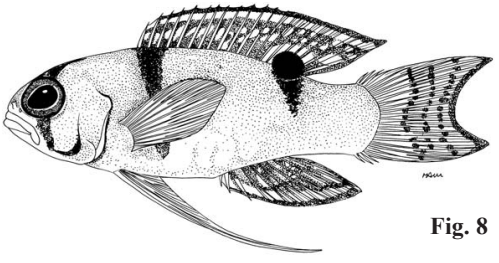


Fig. 8

9a. Dorsal-fin spines 11, dorsal-fin soft rays 6 or 7; circumpeduncular scales 16; head and body uniformly yellow to rose coloured, caudal fin yellow with dark spots (Fig. 9) . . . . . ***Lipogramma roseum***

9b. Dorsal-fin spines 12 or 13, dorsal-fin soft rays 8 to 10; circumpeduncular scales 18 to 21; not coloured as above . . . . . → ***10***

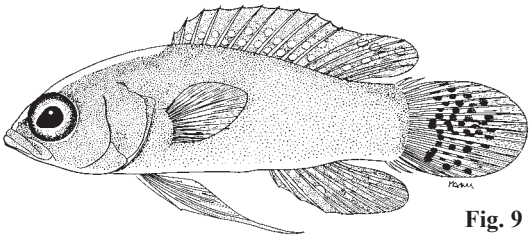


Fig. 9

10a. Bicoloured, purplish red anteriorly, yellow posteriorly; no stripes on head; scales in lateral series 29 to 35; gill rakers on first arch 20 to 21; anal-fin soft rays 8; upper caudal-fin spines 4 or 5 (Fig. 10) . . . . . ***Lipogramma klayi***

10b. Body generally yellowish, median dorsal stripe from snout to dorsal-fin origin, a second stripe from posterior eye onto fore part of body; scales in lateral series 25 to 29; gill rakers on first arch 13 to 18; anal-fin soft rays 7; upper caudal-fin spines 3 (Fig. 11)
. . . . . ***Lipogramma trilineatum***

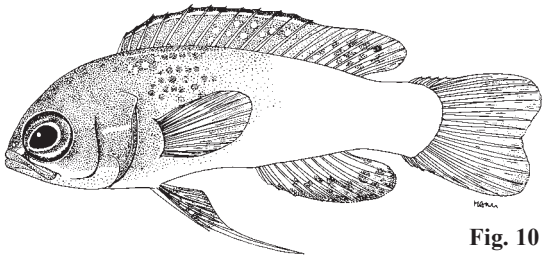


Fig. 10

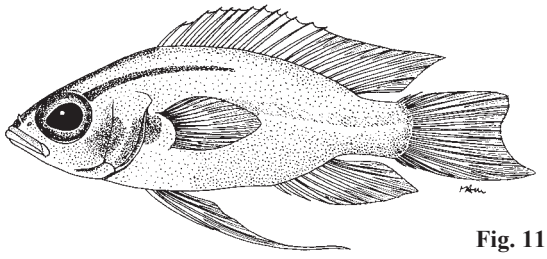


Fig. 11

List of species occurring in the area

Gramma linki Starck and Colin, 1978. To 60 mm SL (80 mm TL). Tropical, 20 to 130 m; Bahamas, Mexico (Quintana Roo), Belize, Jamaica, Puerto Rico (likely more widely distributed).

Gramma loreto Poey, 1868. To 65 mm SL (about 80 mm TL). Tropical to 65 m; Bahamas, Florida. Keys (apparently introduced), Mexico (Quintana Roo), Belize, Honduras, Colombia, Venezuela, Greater Antilles (and Grand Cayman), Lesser Antilles, Tobago.

Gramma melacara Böhlke and Randall, 1963. To 80 mm SL (about 100 mm TL). Tropical, 35 to 100 m; Bahamas, Belize, Honduras, Colombia, Grand Cayman, Jamaica, Hispaniola (likely more widely distributed).

Lipogramma anabantoides Böhlke, 1960. To 20 mm SL (27 mm TL). Tropical 10 to 80 m; Bahamas, SW Florida, Mexico (Quintana Roo), Belize, Honduras, Hispaniola (likely more widely distributed).

Lipogramma evides Robins and Colin, 1979. To 45 mm SL (60 mm TL). Tropical, 50 to 350 m; Bahamas, Mexico (Quintana Roo), Belize, Nicaragua, Jamaica, Barbuda (likely more widely distributed).

Lipogramma flavescens Gilmore and Jones, 1988. To 25 mm SL (about 30 mm TL). Tropical, 200 to 300 m; Bahamas, Belize (likely more widely distributed).

Lipogramma klayi Randall, 1963. To 25 mm SL (about 32 mm TL). Tropical, 40 to 150 m; Bahamas, Belize, Jamaica, Puerto Rico, Lesser Antilles (likely more widely distributed).

Lipogramma regium Robins and Colin, 1979. To 17 mm SL (about 23 mm TL). Tropical, 70 to 90 m; Bahamas, Honduras, Puerto Rico (likely more widely distributed).

Lipogramma robinsi Gilmore, 1997.To 22 mm SL (about 29 mm TL). Tropical 200 to 300 m; Bahamas, Belize (likely more widely distributed).

Lipogramma roseum Gilbert in Robins and Colin, 1979. To 10 mm SL (about 13 mm TL). Tropical 33 m; Bahamas, Colombia (Isla de Providencia) (likely more widely distributed).

Lipogramma trilineatum Randall, 1963. To 28 mm SL (about 35 mm TL). Tropical, to 100 m; Bahamas, SE Florida, Mexico (Quintana Roo), Belize, Honduras, Colombia (Isla de Providencia), Grand Cayman, Jamaica, Puerto Rico, Curaçao (likely more widely distributed).