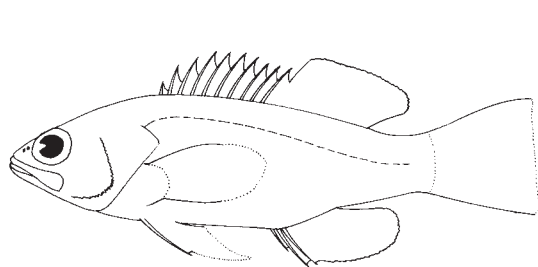


SERRANIDAE

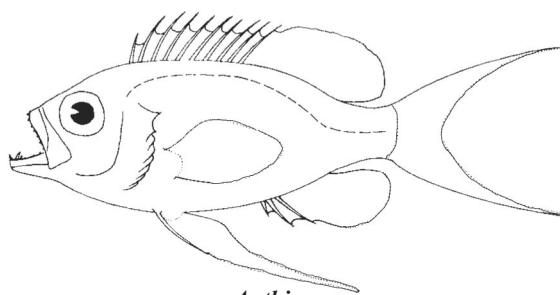
Groupers (seabasses, creolefish, coney, hinds, hamlets, anthiines, and soapfishes)

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

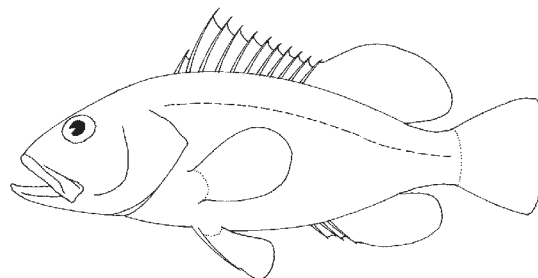
Diagnostic characters: Small to enormous fishes (the largest grouper, the jewfish, attains a length of 2.5 m and a weight of 400 kg; maximum size for the smallest serranid, *Jeboehlkia gladifer*, is about 5 cm total length); body robust or compressed and deep-bodied to moderately elongate and slender, 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.**



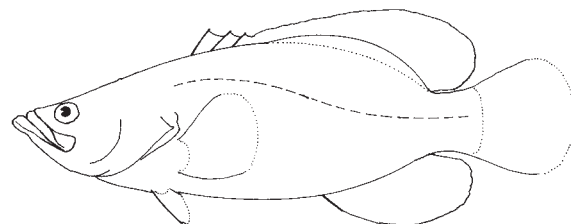
Serranus



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.

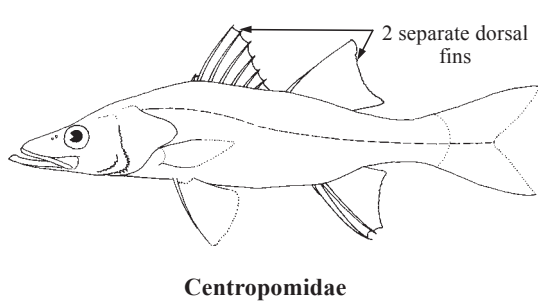
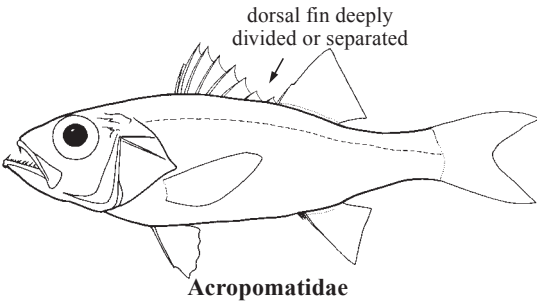
Remarks: The composition of the family used here follows Johnson (1983, 1984) and Baldwin and Johnson (1993). In the 1977 edition of the *FAO Species Identification Sheets for the Western Central Atlantic*, the tribe Grammistini and the subfamily Anthiinae were recognized as separate families. Lateral 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

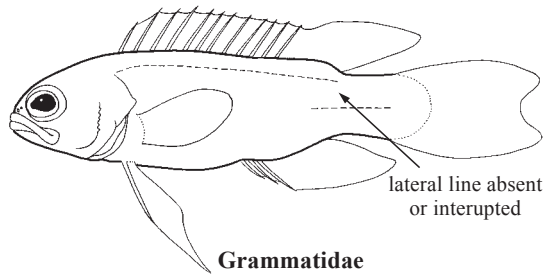
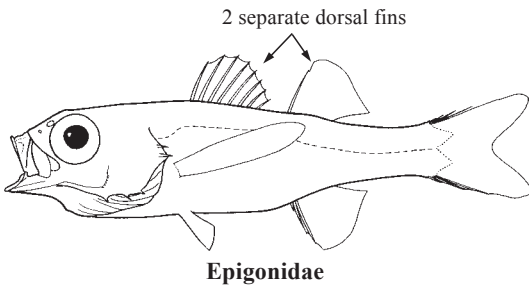
Acropomatidae: rear edge of opercle with 2 flat points; dorsal fin deeply divided or as separate spinous fin with 7 to 10 spines and soft-rayed fin with 1 spine and 9, 10, or 14 rays.

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.



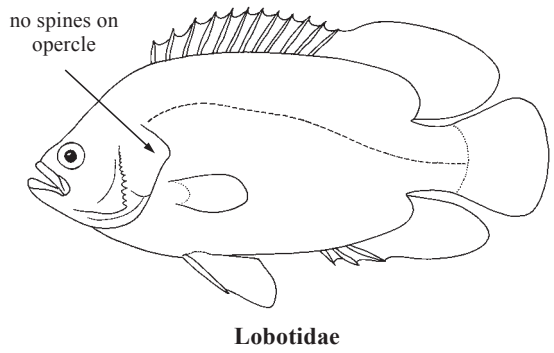
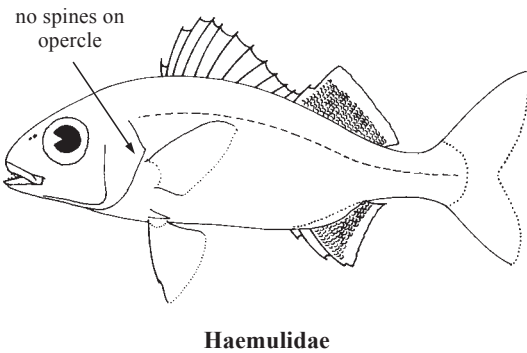
Epigonidae: dorsal fins separate, first with 6 to 8 spines, second with 1 spine and 8 to 11 rays; anal fin with 1 to 3 spines and 7 to 10 rays; eye diameter about 1/3 or more of head length.

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.



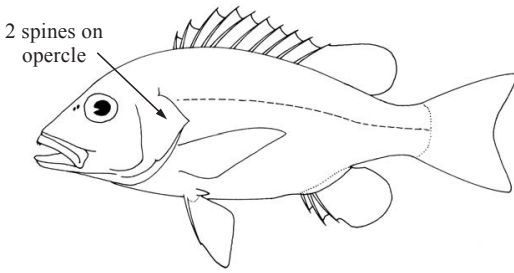
Haemulidae: maxilla mostly covered by preorbital bone when mouth is closed; no teeth on vomer or palatines; no spines on opercle.

Lobotidae: no spines on opercle; no teeth on vomer or palatines; soft dorsal and anal fins enlarged, projecting well past caudal-fin base.

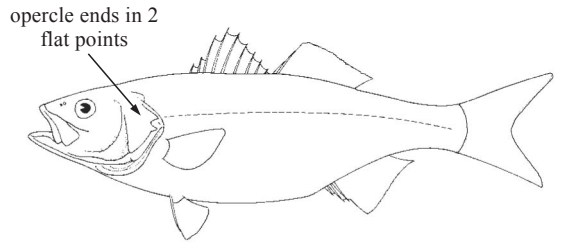


Lutjanidae: maxilla mostly covered by preorbital bone when mouth is closed; 2 spines on opercle; scaly axillary process at base of pelvic fins usually well developed.

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.



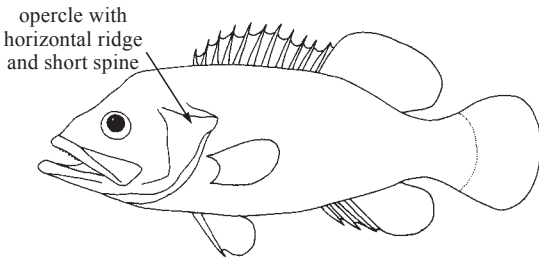
Lutjanidae



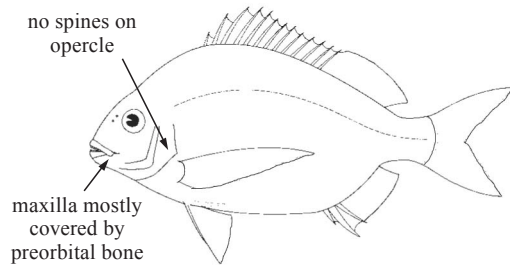
Moronidae

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

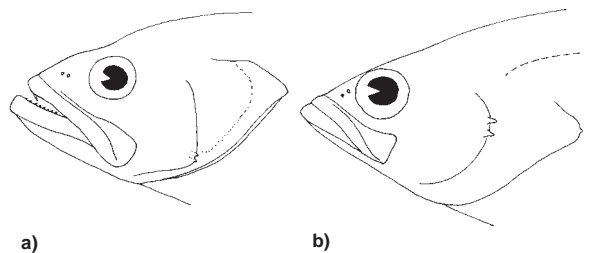


Fig. 1 operculum

- 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*

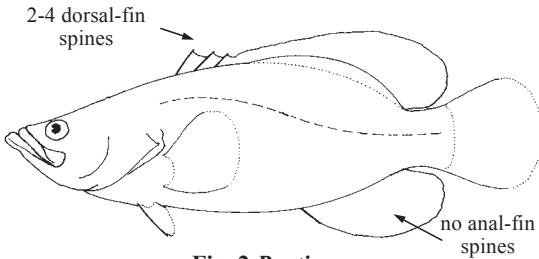


Fig. 2 *Rypticus*

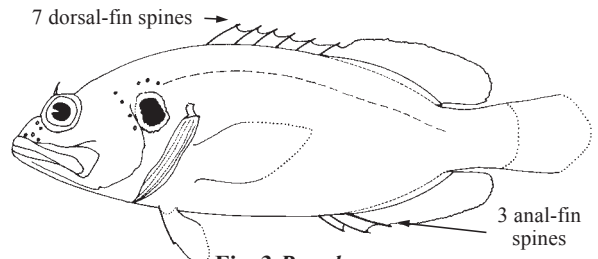


Fig. 3 *Pseudogramma*

- 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*

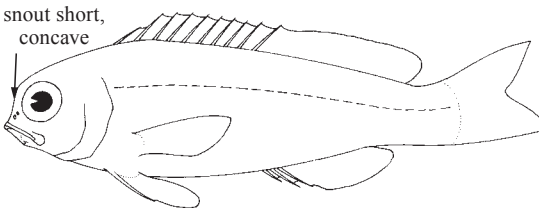


Fig. 4 *Bullisichthys caribbaeus*

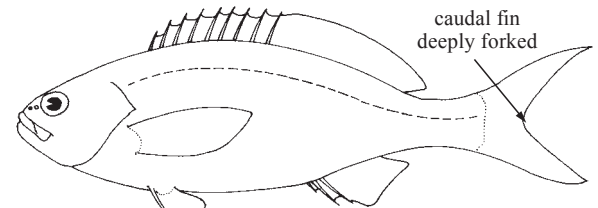


Fig. 5 *Paranthias*

- 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*

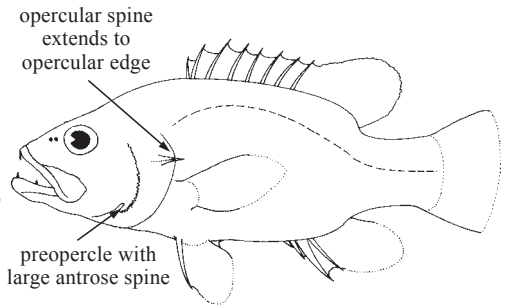


Fig. 6 *Gonioplectrus hispanus*

- 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

- 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

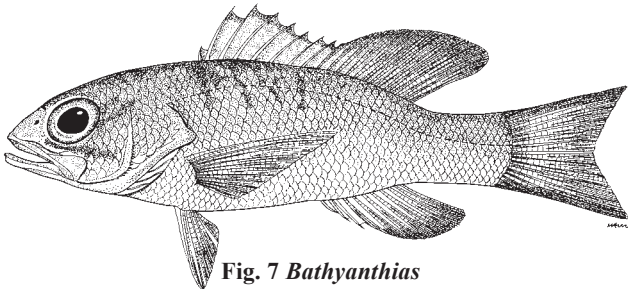


Fig. 7 *Bathyanthias*

- 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) ***Jeboehkia 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***

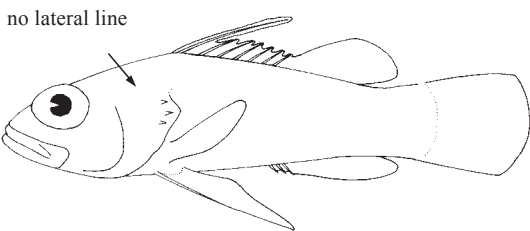


Fig. 8 *Jeboehkia gladifer*

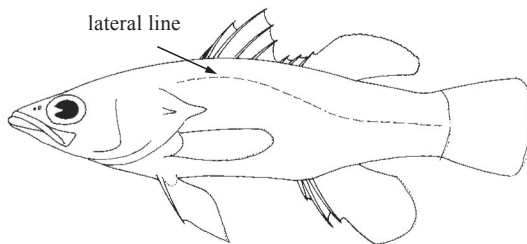


Fig. 9 *Liopropoma*

- 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

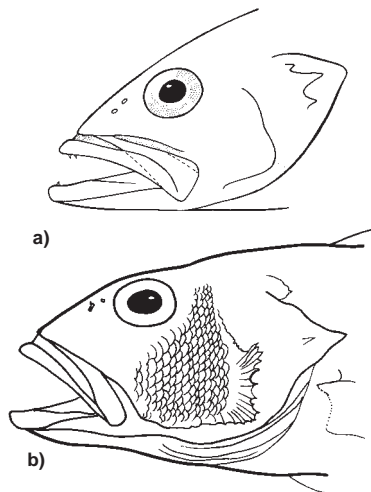


Fig. 10

- 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

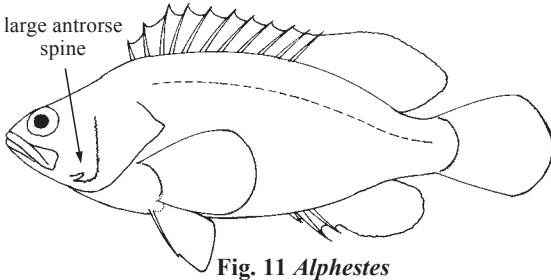


Fig. 11 *Alphestes*

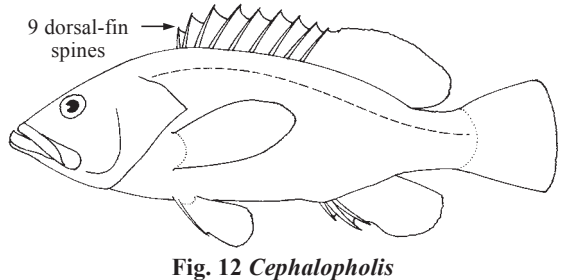


Fig. 12 *Cephalopholis*

- 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

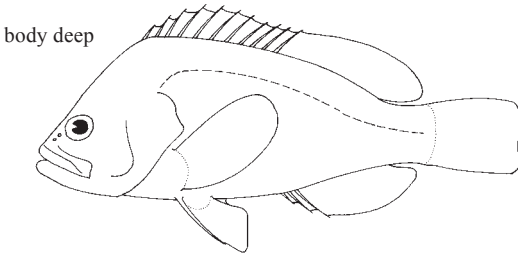


Fig. 13 *Dermatolepis*

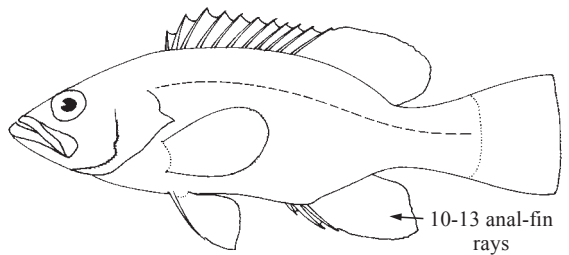


Fig. 14 *Mycteroperca*

- 13a. Anal-fin rays 10 to 13 (Fig. 14) *Mycteroperca*
- 13b. Anal-fin rays 7 to 9 (rarely 10) (Fig. 15) *Epinephelus*

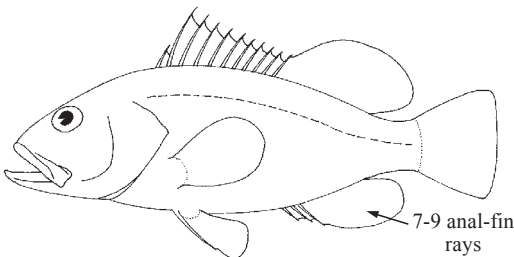


Fig. 15 *Epinephelus*

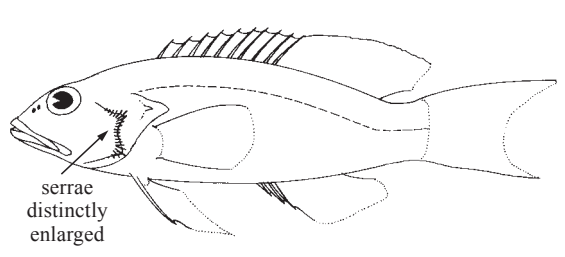


Fig. 16 *Diplectrum*

- 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

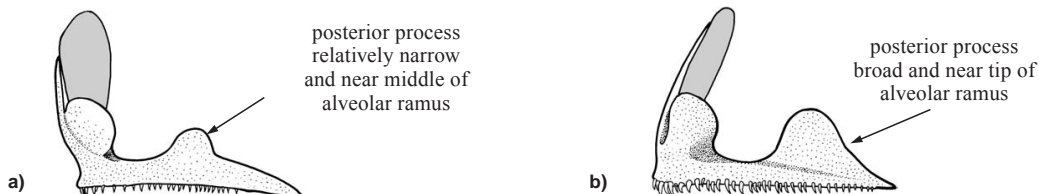


Fig. 17 premaxilla

- 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*

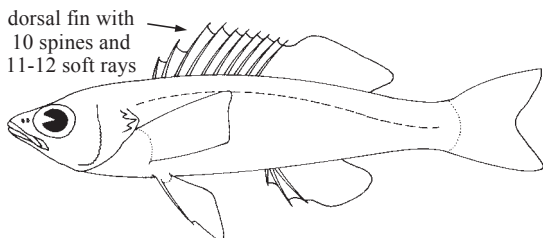


Fig. 18 *Schultzea*

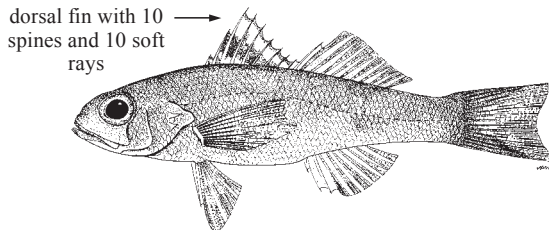


Fig. 19 *Parasphyraenops*

- 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

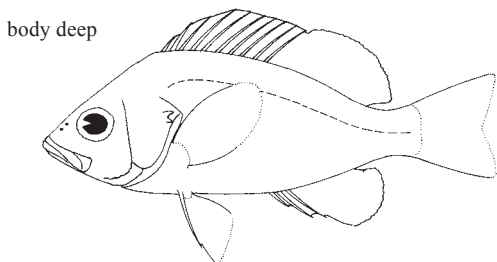


Fig. 20 *Hypoplectrus*

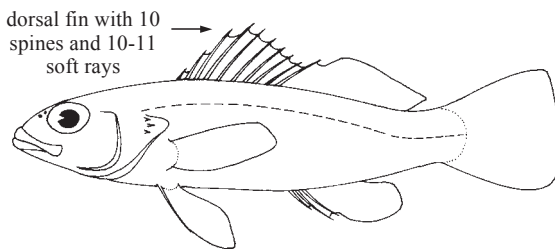


Fig. 21 *Serraniculus*

- 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

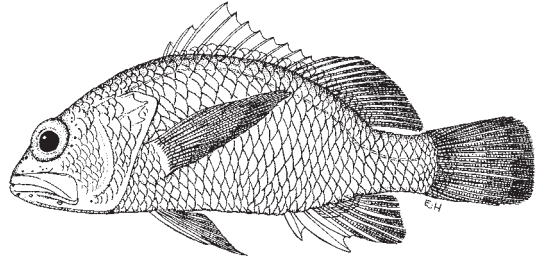


Fig. 22 *Plectranthias garrupellus*

- 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

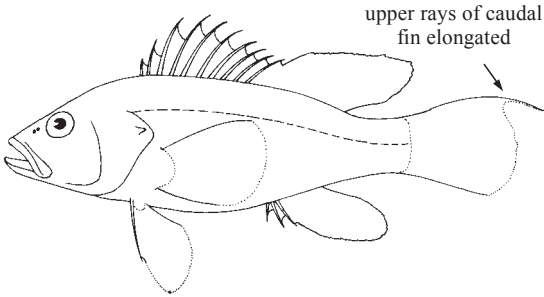


Fig. 23 *Centropristis*

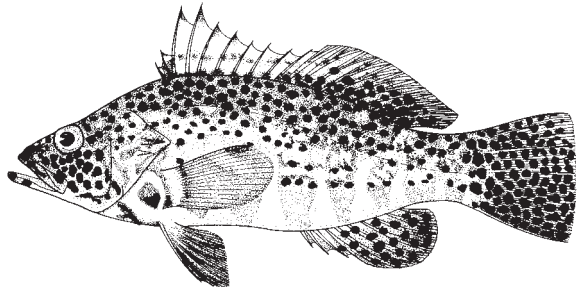


Fig. 24 *Paralabrax dewegeri*

- 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

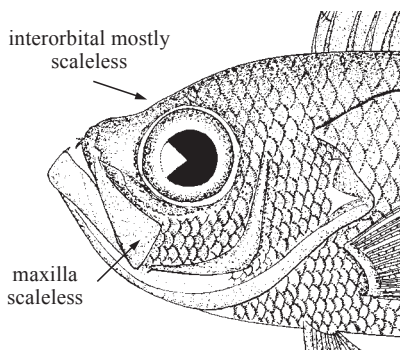


Fig. 25 lateral view of head (*Hemanthias*)

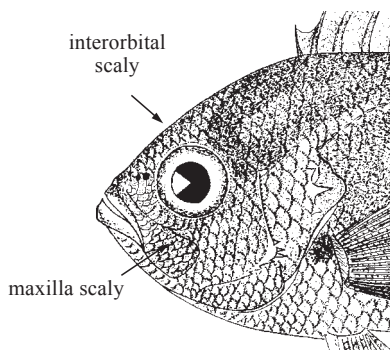


Fig. 26 lateral view of head (*Pronotogrammus*)

- 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*

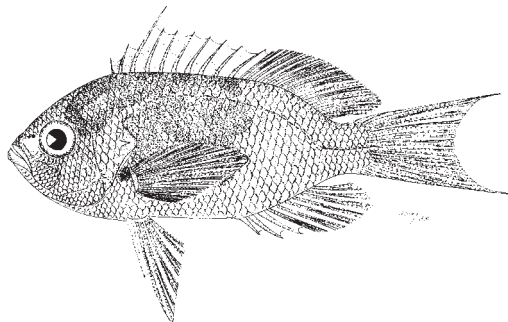


Fig. 27 *Pronotogrammus martinicensis*

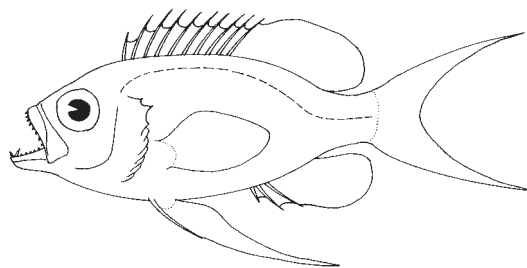


Fig. 28 *Anthias*

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*

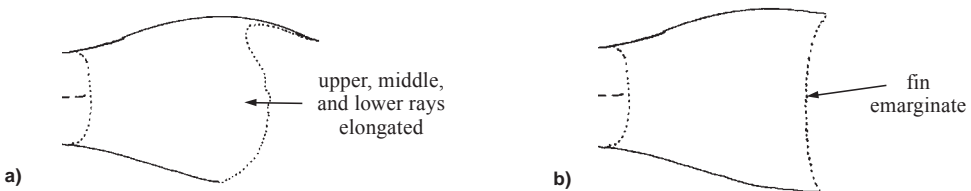


Fig. 29 caudal fins

- 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 philadelphia*

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

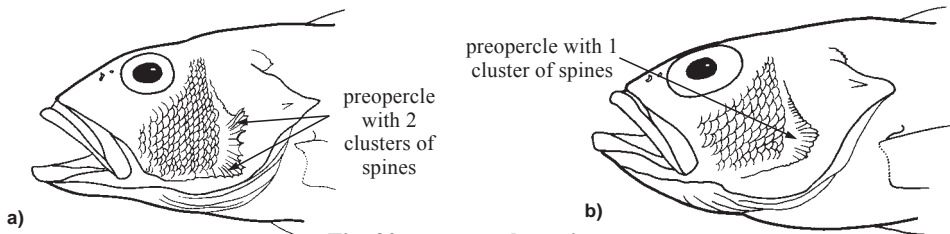


Fig. 30 preopercular spines

- 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 nostrils 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

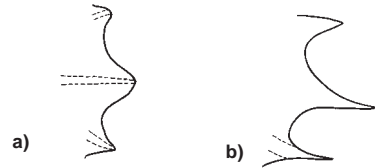


Fig. 31 opercular spines

- 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 to 16; 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 erroneous.

➤ *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.

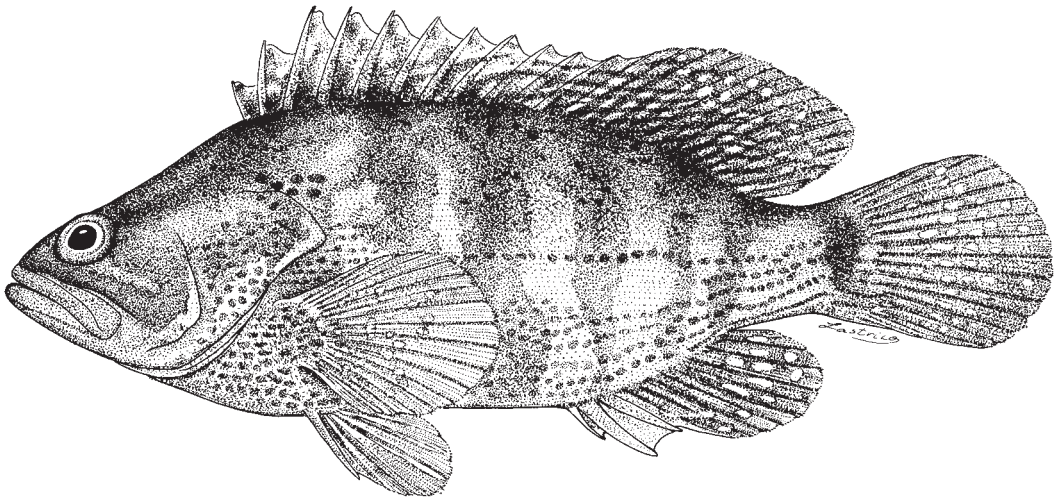
- *Mycteroperca acutirostris* (Valenciennes, 1828).
- *Mycteroperca bonaci* (Poey, 1860).
- *Mycteroperca cidi* Cervigón, 1966.
- *Mycteroperca interstitialis* (Poey, 1860).
- *Mycteroperca microlepis* (Goode and Bean, 1879).
- *Mycteroperca phenax* Jordan and Swain, 1884.
- *Mycteroperca tigris* (Valenciennes, 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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Alphestes afer (Bloch, 1793)

LSF

Frequent synonyms / misidentifications: *Epinephelus afer* (Bloch, 1793) / None.**FAO names:** En - Mutton hamlet; Fr - Varech; Sp - Guaseta

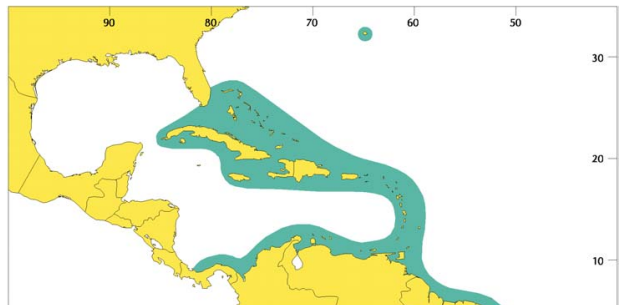
Diagnostic characters: Body depth slightly less than head length, 2.4 to 3.1 in standard length (for fish 13 to 22 cm standard length); caudal peduncle depth 12 to 14% standard length. Eye diameter greater than snout length, 4.1 to 5.3 in head length. Gill rakers on first arch 6 to 8 on upper limb, 16 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.

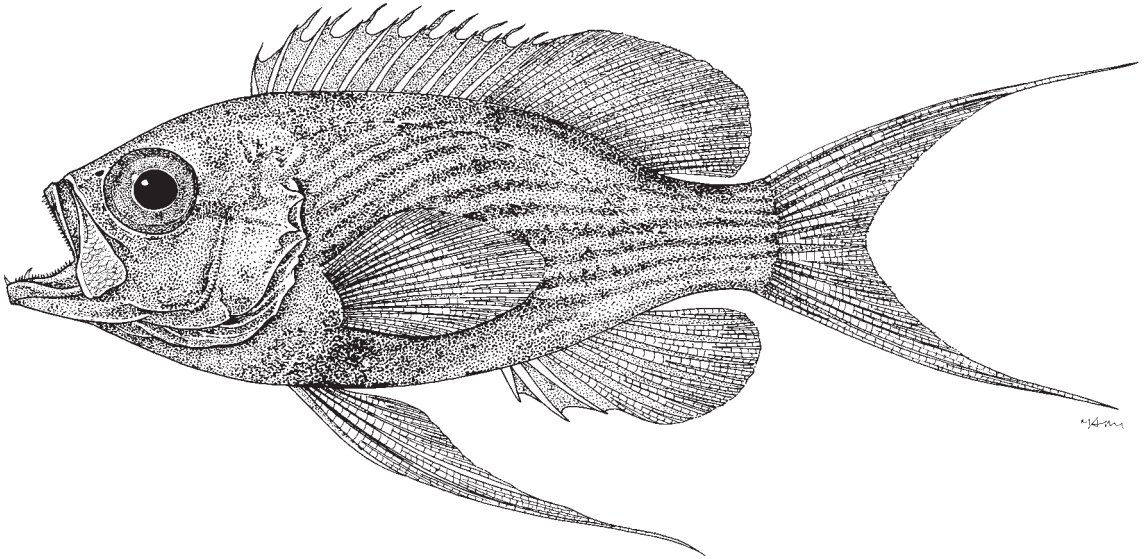
Remarks: Smith (1971) synonymized the eastern Pacific species *Alphestes galapagensis* Fowler, *Alphestes fasciatus* Hildebrand and *Alphestes immaculatus* Breder with the Atlantic species *Alphestes afer*. Subsequently, Heemstra and Randall (1993) recognized these amphi-American populations as distinct 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).

