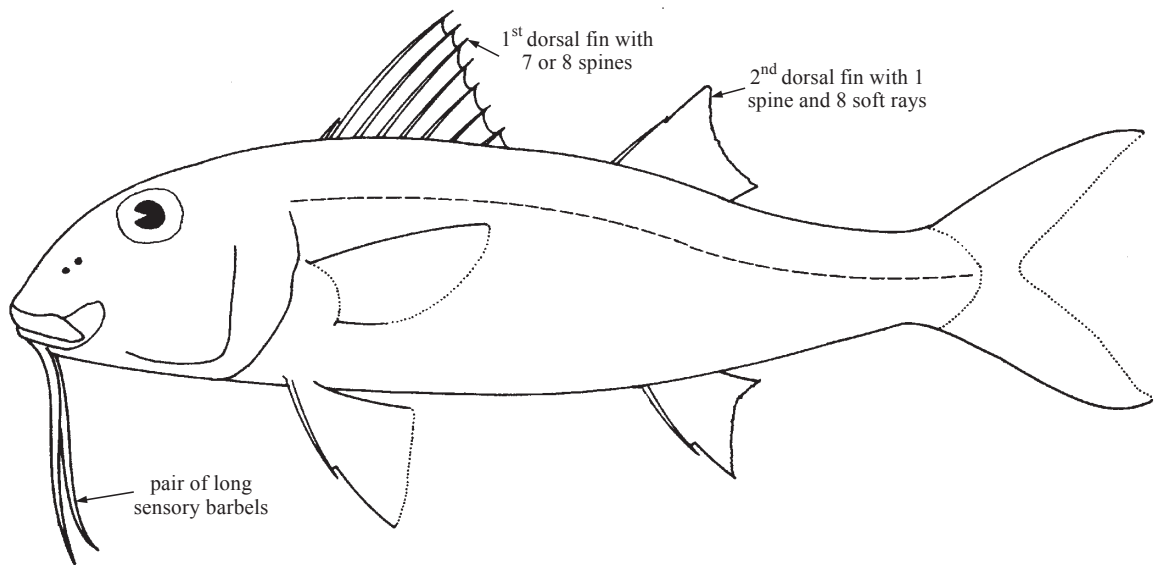


## MULLIDAE

## Goatfishes

by J.E. Randall, B.P. Bishop Museum, Hawaii, USA

**Diagnostic characters:** Small to medium-sized fishes (to 40 cm) with a moderately elongate, slightly compressed body; ventral side of head and body nearly flat. Eye near dorsal profile of head. Mouth relatively small, ventral on head, and protrusible, the upper jaw slightly protruding; teeth conical, small to very small. **Chin with a pair of long sensory barbels that can be folded into a median groove on throat. Two well separated dorsal fins, the first with 7 or 8 spines, the second with 1 spine and 8 soft rays.** Anal fin with 1 spine and 7 soft rays. Caudal fin forked. Paired fins of moderate size, the pectorals with 13 to 17 rays; pelvic fins with 1 spine and 5 soft rays, their origin below the pectorals. Scales large and slightly ctenoid (rough to touch); a single continuous lateral line. **Colour:** variable; whitish to red, with spots or stripes.

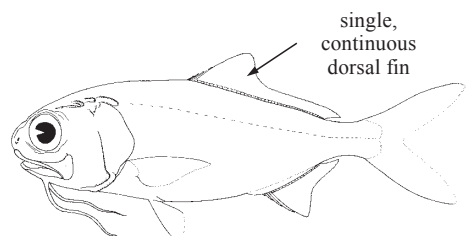


**Habitat, biology, and fisheries:** Goatfishes are bottom-dwelling fishes usually found on sand or mud substrata, but 2 of the 4 western Atlantic species occur on coral reefs where sand is prevalent. The barbels are supplied with chemosensory organs and are used to detect prey by skimming over the substratum or by thrusting them into the sediment. Food consists of a wide variety of invertebrates, mostly those that live beneath the surface of the sand or mud. Because goatfishes lack crushing dentition such as the molars of porgies or the pharyngeal teeth of wrasses, they consume small animals with hard external parts, such as clams, crustaceans, brittle stars, and heart urchins. Larger prey items, such as various worms, are soft-bodied. The barbels of males are rapidly wriggled during courtship (at least in some species). Goatfishes are excellent foodfishes. They are caught by hook-and-line, gill nets, traps, and by spearing.

**Remarks:** The Mullidae consists of 6 genera, distinguished primarily by dentition. The family diagnosis above is based on the 4 western Atlantic species, each of which is classified in a different genus.

#### Similar families occurring in the area

**Polymixiidae:** the only other family of marine fishes with a single pair of barbels on the chin; easily distinguished from goatfishes by having a deeper body, a continuous dorsal fin with 5 spines, anal fin with 4 spines, and pelvic fins with no spine and 7 or 8 soft rays; the 2 Atlantic species, *Polymixia lowei* and *Polymixia nobilis*, generally occur between 180 and 550 m.



Polymixiidae

**Key to the species of Mullidae occurring in the area**

- 1a. A spine posteriorly on opercle; maxilla not reaching to below anterior margin of eye; no teeth on roof of mouth . . . . . → 2
- 1b. No spine on opercle; maxilla reaching to below anterior margin of eye; teeth present on roof of mouth (on vomer and palatines) . . . . . → 3
  
- 2a. Three conspicuous dark blotches along lateral line (Fig. 1); median fins whitish; lateral-line scales 27 to 31; snout pointed; pectoral-fin rays 13 to 15 . . . . . *Pseudupeneus maculatus*
- 2b. A broad yellow stripe from eye to base of caudal fin (Fig. 2); median fins yellow; lateral-line scales 34 to 39; snout not pointed; pectoral-fin rays 15 to 17 . . . . . *Mulloidichthys martinicus*

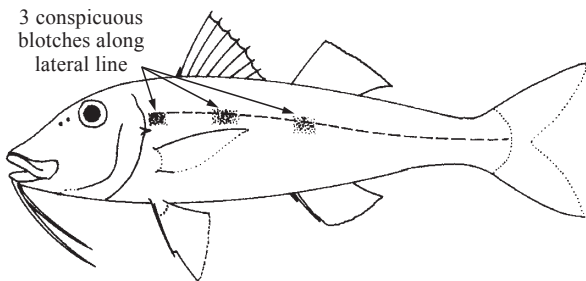


Fig. 1 *Pseudupeneus maculatus*

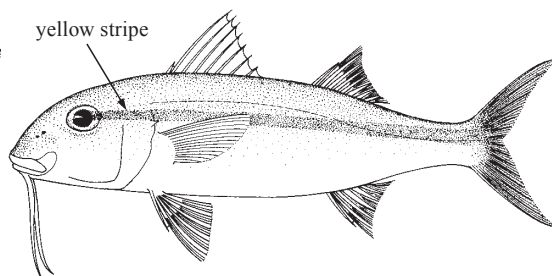


Fig. 2 *Mulloidichthys martinicus*

- 3a. Spines in first dorsal fin 8, the first very small; no teeth in upper jaw; interorbital space broad and flat (Fig. 3); red or reddish dorsally, with 2 distinct yellow stripes on side of body; no black bands in caudal fin. . . . . *Mullus auratus*
- 3b. Spines in first dorsal fin 7; teeth present in both jaws; interorbital space narrow and concave; several yellow stripes on side of body; lobes of caudal fin with oblique black bands (Fig. 4) . . . . . *Upeneus parvus*

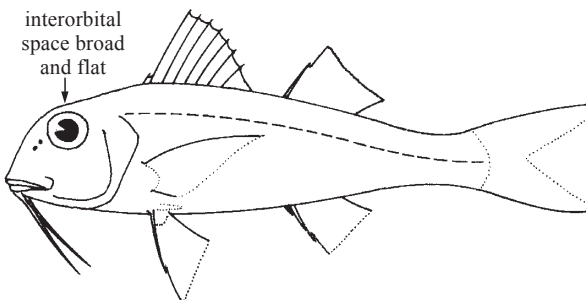


Fig. 3 *Mullus auratus*

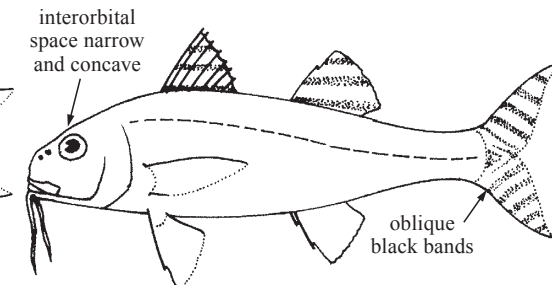






Fig. 4 *Upeneus parvus*

**List of species occurring in the area**

The symbol  is given when species accounts are included.

-  *Mulloidichthys martinicus* (Cuvier, 1829).
-  *Mullus auratus* Jordan and Gilbert, 1882.
-  *Pseudupeneus maculatus* (Bloch, 1793).
-  *Upeneus parvus* Poey, 1852.

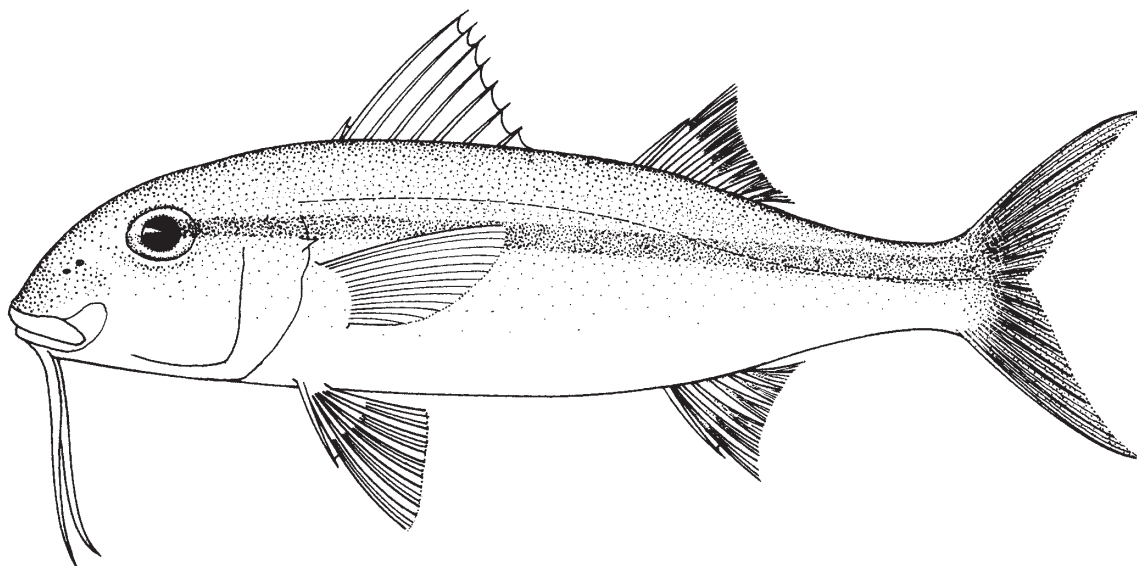
**Reference**

Cervigon, F. 1993. *Los Peces Marinos de Venezuela*. Vol. 2. Caracas, Fundación Científica los Roques, 497 p.

*Mulloidichthys martinicus* (Cuvier, 1829)

**Frequent synonyms / misidentifications:** None / None.

**FAO names:** **En** - Yellow goatfish; **Fr** - Capucin jaune; **Sp** - Salmonete amarillo.



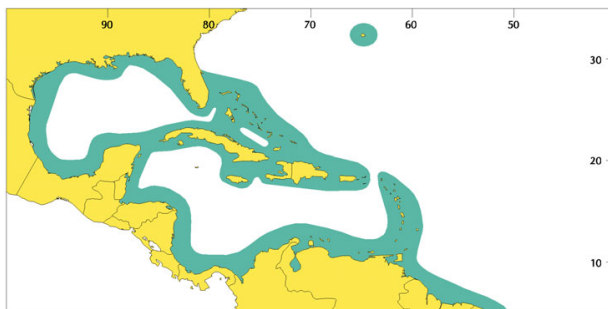
**Diagnostic characters:** Body elongate, the depth 3.45 to 4.0 in standard length. **Snout not pointed, the dorsal profile moderately steep and convex.** Mouth small, ventral on head, the maxilla not reaching a vertical at anterior edge of eye; teeth very small, in 3 rows anteriorly and 2 on side of jaws; no teeth on roof of mouth (i.e. none on vomer or palatines). A pair of long barbels on chin. **A short spine posteriorly on opercle. First dorsal fin with 8 spines**, the first spine very small. Second dorsal fin with 1 spine and 8 soft rays. **Pectoral-fin rays 15 to 17. Lateral-line scales 34 to 39.** Gill rakers 28 to 33. **Colour:** light olivaceous dorsally, shading to white ventrally, with a yellow stripe (often with a bluish border) from eye along upper side of body to base of caudal fin which is yellow; dorsal fins yellowish. Assumes a pattern of large interconnected dark red blotches at night.

**Size:** Maximum to 40 cm; common to 28 cm.

**Habitat, biology, and fisheries:** A shallow-water species of coral reefs, the young common in seagrass beds. Tends to form aggregations over or near reefs when not feeding. Reported to be nocturnal, but feeding occasionally observed during the day. Feeds individually over sand. One study of 17 specimens reported the following prey animals (in the order of percentage of food volume in the stomachs): polychaete worms, clams and other bivalves, shrimps, brittle stars, chitons, sipunculids (peanut worms), isopods, amphipods, and other crustaceans. Most of the bivalves and crustaceans were very small.

**Distribution:** Bermuda and Florida to Brazil; absent from areas of the Gulf of Mexico devoid of reefs, and probably absent from broad regions off the mouth of the Orinoco and Amazon Rivers.

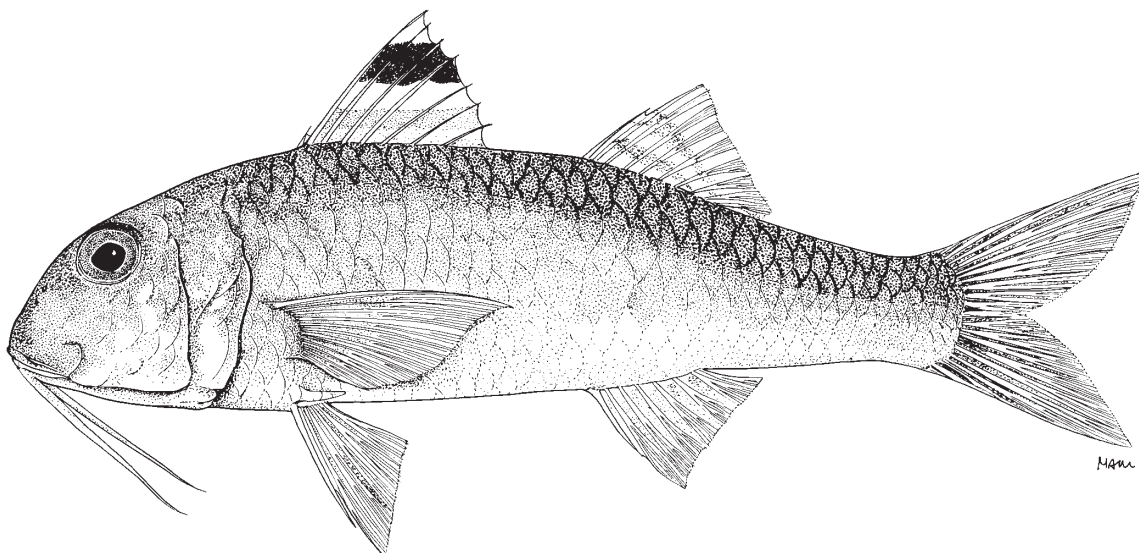
**Note:** *Mulloidichthys martinicus* is one of a complex of 3 closely related species, all of similar body form and colour; the other 2 are *M. dentatus* of the eastern Pacific and *M. vanicolensis* of the Indo-Pacific.



***Mullus auratus*** Jordan and Gilbert, 1882

**Frequent synonyms / misidentifications:** None / None.

**FAO names:** **En** - Red goatfish; **Fr** - Rouget-barbet doré; **Sp** - Salmonete colorado

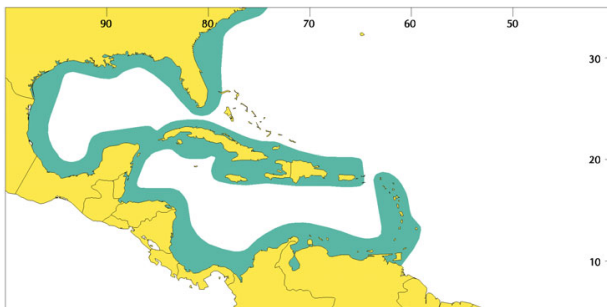


**Diagnostic characters:** Body moderately elongate, the depth 3.3 to 3.6 in standard length. **Snout short, the dorsal profile steep, forming an angle of about 60° and nearly straight. Interorbital space broad and flat.** Mouth small, ventral on head, the maxilla reaching slightly posterior to a vertical at anterior edge of eye; **teeth very small, in a villiform band in lower jaw, none in upper jaw;** teeth present on roof of mouth, in a broad villiform band on vomer and palatines. A pair of long barbels on chin. **No spine on opercle. First dorsal fin with 8 spines,** the first spine very small. Second dorsal fin with 1 spine and 8 soft rays. **Pectoral rays 16 or 17. Lateral-line scales 34 to 37.** Gill rakers 18 to 20. **Colour:** red to reddish dorsally, grading to whitish ventrally, with 2 to 5 longitudinal yellow stripes that are generally not sharply defined; first dorsal fin with 2 orange to red stripes, the outer part of fin sometimes blackish; second dorsal fin with 4 or 5 narrow reddish stripes; caudal fin reddish.

**Size:** Maximum to 27 cm; common to 18 cm.

**Habitat, biology, and fisheries:** A coastal species of mud or silty sand bottoms. Generally found at depths of 10 to 90 m. Usually caught by trawling.

**Distribution:** Nova Scotia south to the Guyana coast, including the Gulf of Mexico. Rare north of Florida; absent from Bermuda and the Bahamas.

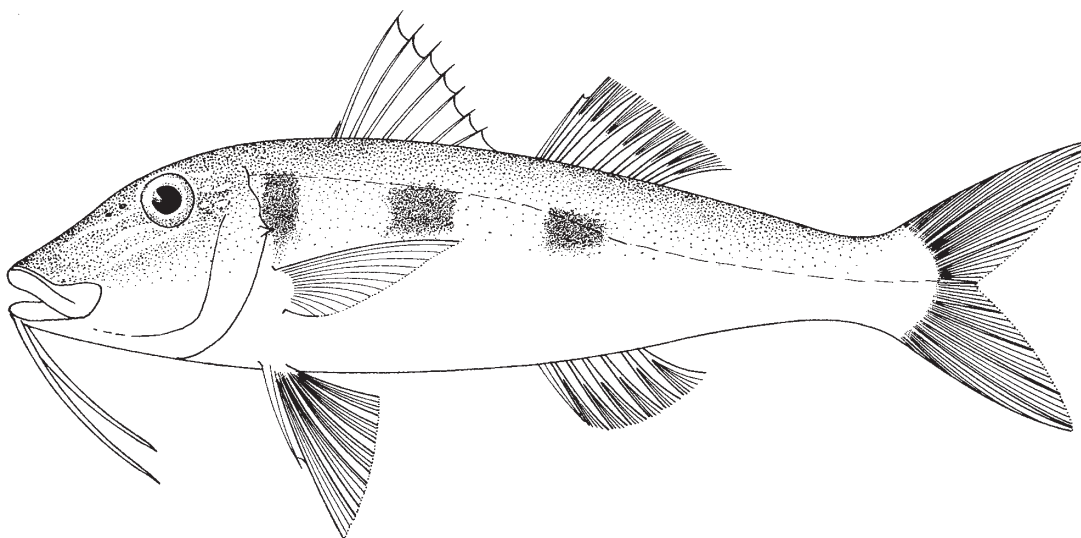


*Pseudupeneus maculatus* (Bloch, 1793)

UDU

**Frequent synonyms / misidentifications:** None / None.

**FAO names:** En - Spotted goatfish; Fr - Rouget-barbet tacheté; Sp - Salmonete manchado.

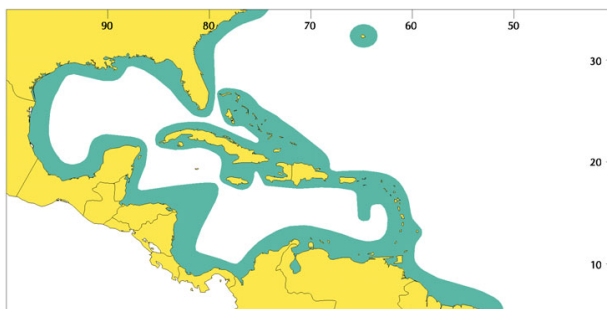


**Diagnostic characters:** Body elongate, the depth 3.4 to 4.0 in standard length. **Snout pointed, the dorsal profile nearly straight, forming an angle of about 45°** to horizontal axis of head. Mouth small, ventral on head, the maxilla not reaching a vertical at anterior edge of eye; teeth small, in 2 irregular rows anteriorly in jaws of adults (1 in juveniles), those in outer row larger, and in 1 row posteriorly; no teeth on roof of mouth (i.e. none on vomer or palatines). A pair of long barbels on chin. **A short spine posteriorly on opercle. First dorsal fin with 8 spines, the first spine very small. Second dorsal fin with 1 spine and 8 soft rays. Pectoral-fin rays 13 to 16. Lateral-line scales 27 to 31.** Gill rakers 26 to 28. **Colour:** whitish to pink, the scale edges reddish to yellowish brown (darker dorsally); 3 large reddish black spots in a row on upper side of body below dorsal fins; oblique blue lines extending anteriorly and posteriorly from eye; fins whitish. At night the body and fins have large interconnected red blotches; this pattern may be rapidly assumed during the day when at rest on bottom.

**Size:** Maximum to 30 cm; common to 22 cm.

**Habitat, biology, and fisheries:** Occurs in coral reef areas as solitary individuals or in small groups; the young often in seagrass beds. A shallow-water species, rarely found at depths greater than 40 m. Food habits based on 26 adult specimens (prey animals in order of volume in stomach contents): crabs, shrimps, polychaete worms, unidentified crustaceans, bivalves, sipunculids (peanut worms), stomatopods (mantis shrimps), isopods, amphipods, brittle stars, and gastropods. Most prey were small. While rooting in the sand, individuals of this species are often closely followed by wrasses, yellowtail snappers, and jacks in order to feed on crustaceans and fishes escaping from the goatfish.

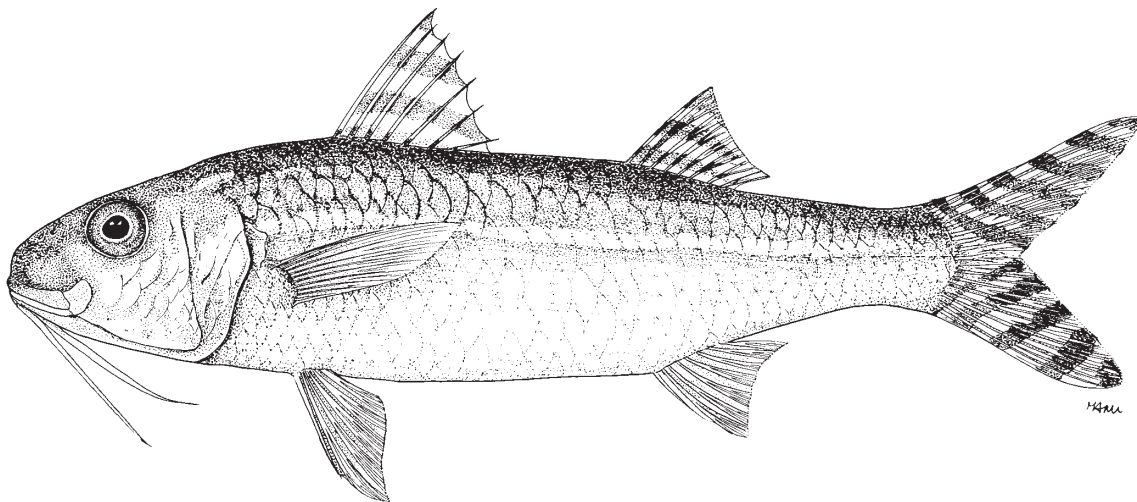
**Distribution:** New Jersey and Bermuda south to Brazil, including the Gulf of Mexico. Rare north of Florida, and probably absent from broad regions off the mouth of the Orinoco and Amazon Rivers.





*Upeneus parvus* Poey, 1853

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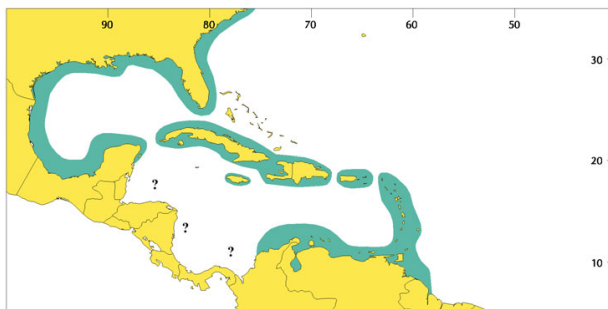
**Frequent synonyms / misidentifications:** None.**FAO names:** **En** - Dwarf goatfish; **Fr** - Rouget-souris mignon; **Sp** - Salmonete rayuelo.

**Diagnostic characters:** Body elongate, the depth 3.5 to 4.0 in standard length. **Snout short, the dorsal profile strongly convex. Interorbital space narrow and concave.** Mouth small, ventral on head, the maxilla reaching slightly posterior to a vertical at anterior edge of eye; **teeth very small, in 2 or 3 rows in jaws;** teeth present on roof of mouth, in a villiform band on vomer and palatines. A pair of long barbels on chin. **No spine on opercle. First dorsal fin with 7 spines.** Second dorsal fin with 1 spine and 8 soft rays. **Pectoral-fin rays 15 to 16 (usually 15). Lateral-line scales 36 to 40.** Gill rakers 15. **Colour:** reddish to salmon pink dorsally, grading to silvery white ventrally, sometimes with a yellow midlateral stripe on body and narrower yellow stripes dorsal to it; dorsal fins with 2 or 3 bronze stripes; lobes of caudal fin with 4 to 6 distinct oblique dark bands (including dark tip).

**Size:** Maximum to 20 cm; common to 15 cm.

**Habitat, biology, and fisheries:** A coastal species of mud or silty sand bottoms. Generally found at depths of 40 to 100 m. The late postlarval stage is large, up to 8 cm total length. Usually caught by trawling.

**Distribution:** North Carolina to Brazil, including the Gulf of Mexico; not known from Bermuda or the Bahamas. Not reported from the western Caribbean but should be expected there.

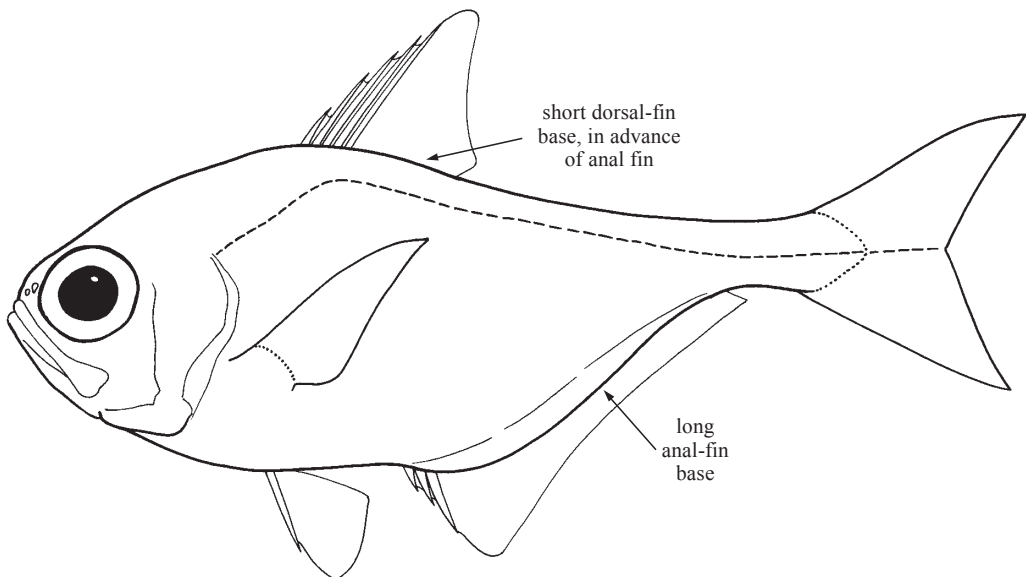


## PEMPHERIDAE

## Sweepers

by R.D. Mooi, Milwaukee Public Museum, Wisconsin, USA

**Diagnostic characters:** Small to medium-sized (to 150 mm total length, 120 mm standard length) with **deep body, strongly compressed**. Dorsal profile roughly horizontal, at least from dorsal-fin origin. **Ventral 'keel' anterior to pelvic fins** resulting from closely applied ventral margins of expanded coracoid. Head large. Eye large (< 3 in head length), adipose lid not present. Mouth moderate and superior. Teeth small. Snout short. Gill rakers on first arch long and numerous (20 to 28). Branchiostegal rays 7. **Dorsal-fin base short with 4 to 6 weak spines** and 8 to 10 soft rays, **much shorter than anal-fin base, dorsal fin in advance of anal fin**. **Anal fin long with 3 spines (first very short) and 22 to 36 rays**, its origin at midbody. Caudal fin forked. Pectoral fins long and pointed with 15 to 18 soft rays. Pelvic fins short, reaching to anal-fin origin, with 1 spine and 5 soft rays. No adipose fin. Most scales ctenoid or weakly ctenoid, flank scales often cycloid. Head mostly scaled; anal fin with scale sheath almost covering rays over entire length; scales extending well onto caudal fin. **Lateral line complete, arching high towards dorsal-fin base and extending almost to the tips of the central caudal rays**, 48 to 61 lateral-line scales to caudal-fin base. **Colour:** yellowish brown to coppery or dusky with silvery or bluish iridescence on flanks; fins hyaline, sometimes with black edging. Juveniles almost transparent with silvery flanks or abdomen.



**Habitat, biology, and fisheries:** Rocky shore or reef fishes, from reef crest to at least 30 m depth, usually collected from 0 to 10 m; reported as common in 15 m in the Bahamas. Nocturnal; found schooling in caves, under ledges, or among dense branching coral during the day; follow relatively stable migration routes to feeding areas on the forereef at dusk where they disperse to forage, returning to shelter just before sunrise. Feed on meroplanktonic crustaceans not available during the day, selecting larger individuals. Not important commercially, but local abundance results in occasional capture in fish traps and seine hauls.

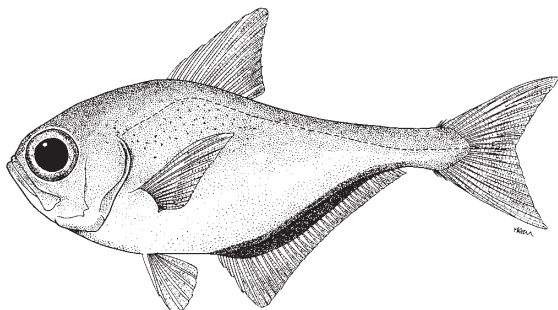
**Remarks:** Six nominal species in our area, *Pempheris mexicana* Cuvier, *P. schomburgkii* Müller and Troschel, *P. muelleri* Poey, *P. schreineri* Miranda-Ribeiro, *P. polio* Breder, and *P. poeyi* Bean. The first 5 are synonyms, the name used by most authors being *P. schomburgkii*; reported vernacular names are glassy or copper sweeper (English), catalufa de lo alto (Spanish), babalochi (Papiamentu); this species is found throughout Area 31 into Area 41 (Bermuda to Brazil). *P. poeyi* is known as the shortfin sweeper; it is more rarely collected, with records scattered through Area 31 (Bermuda to Tobago).

### Similar families

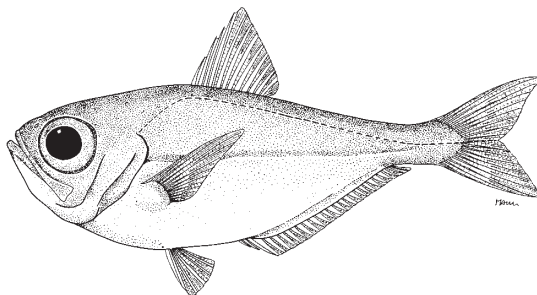
None in the area, but possibly mistaken with Bathyclupeidae. To about 20 cm. Similar in having a short-based dorsal fin and long-based anal fin. Easily distinguished by minute pelvic fins, no spines in dorsal fin which is posterior to anal-fin origin, one spine in anal fin, 15 gill rakers on first arch. A mesopelagic fish (400 to 3 000 m).

**Key to the species of Pempheridae occurring in the area**

- 1a. Soft anal-fin rays 29 to 36, usually 31 to 34; live coloration of adults coppery red over silver to olive green, with iridescent blue highlights and a dark band along the anal-fin base; dorsal spines almost always 5 . . . . . *Pempheris schomburgkii*
- 1b. Soft anal-fin rays 22 to 26, usually 23 to 24; live coloration of adults light yellowish brown and slightly dusky dorsally to blackish, flanks silvery, without dark band along the anal-fin base; dorsal spines almost always 4. . . . . *Pempheris poeyi*



*Pempheris schomburgkii*



*Pempheris poeyi*

**List of species occurring in the area**

*Pempheris poeyi* Bean, 1885. To 72 mm SL (almost 100 mm TL). Tropical, to 25 m; Bermuda, Bahamas, Cuba, Grenadines, Grenada, Tobago, Venezuela, Colombia (likely more widely distributed).

*Pempheris schomburgkii* Müller and Troschel in Schomburgk, 1848. To 120 mm SL (150 mm TL). Tropical, to at least 20 m; throughout Area 31 on coral and rocky reefs, although only marginally into Gulf of Mexico (Key West, Dry Tortugas, Quintana Roo), and S to São Paulo, Brazil.

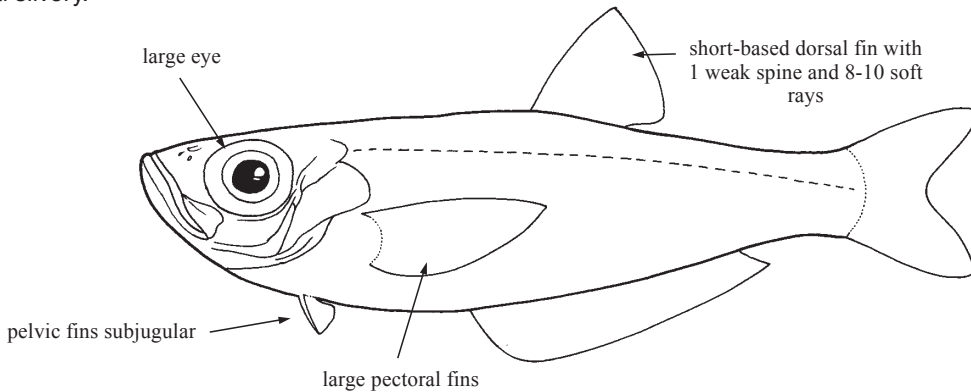


## BATHYCLUPEIDAE

### Bathyclupeids

by J.R. Paxton, Australian Museum, Sydney, and K.E. Carpenter, Old Dominion University, Virginia, USA

**Diagnostic characters:** Moderate-sized (to 30 cm) perciform fishes, body moderately to distinctly elongate, very compressed. Head moderate to large, **dorsal profile horizontal**. **Eye very large, its diameter greater than snout length**. **Mouth large, oblique to almost vertical**, jaws not reaching level of anterior margin of pupil. Small teeth in bands on jaws and palatine, inconspicuous V-shaped patch on vomer. Gill rakers lath-like, 15 to 19 on first gill arch. **Fin spines very weakly developed; a single short-based dorsal fin near middle of body and over middle of anal fin**, with 1 spine and 8 to 10 soft rays; anal fin with 1 spine and 24 to 39 soft rays; **pelvic fins subjugular, anterior to level of pectoral-fin base, very short**, with 1 spine and 5 soft rays; **pectoral fins very large, reaching level of dorsal-fin origin, with 26 to 30 rays**. Scales large, cycloid on body and nape, head naked; lateral-line scales with several small pores. **Colour:** dorsal dark, ventral silvery.



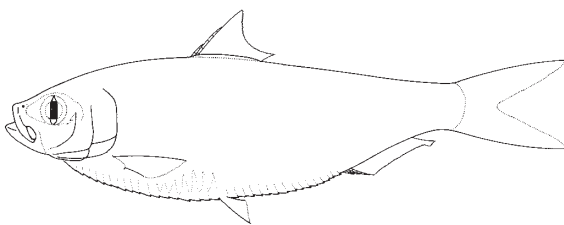
**Habitat, biology, and fisheries:** Deep-sea fishes of slope and oceanic waters, meso-, bathy-, or benthopelagic. Carnivores, mostly feeding on small crustaceans. Rare deep-sea fishes of no commercial importance.

**Remarks:** One genus with 7 nominal species restricted to tropical and subtropical latitudes in the world's oceans, except the eastern Pacific and northeastern Atlantic. The family requires revision.

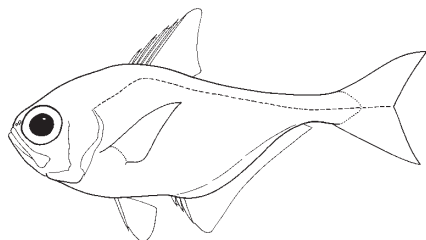
#### Similar families occurring in the area

Clupeidae: no fin spines; pelvic fins behind level of pectoral-fin base.

Pempheridae: pelvic fins moderate in length, behind level of pectoral-fin base; dorsal-fin origin anterior to anal-fin origin.



Clupeidae



Pempheridae

#### List of species occurring in the area

*Bathyclupea argentea* Goode and Bean, 1896. To 21 cm. Presumably widespread WC Atlantic.

*Bathyclupea schroederi* Dick, 1962. To at least 14 cm. Presumably widespread WC Atlantic.

#### Reference

Dick, M.M. 1972. A review of the fishes of the family Bathyclupeidae. *J. Mar. Biol. Ass. India*, 14(2):539-544.