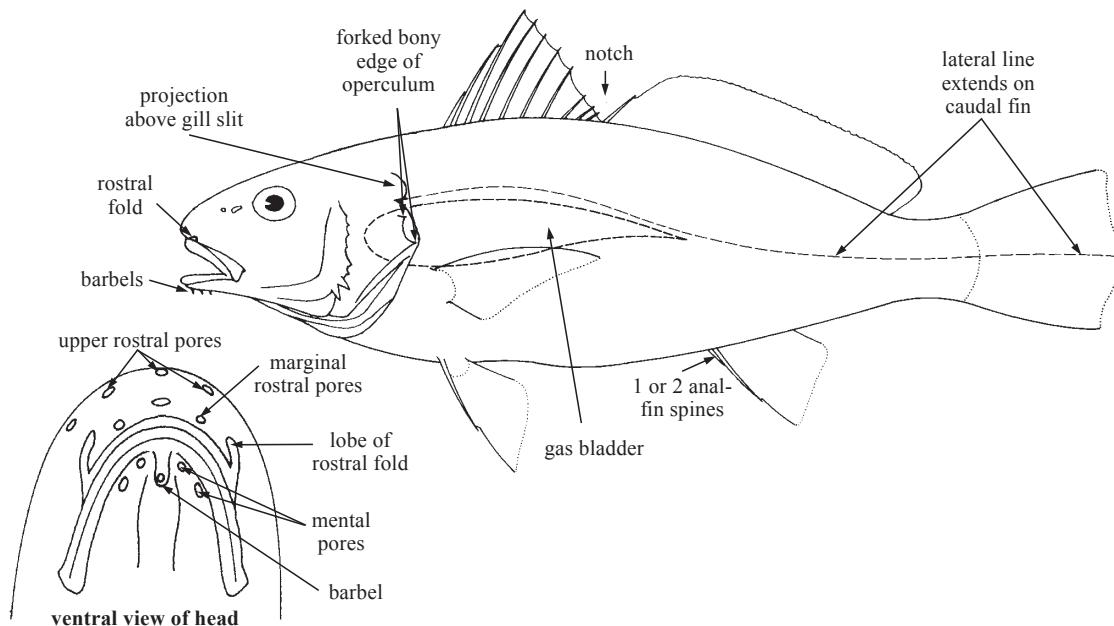


SCIAENIDAE

Croakers (drums)

by N.L. Chao, Universidade Federal do Amazonas, Manaus, Brazil

Diagnostic characters: Small to large (5 to 200 cm), most with fairly elongate and compressed body, few with high body and fins (*Equetus*). **Head short to medium-sized, usually with bony ridges on top of skull, cavernous canals visible externally in some** (*Stellifer*; *Nebris*). Eye size variable, 1/9 to 1/3 in head length, some near-shore species with smaller eyes (*Lonchurus*, *Nebris*) and those mid- to deeper water ones with larger eyes (*Ctenosciaena*, *Odontoscion*). Mouth position and size extremely variable, from large, oblique with lower jaw projecting (*Cynoscion*) to small, inferior (*Leiostomus*) or with barbels (*Paralonchurus*). **Sensory pores present at tip of snout (rostral pores, 3 to 7), and on lower margin of snout (marginal pores, 2 or 5).** Tip of lower jaw (chin) with 2 to 6 mental pores, some with barbels, a single barbel (*Menticirrhus*), or in pairs along median edges of lower jaw (*Micropogonias*) or subopercles (*Paralonchurus*, *Pogonias*). **Teeth usually small, villiform, set in bands on jaws with outer row of upper jaw and inner row of lower jaw slightly larger** (*Micropogonias*), or on narrow bony ridges (*Bairdiella*); some with a pair of large canines at the tip of upper jaw (*Cynoscion*, *Isopisthus*) or series of arrowhead canines on both jaws (*Macrodon*); **roof of mouth toothless (no teeth on pre vomer or palatine bones).** Preopercle usually scaled, with or without spines or serration on posterior margin. **Dorsal fin long, continuous with deep notch between anterior (spinous) and posterior (soft) portions**, except in *Isopisthus* which has 2 well-separated dorsal fins; spinous dorsal fin with 7 to 13 spines (mostly 10), soft portion with 1 to 4 spines plus 18 to 46 soft rays. **Anal fin with 2 spines** (only 1 in *Menticirrhus*), obscure (*Cynoscion*) or very strong (*Bairdiella*), usually with 6 to 12 soft rays (18 to 20 in *Isopisthus*); pectoral fins short and rounded to very long and pointed (*Lonchurus*), with 15 to 20 long rays (1 to 3 short rays at base of upper margin). **Caudal fin never forked, usually pointed in juveniles, becoming emarginate, truncate, rounded to rhomboidal, or S-shaped in adults.** Scales ctenoid (edge comb-like) or cycloid (smooth) cover entire body, except tip of snout where scales often absent or embedded under skin. **A single continuous lateral line extending to hind margin of caudal fin;** pored lateral-line scales often with intercalated small scales, which often make the lateral line appear much thicker. Dorsal and anal fins often with scaly sheath along the base and scales on the membranes between fin rays. Caudal fin usually covered with small scales at base and on lateral line, some with scales covering almost entire caudal fin (*Pachyurus*). Total number of vertebrae usually 25, with exceptions such as *Cynoscion microlepidotus* (22), *Pogonias cromis* (24), *Cynoscion nothus* (27) and *Lonchurus* (29); ventral side of first few vertebrae often with slightly expanded lateral processes, where gas bladder firmly attached. a large gas bladder (2 chambers in the subfamily *Stelliferinae*) often with variably developed appendices (diverticula), and 1 or 2 pairs of large earstones (sagittae and lapilli) inside skull. **Colour:** variable from silvery to yellowish or dark brown, often with dark spots, vertical bars and longitudinal stripes; tip of spinous dorsal fin often dark edged; abdominal and lower fins often yellowish; a dark blotch often present at pectoral-fin bases; roof of mouth and lining of gill cavity often black and showing through opercle as a diffuse triangular blotch.

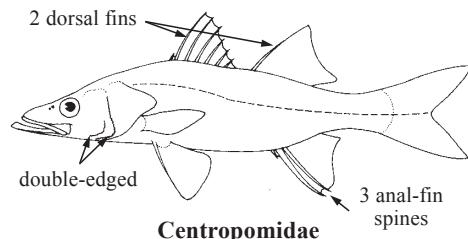


Habitat, biology, and fisheries: Croakers are primarily coastal marine fishes; some are confined to fresh water rivers (e.g. *Aplodinotus grunniens* of North and Central America; *Pachyrops*, *Pachyurus*, *Plagioscion* of South America). While the large majority live inshore over sandy or muddy bottoms, a few species are found in deep water (*Protosciaena bathytatos* to 600 m) and others have adapted to special habitats such as coral reefs (*Equetus*) and surf zones (*Menticirrhus*). Many croakers use estuarine environments seasonally as nursery grounds during their juvenile phase (young-of-the-year), and as feeding grounds during young adult phase, others are year-round inhabitants of estuaries and coastal lagoons. Croakers are mostly demersal fishes, some midwater, usually randomly scattered or in small patches, sometimes forming larger aggregations during spawning season. Seasonally, some species occur in relatively limited geographic areas with large quantities, and move into estuaries or along shorelines; hence local artisanal and subsistence fisheries also exploit them. Croakers often represent a major component of near-shore bottom trawl catches and bycatches (in the northern Gulf of Mexico croakers are reported to account for more than 50% of the total landing, not including bycatches of shrimp trawlers, and catch rates are also high on trawling grounds off Venezuela and Guyana). Actual landings are probably much higher since available statistics only cover a few species and the majority are lumped together with other fishes. They are taken also with other types of gear, especially gill nets, pound nets and artisan beach haul seines; large surf-living species are also caught by anglers. Most croakers are valuable foodfishes, especially the larger species. Gas bladders of *Cynoscion* are used to produce isinglass for industrial use and as an esteemed oriental delicacy. Overfishing (including bycatch) and changing coastal environmental conditions have reduced many local stocks. One of the largest sciaenids, *Totoaba macdonaldi*, endemic to Gulf of California on Pacific coast, was one of the first recognised threatened and endangered marine fish since the mid 1970s. Therefore, regional fishery agencies should consider the conservation aspects of large sciaenids such as *Cynoscion*, *Sciaenops*, and *Pogonias* and shrimp trawler bycatch of many juvenile sciaenids more rigorously.

Similar families occurring in the area

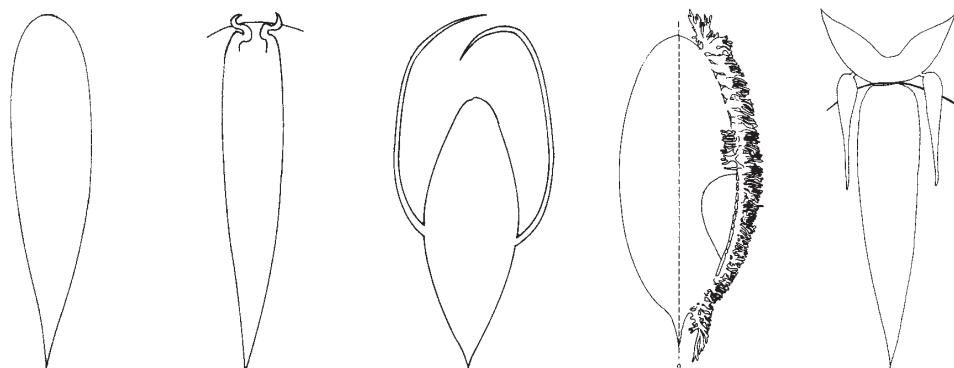
Centropomidae: always with 2 well-separated dorsal fins; preopercle double-edged (single-edged in Sciaenidae); conspicuous enlarged axial scales present at pelvic-fin bases (absent in Sciaenidae); 3 spines in anal fin (2 in Sciaenidae); caudal fin deeply forked (never in Sciaenidae).

All other perch-like fishes in the area: lateral line not extending to hind margin of caudal fin



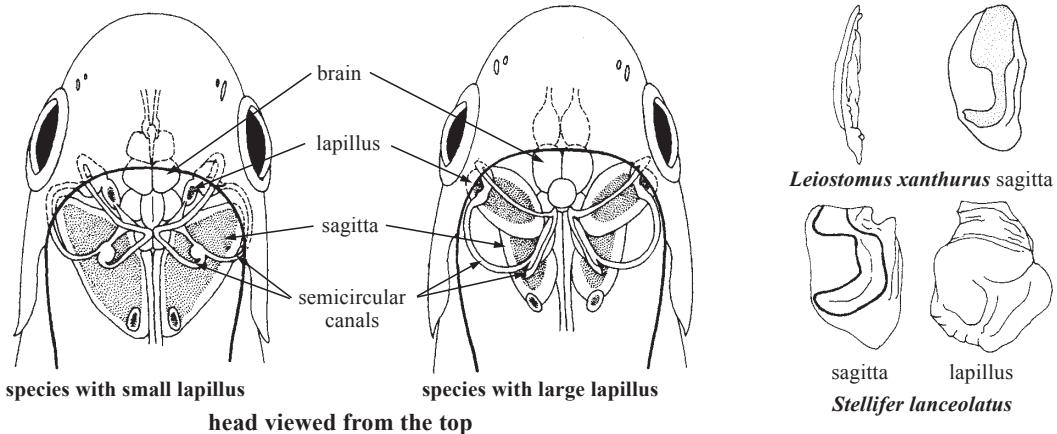
Note: Anatomic characters of gas bladders and earstones (sagitta and lapillus otoliths) are particularly helpful in the identification of genera and species in this family.

Gas bladder is located between the viscera and the backbone (vertebral column). It is well-developed in all west Atlantic sciaenids, except in genera *Menticirrhus* and *Lonchurus* where it becomes absent or rudimentary in adults. The organ is usually a carrot-shaped gas chamber (primitive condition), many sciaenids have developed lateral appendages or diverticula from the main chamber (derived conditions), which are also useful in identifying species. An additional yoke-shaped chamber anterior to the main gas chamber is found in the subfamily Stelliferinae. A pair of oval-elongated reddish drumming muscles often present on sides of body walls or on gas bladder (*Pogonias*), their contraction and friction against the gas bladder produces croaking sounds.



gas bladders with variable developed lateral appendages and drumming muscles

Otoliths (earstones) are located in the ear capsules on the ventral side of the cranium (see figures below); croakers always have a large pair of sagitta earstones, a second pair (lapillus) is also enlarged in the subfamily Stelliferinae (*Bairdiella*, *Coryula*, *Odontoscion*, *Ophioscion* and *Stellifer*) in the area. The inner (smooth) surface of the sagitta bears a tadpole-shaped impression with a shallow head (sulcus) and a deeply grooved and often hooked tail (cauda). The overall shape and thickness of the sagitta are characteristic for each genus, and the configuration of the tadpole impression often provides correct identification to species.



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

- 1a. Chin, underside of lower jaw or opercle with barbel → 2
- 1b. Chin without barbel → 9

- 2a. A single barbel on tip of lower jaw (Fig. 1) → 3
- 2b. Two or more barbels on chin or in paired series along median edges of lower jaw or opercles (Fig. 2) → 5

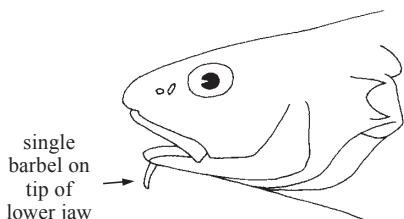


Fig. 1 lateral view of head (*Menticirrhus*)

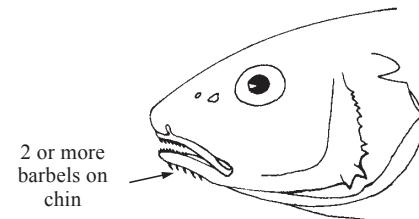


Fig. 2 lateral view of head (*Micropogonias*)

- 3a. Body elongate and rounded in cross-section, belly flat (Fig. 3); anal fin with 1 short spine; gas bladder absent or rudimentary in adults *Menticirrhus*
- 3b. Body oblong and compressed, belly rounded (Fig. 4); anal fin with 2 spines; gas bladder well developed → 4

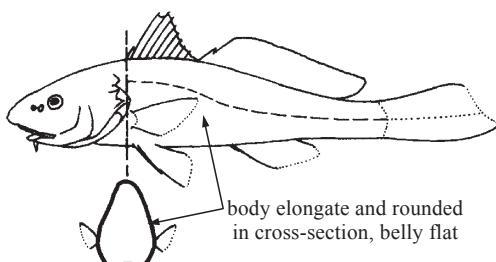


Fig. 3 *Menticirrhus*

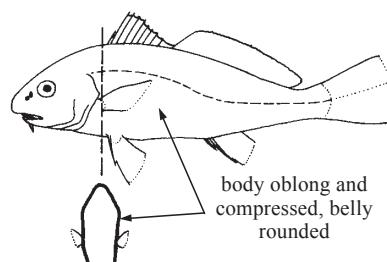


Fig. 4 *Umbrina*

4a. Mouth large, terminal, slightly oblique; mental barbel slender, flexible, its tip tapering, without pore (Fig. 5a); eye large, 3.8 times or less in head length; body uniformly silvery with a distinct black spot at pectoral-fin base *Ctenosciaena gracilicirrhus*

4b. Mouth small, inferior; mental barbel short, rigid with pore on its tip or middle (Fig. 5b); eye moderately large, 4 times or more in head length; body either dark brown or silvery with distinct oblique stripes or vertical bars *Umbrina*

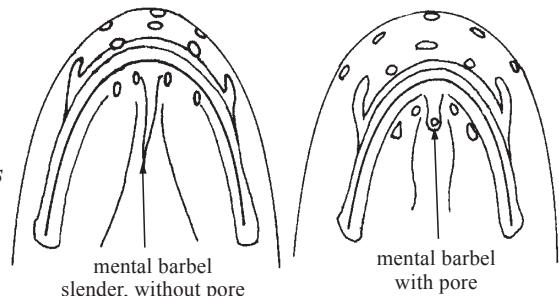
a) *Ctenosciaena*b) *Umbrina*

Fig. 5 underside of head

5a. Pectoral fin long, jet-black reaching beyond anal-fin base; caudal fin long and pointed; eye small, 8 times or more in head length; preopercle margin smooth; soft dorsal-fin rays 31 to 39; 11 precaudal and 18 caudal vertebrae (29 total) *Lonchurus*

5b. Pectoral fin short, pale, not reaching beyond anus; caudal fin truncate or rhomboid; eye moderate, less than 5 times in head length; preopercle margin usually serrate; soft dorsal-fin rays 19 to 30; gas bladder well developed; 10 precaudal and 14 or 15 caudal vertebrae (24 or 25 total) → 6

6a. Three miniature barbels on tip of lower jaw; eye large, 3 to 4 times in head length; small scales cover almost entire caudal fin like a sheath (fresh water South America) *Pachypops* group

6b. Barbels in tuft at tip of chin or in series along median margins of lower jaw and opercles; eye smaller, 4.5 times or more in head length; caudal fin scaled only basal half, never sheath-like; coastal marine and estuaries → 7

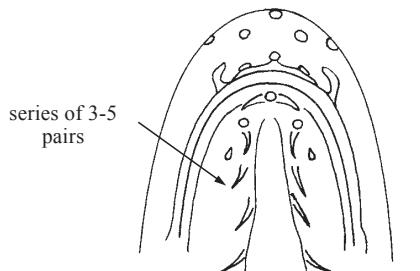
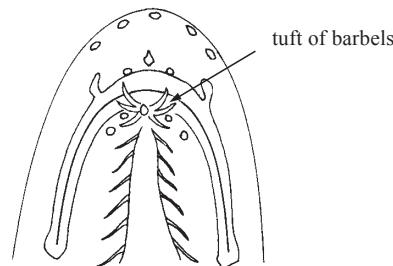
a) *Micropogonias* and *Pogonias*b) *Paralonchurus*

Fig. 6 underside of head

7a. Barbels in series of 3 to 5 pairs along median margins of lower jaw (Fig. 6a); side with series of small spots forming oblique wavy lines along transverse scale rows or scattered on back in reticulate pattern *Micropogonias*

7b. Barbels in tuft at tip of chin or in series of 10 to 13 pairs along median margins of lower jaw and opercles (Fig. 6b); body often with broad vertical bars on side, less prominent in adults → 8

- 8a. Body oblong and compressed, dark greyish with 4 or 5 vertical bars in young fish to 25 cm, adult uniformly dark grey; caudal fin truncate; soft dorsal-fin rays 19 to 22, anal-fin rays 5 to 7; gas bladder with well-developed lateral diverticula *Pogonias cromis*
- 8a. Body elongate and rounded, yellowish brown with 7 to 9 vertical bars on side and a dark spot above gill slit; caudal fin rhomboidal; soft dorsal-fin rays 28 to 30, anal-fin ray 7 to 9; gas bladder with 2 pairs of tubular appendages *Paralonchurus brasiliensis*
- 9a. Spinous and rayed dorsal fins well separated (Fig. 7a); anal-fin base long with 18 to 20 soft rays *Isopisthus parvipinnis*
- 9b. One continuous dorsal fin, with a deep notch between spinous and soft-rayed portion (Fig. 7b); anal-fin base much shorter, with 7 to 13 soft rays → 10

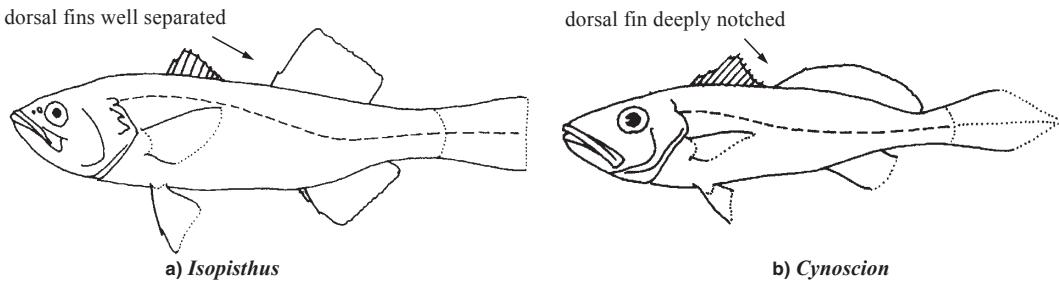


Fig. 7

- 10a. Lateral line with a much thickened appearance, pored lateral-line scales completely concealed by layers of smaller scales; gas bladder with a pair of tubular appendages running from posterior end along lateral wall ending anteriorly in a pair of horns (fresh water South America). *Plagioscion*
- 10b. Lateral line not appearing thickened, pored lateral-line scales with intercalated scales but never concealed by small scales; gas bladder with 1 or 2 chambers, some with variably developed appendages, but never originating from posterior end of gas bladder → 11
- 11a. Preopercle serrate often with 1 or more distinct bony spines at angle or prominent serration on posterior margin (except in *Protosciona bathytatos*) → 12
- 11b. Preopercle smooth or slightly denticulate or ciliate, never with strong bony spine or serration in adult → 15
- 12a. Eye large, 3.5 or less in head length; gas bladder in a single chamber, carrot-shaped; inner ear with only a pair of large otolith (sagitta); inhabits deeper waters (70 to 300 m) *Protosciona*
- 12b. Eye moderate to small, 4 or more in head; gas bladder with 2 chambers; posterior one carrot-shaped, anterior one yoke-shaped, its tips often visible under skin at upper corner of gill slit; inner ears with 2 pairs of large otoliths (sagitta and lapillus) → 13

- 13a. Head broad, top cavernous, often translucent under skin, hollow or spongy to touch (Fig. 8a); interorbital width less than 3.5 times in head length; a pair of variable developed appendages present on posterior margin of anterior chamber (Fig. 9) ***Stellifer***
- 13b. Head narrower, top cavernous, but usually not translucent under skin, firm to touch (Fig. 8b); interorbital width 3.5 times or more in head length; no appendages on posterior margin of anterior gas chamber → 14

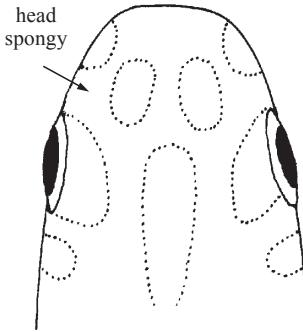
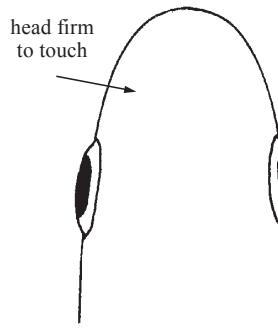
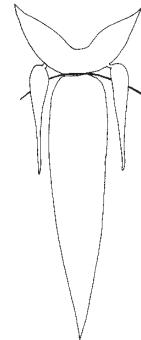
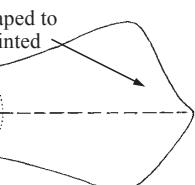
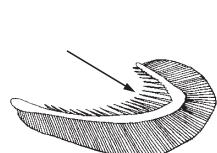
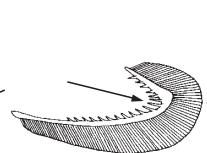
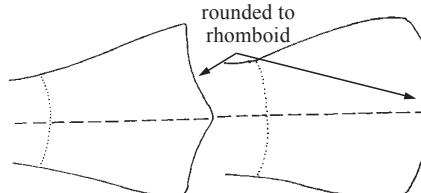
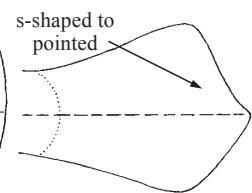
a) *Stellifer*b) *Bairdiella* and *Ophioscion*Fig. 9 gas bladder of *Stellifer**Bairdiella**Ophioscion*a) *Bairdiella*b) *Ophioscion*a) *Bairdiella*b) *Ophioscion*

Fig. 10 gill arch

Fig. 11 caudal fin

- 15a. Mouth small, inferior, snout projecting in front of upper jaw → 16
- 15b. Mouth moderate to large, horizontal to strongly oblique, terminal or lower jaw projecting in front of upper jaw → 21

- 16a. Body short and deep, dorsal profile strongly elevated or arched on nape; body depth less than 3.5 times in standard length (Fig. 12a). → 17
- 16b. Body elongate, dorsal profile not strongly elevated or arched on nape; body depth more than 4 times in standard length (Fig. 12b) → 20

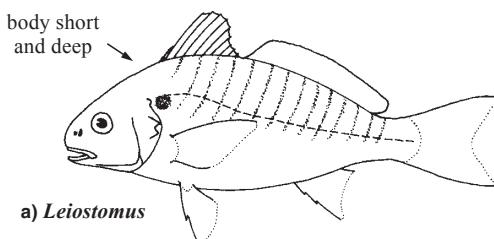
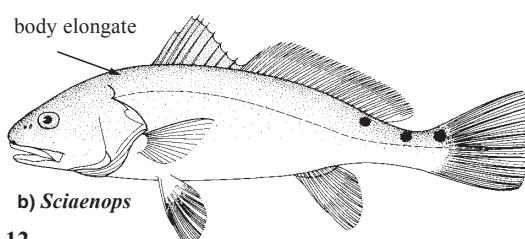
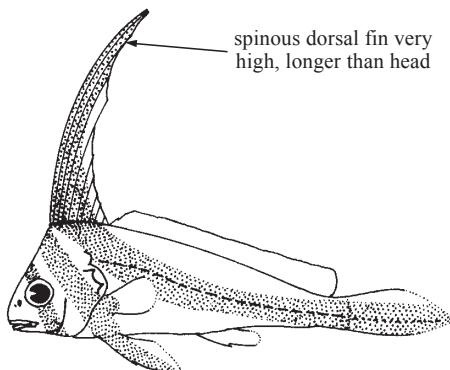
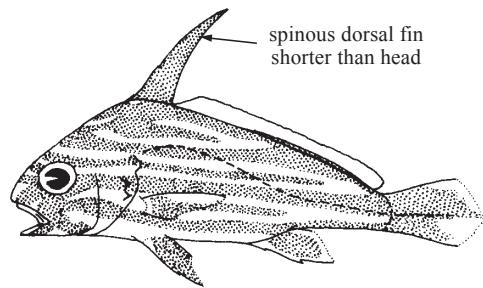
a) *Leiostomus*b) *Sciaenops*

Fig. 12

- 17a.** Body uniformly silvery, darker dorsally; lower pharyngeal tooth plates fused into a single triangular plate (fresh water North America) *Aplodinotus grunniens*
- 17b.** Body with spots, bars or stripes; lower pharyngeal tooth plates not fused → 18
- 18a** Body silvery with narrow oblique stripes along transverse scale rows, a dark humeral spot behind upper end of gill slit; soft dorsal-fin rays 28 to 33; 30 to 36 gill rakers on first arch *Leiostomus xanthurus*
- 18b.** Body dark silvery to brownish with conspicuous longitudinal stripes, or broad oblique bars on head and flank; soft dorsal-fin rays 35 or more; less than 20 gill rakers on first arch → 19
- 19a.** Spinous dorsal fin very high, longer than head; sides with 3 dark oblique bars, 2 on head, 1 from spinous dorsal fin obliquely extends to caudal fin (Fig. 13); soft dorsal-fin rays more than 45 *Equetus*
- 19b.** Spinous dorsal fin not as high, much shorter than head; sides with dark longitudinal stripes or diffused dark saddle-like bar on head (Fig. 14); soft dorsal-fin rays 38 to 44 *Pareques*

Fig. 13 *Equetus*Fig. 14 *Pareques*

- 20a.** Mouth horizontal, not enclosed under snout; 1 or more ocellated spots (larger than eye) below soft dorsal fin and on caudal peduncle; gas bladder with a pair of horn-like appendages and laterally outcropping diverticula; scales cover to basal half of caudal fin *Sciaenops ocellata*
- 20b.** Mouth small, inferior, completely enclosed by suborbital bones under snout; sides often with small dark spots or band; gas bladder simple, carrot-shaped, or with a pair of short horn-like appendages; caudal fin almost entirely covered with small scales (fresh water South America). *Pachyurus* group
- 21a.** Eyes small, 8 to 11 times in head length (Fig. 15a); body rounded in cross-section; mouth large extremely oblique, top of head cavernous, spongy to touch *Nebrius microps*
- 21b.** Eyes moderate to large, 3 to 6 times in head length (Fig. 15b); body compressed or robust, mouth horizontal to strongly oblique, top of head cavernous, but never spongy to touch. → 22

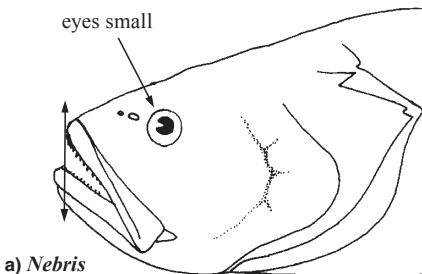
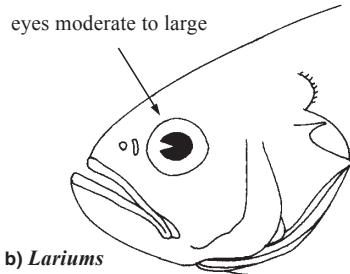
a) *Nebrius*b) *Larius*

Fig. 15 lateral view of head

- 22a.** Body elongated with a pair of large canine-like teeth present on tip of upper jaw; anal spines short and weak, less than 1/4 of first soft ray height → 23
- 22b.** Body oblong, without large canine on tip of upper jaw; second anal spine sharp, more than 1/2 of first ray height → 24
- 23a.** Canine-like teeth with arrowhead tips on both jaws, those at tip of upper jaw larger, strongly curved; large canines on lower jaw often exposed externally when mouth closed (Fig. 16) *Macrodon ancylodon*
- 23b.** Canine-like teeth sharp but never arrowheaded; teeth on lower jaw conical, usually not exposed externally when mouth closed (Fig. 17) *Cynoscion*

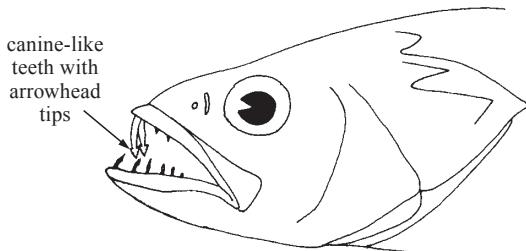


Fig. 16 *Macrodon ancylodon*

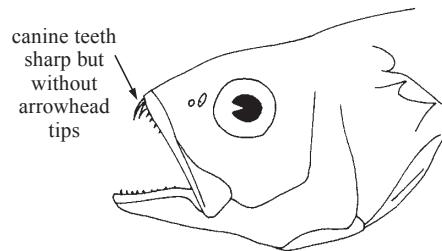


Fig. 17 *Cynoscion*

- 24a.** Mouth strongly oblique, lower jaw projecting (Fig. 18); gill rakers 28 to 36, long and slender; gas bladder with 1 chamber; inner ear with only 1 pair of large otoliths (sagitta) *Larimus*
- 24b.** Mouth slightly oblique, terminal; gill rakers less than 25; gas bladder with 2 chambers; inner ear with 2 pairs of large otoliths (sagitta and lapillus) → 25

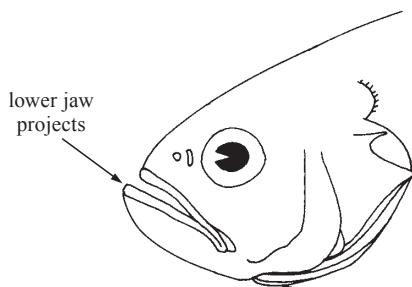


Fig. 18 *Larimus*

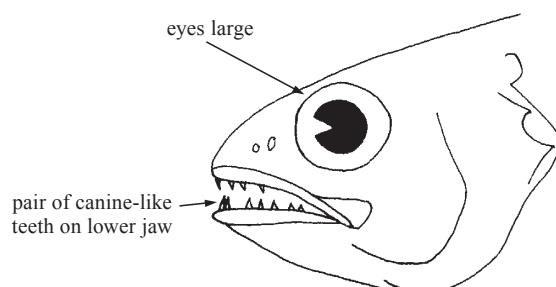


Fig. 19 *Odontoscion dentex*

- 25a.** Eye large, 3.6 or less in head length; teeth in a sharp row on both jaws, a pair of canine-like teeth on tip of lower jaw (Fig. 19) *Odontoscion dentex*
- 25b.** Eye moderate, 4 times in head length; teeth small, conical, never canine-like *Corvula*

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

- 1a. Second anal-fin spine stout, about same length as first soft ray (Fig. 20); 1.3 to 1.6 in head length; anal-fin rays 7 to 9 (usually 8); side often with longitudinal stripes *Bairdiella ronchus*
- 1b. Second anal-fin spine thin, shorter than first soft ray, 1.7 to 2.2 in head length (Fig. 21); anal-fin rays 8 to 10 (usually 9); side uniformly silvery *Bairdiella chrysoura*

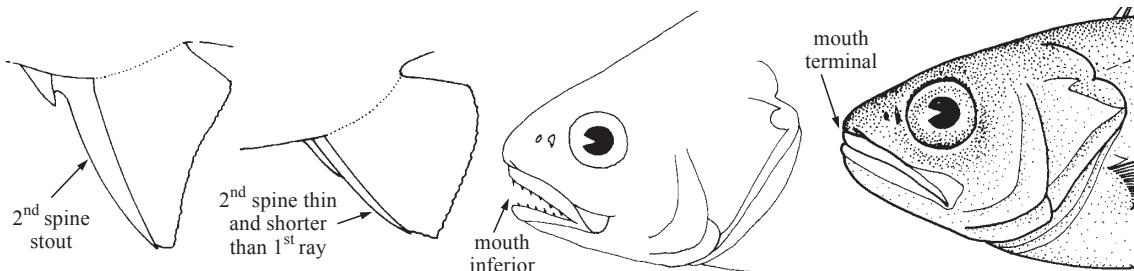


Fig. 20
Bairdiella ronchus

Fig. 21
Bairdiella chrysoura

Fig. 22
Corvula batabana

Fig. 23
Corvula sanctaeluciae

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

- 1a. Mouth slightly inferior (Fig. 22); side with distinct longitudinal stripes; dorsal-fin rays 25 to 29; anal-fin rays 7 or 8, second anal-fin spine 2.5 to 3.0 in head length; gill rakers 18 to 22 *Corvula batabana*
- 1b. Mouth terminal (Fig. 23); side with faint oblique stripes; dorsal-fin rays 22 to 24; anal-fin rays 9 (rarely 8), second anal-fin spine 3.2 to 3.6 in head; gill rakers 23 to 25 *Corvula sanctaeluciae*

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

- 1a. Scales on body cycloid, much smaller than pored lateral-line scales; more than 100 transverse rows above lateral line → 2
- 1b. Scales on body ctenoid, about same size or larger than pored lateral-line scales; less than 70 transverse rows of scales above lateral line → 4
- 2a. Caudal fin truncate in adults (Fig. 24); inner row teeth of lower jaw slightly enlarged, uniform in size, and closely set; anal fin with 10 to 12 soft rays; about 110 transverse scale rows above lateral line *Cynoscion leiarchus*
- 2b. Caudal fin rhomboidal in adults (Fig. 25); inner row teeth of lower jaw distinctly larger, gradually increasing in size posteriorly, and widely spaced; anal fin with 7 to 10 soft rays; about 140 transverse scale rows above lateral line → 3

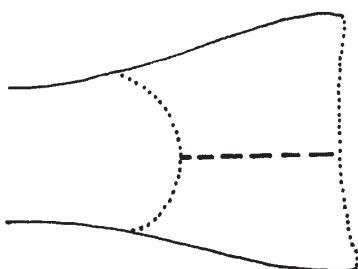


Fig. 24 *Cynoscion leiarchus* (caudal fin)

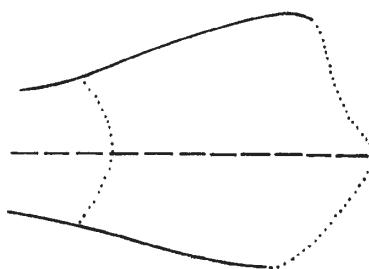


Fig. 25 *Cynoscion microlepidotus* (caudal fin)

- 3a. Soft dorsal fin almost entirely covered with small scales; dorsal fin with 22 to 25 soft rays
gas bladder with a pair of long straight horn-like appendages (Fig. 26); vertebrae 22 *Cynoscion microlepidotus*
- 3b. Soft dorsal fin unscaled, except 1 or 2 rows of small scales at base; dorsal fin with 27 to 31
soft rays; gas bladder with a pair of curved horn-like appendages; vertebrae 25 (Fig. 27) *Cynoscion virescens*

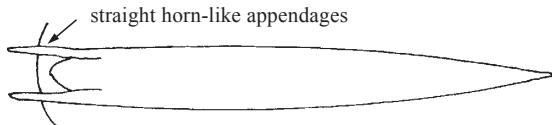


Fig. 26 *Cynoscion microlepidotus* (gas bladder)

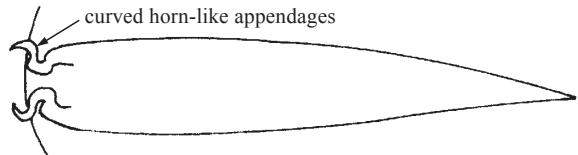


Fig. 27 *Cynoscion virescens* (gas bladder)

- 4a. Body with spots or stripes on back, dorsal, or caudal fins; caudal fin truncate or
emarginated in adults → 5
- 4b. Body uniformly silvery, some with faint streaks on back but never with spots or stripes; cau-
dal fin rhomboidal or double emarginated in adults → 7
- 5a. Back with distinct spots scattered randomly on dorsal and caudal fins (Fig. 28); soft dorsal
fin unscaled; pectoral fin shorter than pelvic fin *Cynoscion nebulosus*
- 5b. Back with numerous small spots forming oblique and undulating lines, usually not extend-
ing to dorsal or caudal fins (Fig. 29); pectoral fin slightly longer than pelvic fin → 6

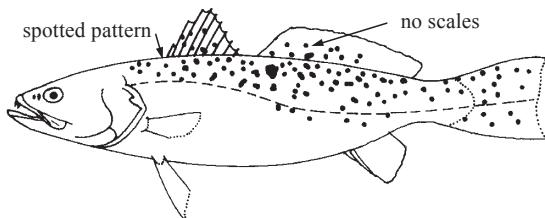


Fig. 28 *Cynoscion nebulosus*

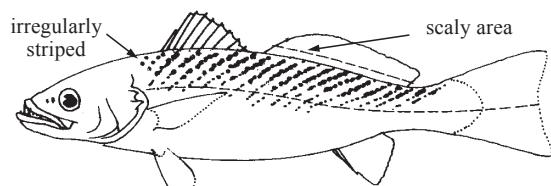


Fig. 29 *Cynoscion regalis*

- 6a. Dotted stripes on trunk irregular or reticulated; anal fin with 11 to 13 soft rays (not yet re-
ported in Fishing Area 31, found south of the area) *Cynoscion regalis*
- 6b. Dotted stripes on trunk run on oblique scale rows; anal fin with 8 to 10 soft rays → 9
- 7a. Soft dorsal fin with 18 to 21 rays, gill rakers 21 to 26, longer than gill filament *Cynoscion guatucupa*
- 7b. Soft dorsal fin with more than 23 rays; gill rakers less than 13, shorter than gill filament on
first arch → 8
- 8a. Lower jaw teeth closely set, similar in size; soft dorsal fin membranes unscaled, except 2 or
3 rows of small scales along its base *Cynoscion similis*
- 8b. Lower jaw teeth widely spaced, gradually increasing in size posteriorly; soft dorsal fin cov-
ered with small scales to 3/4 of fin height *Cynoscion jamaicensis*
- 9a. Pectoral fin shorter than pelvic fin, 2 times or more in head length → 10
- 9b. Pectoral fin about equal or longer than pelvic fin, less than 2 times of head length → 11

- 10a.** Large canine-like teeth absent from tip of upper jaw; soft dorsal fin with 21 to 24 rays and almost entirely covered with small scales; vertebrae 25 *Cynoscion steindachneri*
- 10b.** A pair of large canine-like teeth always present; dorsal fin with 26 to 31 soft rays, covered with small scales to 1/2 of fin height; vertebrae 27 *Cynoscion nothus*
- 11a.** Dorsal fin with 17 to 22 soft rays; anal fin with 7 to 9 soft rays (usually 8) *Cynoscion acoupa*
- 11b.** Dorsal fin with 25 to 29 soft rays; anal fin with 10 to 12 soft rays *Cynoscion arenarius*

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

- 1a.** Body with 2 narrow longitudinal stripes above and below third oblique bar (Fig. 30); pectoral fins dark brown; median fins (dorsal, anal, and caudal) darkish scattered with light spots, dorsal fin with 45 to 47 soft rays; pectoral fin with 17 or 18 soft rays; coral reef habitat *Equetus punctatus*
- 1b.** Body without longitudinal stripes; broad oblique band on side with distinct white margin (Fig. 31); pectoral and median fins pale without spots; dorsal fin with 47 to 55 soft rays; pectoral fin with 15 or 16 soft rays; coral reef habitat *Equetus lanceolatus*

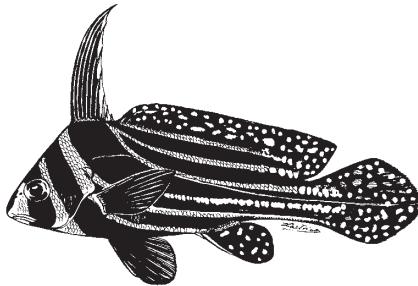


Fig. 30 *Equetus punctatus*

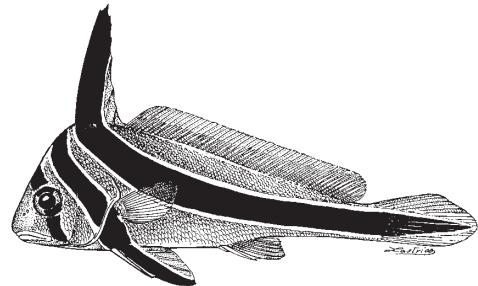


Fig. 31 *Equetus lanceolatus*

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

- 1a.** Body silvery, back with 7 to 9 vertical bars; gill rakers 34 to 36, longest raker equal to eye diameter. *Larimus fasciatus*
- 1b.** Body silvery, greyish on back, but no vertical bar on back; gill rakers 28 to 33, longest raker longer than eye diameter. *Larimus breviceps*

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

- 1a.** Two slender barbels on tip of lower jaw beside the median mental pore longer than eye diameter (Fig. 32); pectoral fin tip reaching to caudal peduncle; soft dorsal-fin rays 37 to 39 *Lonchurus lanceolatus*
- 1b.** Three pairs of short barbels in tuft on tip of jaw around the median mental pore, in a series of 10 to 12 pairs along rami of chin (Fig. 33); soft dorsal-fin rays 31 to 34 *Lonchurus elegans*

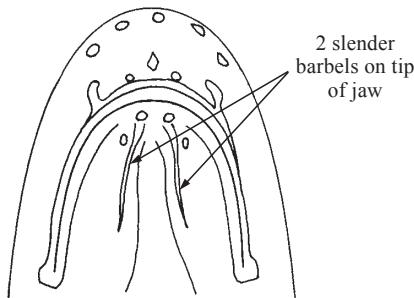


Fig. 32 *Lonchurus lanceolatus* (ventral view of head)

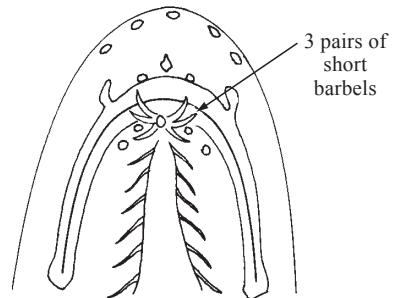


Fig. 33 *Lonchurus elegans* (ventral view of head)

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

- 1a. Body uniformly silvery; breast scales (below pectoral-fin base and pelvic-fin origin) much smaller than those along lateral line (Fig. 34); pectoral fin short, usually not reaching to tip of pelvic fin; molariform teeth present on pharyngeal plates *Menticirrhus littoralis*
- 1b. Body silvery grey with dark oblique bars on sides; breast scales not much reduced in size; pectoral fin longer, reaching to or beyond tip of pelvic fin; no molariform teeth on pharyngeal plates → 2
- 2a. Side with 7 or 8 distinct oblique bars, second and third bars form a V below spinous dorsal fin, a longitudinal stripe below lateral line extending to tip of caudal fin; spinous dorsal fin high, when depressed back, its tip reaching beyond base of fourth soft dorsal-fin ray (Fig. 35); anal-fin rays usually 8 (7 to 9); gas bladder well developed in young, become rudimentary in adult *Menticirrhus saxatilis*
- 2b. Side with 8 or 9 diffused saddle-like bars or dark blotches, second and third bars form a faint V below nape and spinous dorsal fin; no stripes connecting eyes or below lateral line; spinous dorsal fin lower, when depressed back not reaching to base of second soft ray (Fig. 36); anal-fin rays usually 7 (6 to 8); gas bladder atrophied in young fish of 10 cm total length *Menticirrhus americanus*

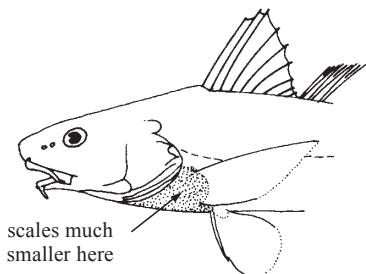


Fig. 34 *Menticirrhus littoralis*

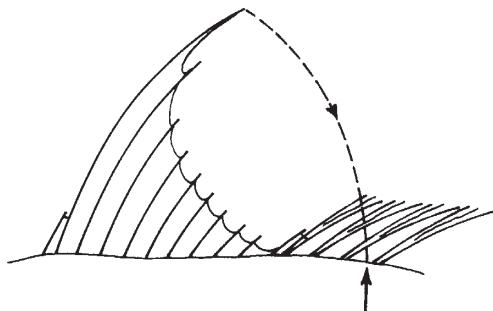


Fig. 35 *Menticirrhus saxatilis* (dorsal fin)

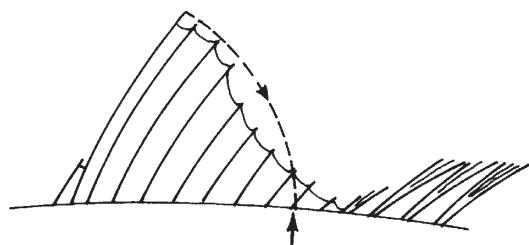


Fig. 36 *Menticirrhus americanus* (dorsal fin)

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

- 1a. Dark spots under soft dorsal fin usually arranged in parallel or wavy lines on transverse scale rows directing anteroventrally (Fig. 37); 6 or 7 transverse scales between dorsal-fin origin and lateral line; soft dorsal-fin rays usually 26 or 27 *Micropogonias furnieri*
- 1b. Dark spots under soft dorsal fin usually scattered above lateral line, often reticulated but not in parallel lines (Fig. 38); 8 or 9 transverse scales between dorsal-fin origin and lateral line; soft dorsal-fin rays usually 28 or 29 *Micropogonias undulatus*

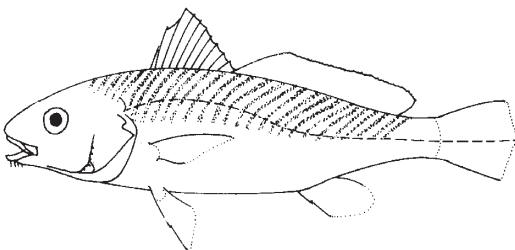


Fig. 37 *Micropogonias furnieri*

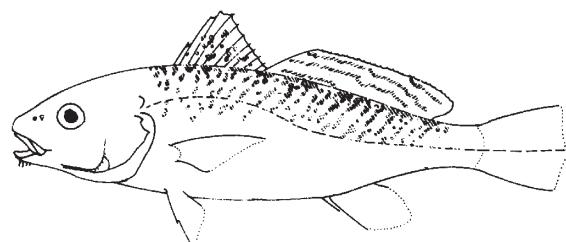


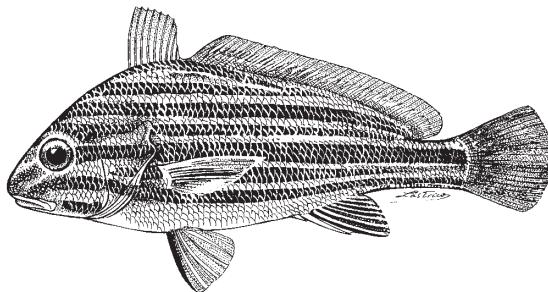
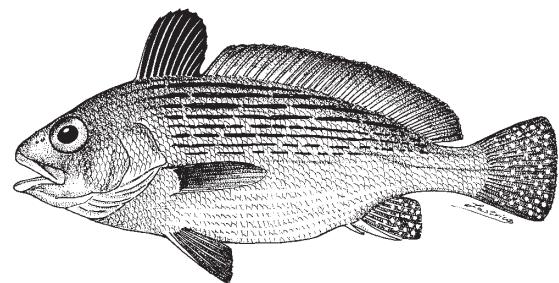
Fig. 38 *Micropogonias undulatus*

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

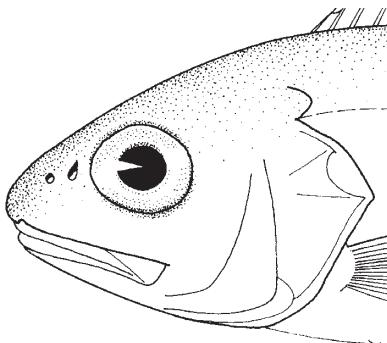
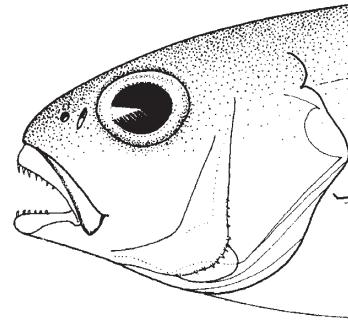
- 1a. Dorsal-fin rays 19 to 21; lateral-line pored scales 47 to 49; anal-fin rays 6 or 7; gill rakers 6 or 7 + 11 to 14 (total 17 to 21) (known only from small type specimens) *Ophioscion panamensis*
- 1b. Dorsal-fin rays 22 to 24; lateral-line pored scales 52 to 54; anal-fin rays 7 (rarely 8); gill rakers 7 or 8 + 13 to 16 (total 16 to 24) *Ophioscion punctatissimus*

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

- 1a. Side with a broad oblique bar from base of spinous dorsal fin to pelvic fins; 1 longitudinal stripe on midline reaching to tip of caudal fin *Pareques iwamotoi*
- 1b. Side with several longitudinal stripes, no oblique bar → 2
- 2a. Side with 3 to 5 broad longitudinal bands, wider than pupil, with narrower stripes in between (Fig. 39); young with a straight dark bar connecting eyes across top of head, diffused in adult; spinous dorsal fin when pressed against back, its tip reaching base of sixth soft dorsal-fin ray *Pareques acuminatus*
- 2b. Side with 7 to 10 narrow longitudinal stripes, narrower than pupil (Fig. 40); young with a V-shaped dark bar connecting eyes across nape, diffused in adult; spinous dorsal fin, when depressed against back, its tip not reaching to base of fourth soft dorsal-fin ray *Pareques umbrosus*

Fig. 39 *Pareques acuminatus*Fig. 40 *Pareques umbrosus***Key to the species of *Protosciaena* occurring in the area**

- 1a. Preopercle strongly serrate (Fig. 41); soft dorsal fin with 21 to 23 rays *Protosciaena bathytatos*
- 1b. Preopercle rather smooth or weakly serrate (Fig. 42); soft dorsal fin with 24 to 26 rays *Protosciaena trewavasae*

Fig. 41 *Protosciaena bathytatos*Fig. 42 *Protosciaena trewavasae*

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

- 1a. Preopercular margin with 2 or 3 prominent spines (Fig. 43) → 2
 1b. Preopercular margin with 4 or more prominent spines (Fig. 44) → 4

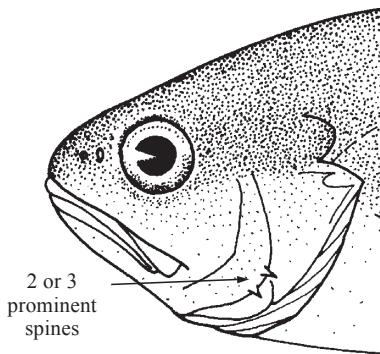


Fig. 43

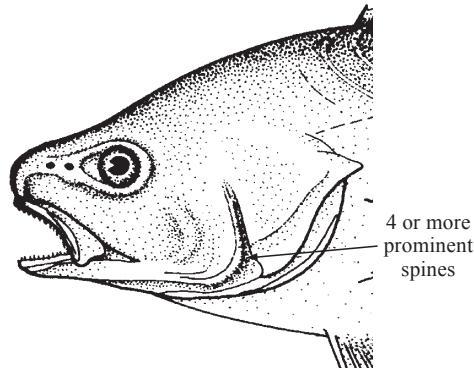


Fig. 44

- 2a. Preopercular margin with 3 prominent spines (occasionally 4 on 1 side); gill rakers 12 to 15 + 21 to 24 (total 33 to 39); dorsal-fin rays 17 to 20 *Stellifer stellifer*
 2b. Preopercular margin with 2 prominent spines; gill rakers 36 or more; dorsal-fin rays 20 to 24 → 3
- 3a. Nape with 1 to several median predorsal rows of ctenoid scales; interorbital width usually less than 2.8 in head length; gill rakers 14 to 21 + 22 to 31 (total 36 to 52); inside of operculum black *Stellifer rastrifer*
 3b. Nape without or with a few predorsal ctenoid scales not in rows; interorbital width usually more than 2.8 in head length; gill rakers 21 to 24 + 31 to 35 (total 52 to 59); inside of operculum lightly dusted with chromatophores *Stellifer griseus*
- 4a. Mouth inferior, snout projecting in front of mouth (Fig. 45); upper jaw gape length 2.6 or more in head length → 5
 4b. Mouth moderately large and oblique, terminal, lower jaw even with upper or slightly projecting (Fig. 46); upper jaw gape length usually 2.5 or less in head length → 11

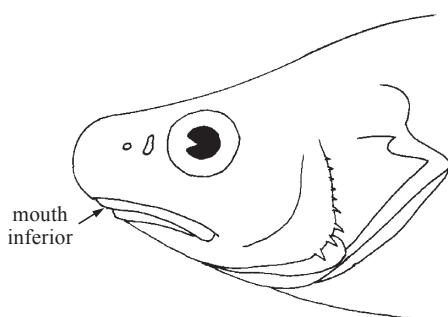


Fig. 45

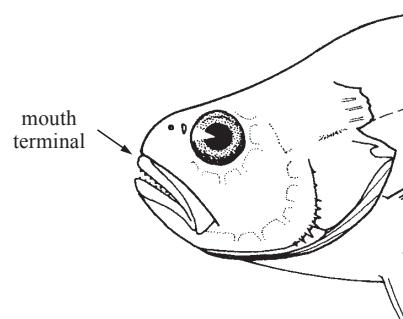


Fig. 46

- 5a. Roof of mouth black; gill rakers long, 13 to 15 + 23 to 28 (total 37 to 40) *Stellifer n. sp. A (Chao ms)*
 5b. Roof of mouth pale, gill rakes short, fewer than 30 gill rakers on first arch → 6

- 6a. Scales on top of head mostly cycloid, except for 1 to 3 ctenoid rows along midline of nape; teeth on lower jaw with medial row slightly enlarged; gas bladder diverticula distal, tubular (Fig. 47a-c) or small, knob-like (Fig. 47d) → 7
- 6b. Scales on top of head ctenoid to interorbital region; teeth in lower jaw equal in size, without an enlarged medial row; gas bladder appendages kidney-shaped (Fig. 47e) → 9

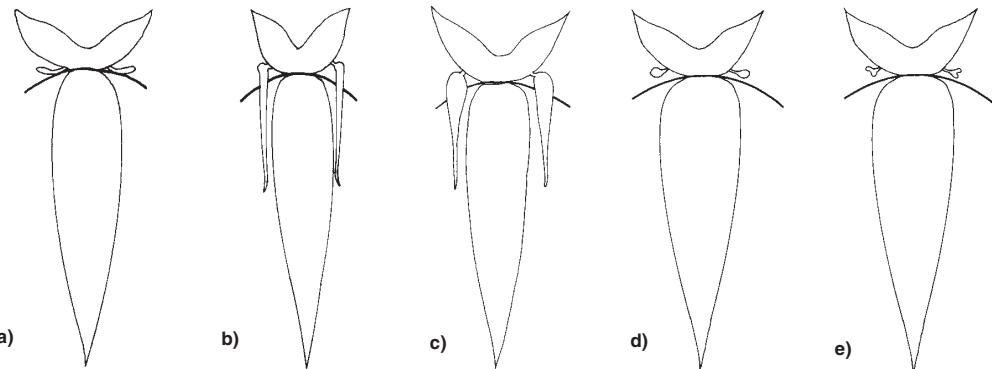


Fig. 47 gas bladder

- 7a. Spinous dorsal fin with 11 spines, anal fin with 8 soft rays (rarely 9); gill rakers 28 to 32 on first arch; anterior chamber of gas bladder with a pair of inconspicuous knob-like appendages (Fig. 47d) *Stellifer* sp. C (Chao ms)
- 7b. Spinous dorsal fin with 10 spines; anal fin with 9 soft rays (rarely 8 or 10); gill rakers less than 25 on first arch; anterior chamber of gas bladder with a pair of tube-like appendages, either short digital form or long (Fig. 47b-d) → 8
- 8a. Eye small, 5.2 to 6.8 (average 5.9) in head; anterior gas bladder diverticula short, digital form, directed laterally (Fig. 47a) *Stellifer microps*
- 8b. Eye moderately large, 4.1 to 5.6 (average 4.8) in head; anterior gas bladder with a pair of long tubular appendages, directed posteriorly and looped in a U *Stellifer brasiliensis*
- 9a. Pelvic fin relatively long, 5.2 to 5.6 times in standard length, its filamentous tip ending behind vent; eye small, 5.4 to 7.8 in head; gill rakers, 7 to 10 + 18 to 20 (total 27 to 29); a small fish, female matured at 6 cm standard length *Stellifer magoi*
- 9b. Pelvic fin short, 5.7 or more in standard length, its tip much short of vent; eye large, less than 5.3 in head; adults reach to 150 mm of standard length → 10
- 10a. Pelvic fin 5.7 to 6.6 in standard length, its tip ending slightly anterior to tip of pectoral fin; eye 3.5 to 4.2 in head; gill rakers 8 or 9 + 14 to 17 (total 22 to 26) *Stellifer naso*
- 10b. Pelvic fin 6.4 to 8.1 in standard length, its tip ending much before tip of pectoral fin; eye 4.1 to 5.3 in head; gill rakers, 9 to 11 + 16 to 20 (total 25 to 31) *Stellifer venezuelae*

- 11a.** Underside of lower jaw with 4 pores (Fig. 48a, b); a dark band medial to teeth; first gill arch dark; longest raker longer than filament at angle; swimbladder diverticula short, small, pear-shaped → 12
- 11b.** Under side of lower jaw with 6 pores (Fig. 48c, d); without a dark band medial to teeth; first arch pale; longest gill raker equal to or shorter than filament at angle; swimbladder diverticula knob-like → 13

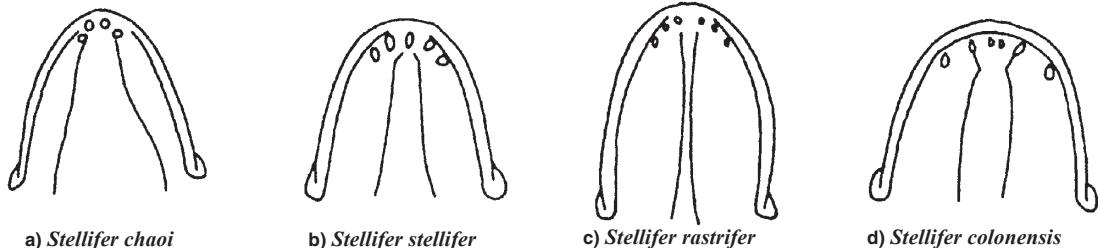
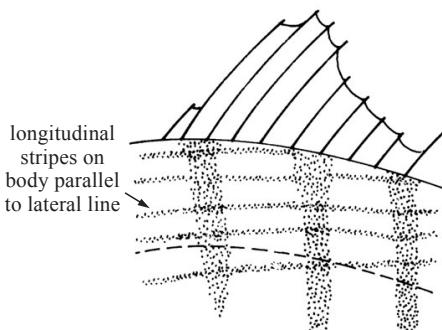
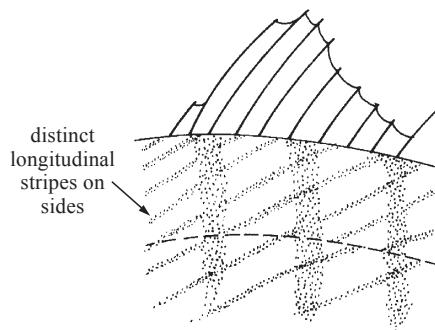


Fig. 48 underside of lower jaw

- 12a.** Gill rakers 17 to 19 + 26 to 30 (total 43 to 49) *Stellifer chaoi*
- 12b.** Gill rakers 11 to 15 + 17 to 22 (total 29 to 36) *Stellifer* sp. B (Chao ms)
- 13a.** Head extremely cavernous, spongy; tip of upper lip on horizontal passing through or above ventral margin of eye; snout usually not projecting beyond upper lip; gill rakers, 10 to 13 + 22 or 23 (total 32 to 36); eye usually 4.4 to 5.5 in head *Stellifer lanceolatus*
- 13b.** Head cavernous, but not spongy; tip of upper lip usually on horizontal line passing through or below ventral margin of eye; snout projecting slightly beyond upper lip; gill rakers 10 to 12 + 19 to 22 (total 29 to 34); eye usually 5.5 to 6.2 in head *Stellifer colonensis*

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

- 1a.** Anal fin with 6 soft rays; gill rakers 13 to 15 on first arch → 2
- 1b.** Anal fin with 7 or 8 soft rays; gill rakers 19 to 22 on first arch → 3
- 2a.** Longitudinal stripes on body below spinous dorsal fin parallel to lateral line (Fig. 49); scales in diagonal series between dorsal-fin origin and lateral line 5 or 6; dorsal fin with 23 to 26 soft rays *Umbrina broussonnetii*
- 2b.** Body with distinct longitudinal stripes on sides (Fig. 50); those under spinous dorsal fin slightly oblique, about 30° to lateral-line; scales in diagonal series between dorsal-fin origin and lateral line 7 or 8; dorsal fin with 26 to 31 soft rays *Umbrina coroides*

Fig. 49 *Umbrina broussonnetii*Fig. 50 *Umbrina coroides*

- 3a. Mental barbel with a pore on the middle of anterior surface; eye smaller, 5.9 to 6.2% of standard length; soft dorsal-fin rays 22 or 23; anal-fin rays 8; caudal peduncle circumferential scales 18 or 19; gill rakers 19 or 20 on first arch; gas bladder simple, carrot-shaped, no appendages. *Umbrina milliae*
- 3b. Mental barbel with an apical pore at tip; eye larger, 9.8 to 10.7% of standard length; soft dorsal-fin rays 24 or 25; anal-fin rays 7; caudal peduncle circumferential scales 22; gill rakers 20 to 22 on first arch; gas bladder with pair of small horn-like diverticula on front margin *Umbrina canosai*

List of the marine and brackish water species occurring in the area

The symbol  is given when species accounts are included.

-  *Bairdiella chrysoura* (Lacepède, 1803).
-  *Bairdiella ronchus* (Cuvier, 1830).
-  *Corvula batabana* (Poey, 1860).
-  *Corvula sanctaeluciae* Jordan, 1890.
-  *Ctenosciaena gracilicirrhus* (Metzelaar, 1919).
-  *Cynoscion acoupa* (Lacepède, 1801).
-  *Cynoscion arenarius* Ginsburg, 1930.
-  *Cynoscion jamaicensis* (Vaillant and Bocourt, 1883).
-  *Cynoscion leiarchus* (Cuvier, 1830).
-  *Cynoscion microlepidotus* (Cuvier, 1830).
-  *Cynoscion nebulosus* (Cuvier, 1830).
-  *Cynoscion nothus* (Holbrook, 1848).
-  *Cynoscion regalis* (Bloch and Schneider, 1801).
-  *Cynoscion similis* Randall and Cervigón, 1968.
-  *Cynoscion steindachneri* (Jordan, 1889).
-  *Cynoscion virescens* (Cuvier, 1830).
-  *Equetus lanceolatus* (Linnaeus, 1758).
-  *Equetus punctatus* (Bloch and Schneider, 1801).
-  *Isopisthus parvipinnis* (Cuvier, 1830).
-  *Larimus breviceps* Cuvier, 1830.
-  *Larimus fasciatus* Holbrook, 1855.
-  *Leiostomus xanthurus* Lacepède, 1802.
-  *Lonchurus elegans* (Boeseman 1948).
-  *Lonchurus lanceolatus* (Bloch, 1788).
-  *Macrodon ancylodon* (Bloch and Schneider, 1801).
-  *Menticirrhus americanus* (Linnaeus, 1758).
-  *Menticirrhus littoralis* (Holbrook, 1847).
-  *Menticirrhus saxatilis* (Bloch and Schneider, 1801).
-  *Micropogonias furnieri* (Desmarest, 1823).
-  *Micropogonias undulatus* (Linnaeus, 1766).
-  *Nebris microps* Cuvier, 1830.
-  *Odontoscion dentex* (Cuvier, 1830).
- Ophioscion panamensis* Schultz, 1945. To 5 cm. Panama. Known only from type species.
-  *Ophioscion punctatissimus* Meek and Hildebrand, 1925.
(Two undescribed species of *Ophioscion* from Northeast Brazil).
-  *Paralonchurus brasiliensis* (Steindachner, 1875).
-  *Pareques acuminatus* (Bloch and Schneider, 1801).
-  *Pareques iwamotoi* Miller and Woods 1988.
-  *Pareques umbrosus* (Jordan and Eigenmann, 1889).
-  *Pogonias cromis* (Linnaeus, 1766).

- Protosciaena bathytatos (Chao and Miller, 1995).
- Protosciaena trewavasae (Chao and Miller, 1995).
- Sciaenops ocellatus (Linnaeus, 1766).
- Stellifer chaoi Aguilera, Solano and Valdez, 1983.
- Stellifer colonensis Meek and Hildebrand, 1925.
- Stellifer griseus Cervigón, 1966.
- Stellifer lanceolatus (Holbrook, 1855).
- Stellifer magoi (Aguilera, 1983).
- Stellifer microps (Steindachner, 1864).
- Stellifer naso (Jordan, 1889).
- Stellifer rastrifer (Jordan, 1889).
- Stellifer stellifer (Bloch, 1790).
- Stellifer venezuelae (Schultz, 1945).
- Stellifer sp. A.
- Stellifer sp. B.
- Stellifer sp. C.
- Umbrina broussonnetii Cuvier, 1830.
- Umbrina coroides Cuvier, 1830.
- Umbrina milliae Miller, 1971.

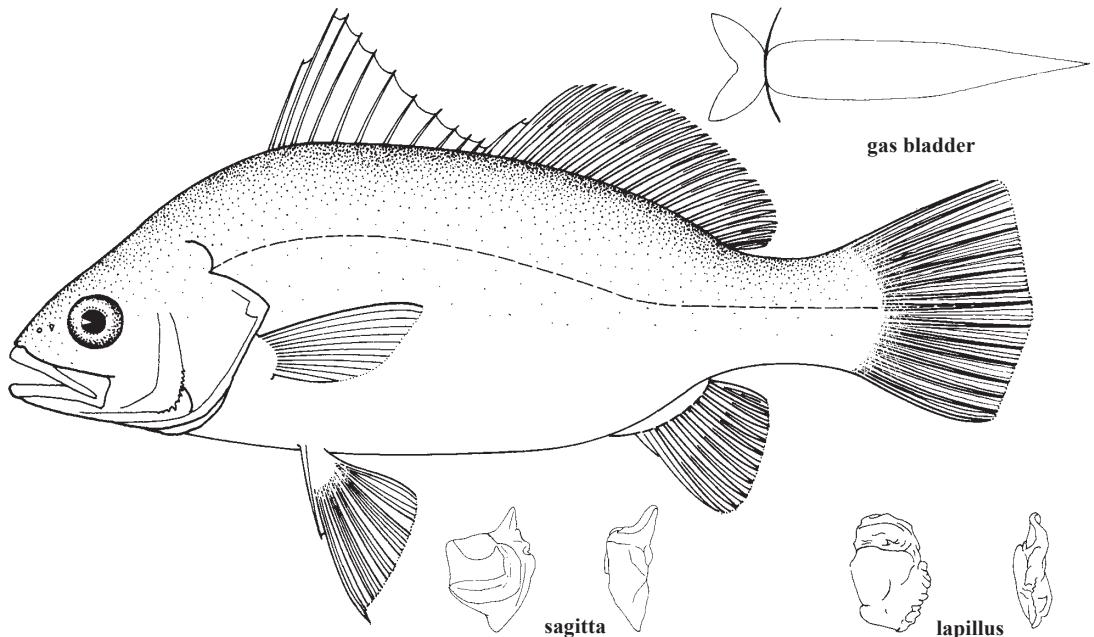
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***Bairdiella chrysoura* (Lacepède, 1803)**

Frequent synonyms / misidentifications: None / None.

FAO names: En - Silver croaker (AFS: Silver perch); Fr - Mamselle blanche; Sp - Corvineta blanca.

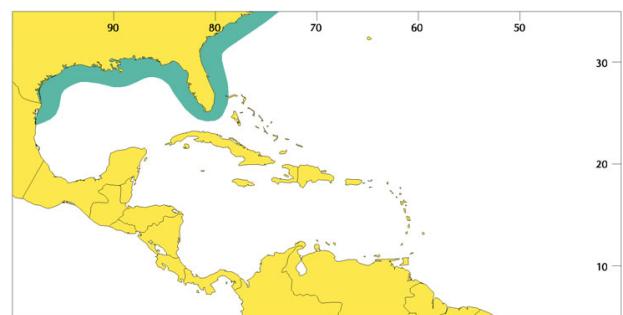


Diagnostic characters: A small fish, body oblong and compressed. Eye moderately large, about 4.5 in head length. Snout blunt; **mouth terminal, moderately large and oblique**; teeth small, set in narrow band on upper jaw and in a single row on lower jaw. **Chin without barbel** but with 6 mental pores (median pair often set in a pit); snout pointed with 8 pores (3 rostral and 5 marginal). Gill rakers long and slender, 22 to 24 on first arch. **Preopercle with few spines at angle**, lowest spine strongest and pointing downward. Spinous dorsal fin with 10 or 11 spines, **posterior portion with 1 spine and 19 to 23 soft rays**; anal fin with 2 spines and 8 to 10 soft rays, **second spine sharp, more than 2/3 length of first soft ray**; caudal fin truncate to slightly rhomboidal. **Gas bladder with 2 chambers; anterior chamber yoke-shaped without appendages, posterior chamber simple, carrot-shaped**. **Lapillus enlarged, about 1/2 the size of sagitta**. Scales ctenoid on body, head cycloid; basal halves of soft dorsal and anal fins covered with scales; lateral-line scales 45 to 50. **Colour:** silvery, greenish, or bluish above, bright silvery on belly; lower fins mostly yellowish to dusky.

Size: Maximum 25 cm; common to 20 cm.

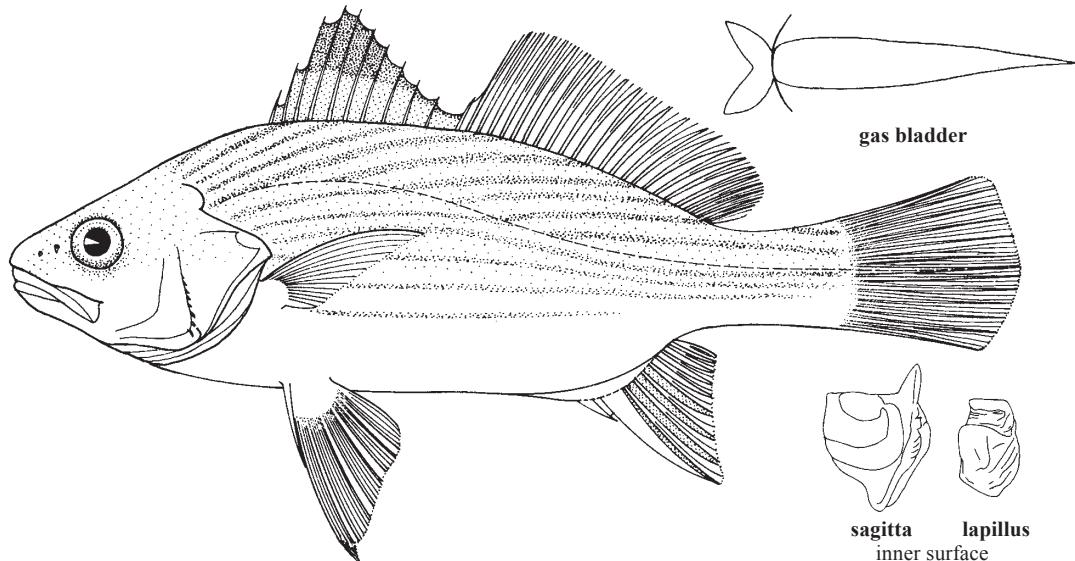
Habitat, biology, and fisheries: Found in coastal waters over sandy and muddy bottoms, move to nursery and feeding areas in estuaries during summer months, sometimes enters fresh waters. Feeds mainly on crustaceans, worms, and occasionally fishes. No special fishery, caught mainly as bycatch with pound nets, seines, and bottom trawls, also by anglers. Only occasionally marketed fresh for human consumption (large specimens); mostly used for bait.

Distribution: Atlantic coast from Cape Cod to Florida and Caribbean islands; in Gulf of Mexico from west Florida to Rio Grande, Mexico.



***Bairdiella ronchus* (Cuvier, 1830)**

BIH

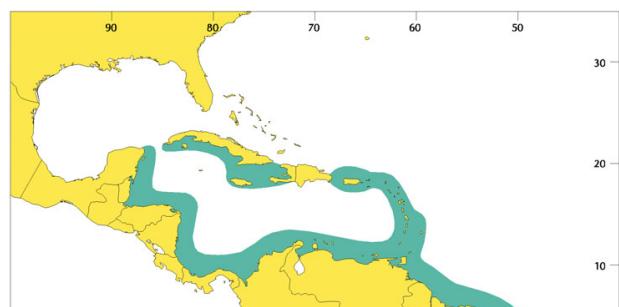
Frequent synonyms / misidentifications: *Bairdiella armata* Gill, 1853 / None.**FAO names:** En - Ground croaker; Fr - Mamselle rouio; Sp - Corvineta ruyo.

Diagnostic characters: A medium-sized fish, oblong to slightly elongate and compressed. Eye moderately large, 4.1 to 4.5 in head length. Snout pointed; **mouth subterminal and oblique**; teeth small-set in narrow bands on both jaws, outer row in upper jaw and inner row in lower jaw slightly larger. **Chin without barbel** but with 5 pores; snout with 8 pores (3 upper and 5 marginal). Gill rakers long and slender, 21 to 27 (usually 24 or 25). **Preopercle serrated with few strong spines at angle**, lowest spine pointing downward. Spinous dorsal fin with 10 (rarely 11) spines, **posterior portion with 1 spine, 21 to 26 (usually 23 to 25) soft rays**; anal fin with 2 spines and 7 to 9 (usually 8) soft rays, **second anal-fin spine very strong, as long as first soft ray**; caudal fin truncate to slightly rounded. **Gas bladder with 2 chambers, the anterior one yoke-shaped without appendages, the posterior one simple, carrot-shaped**. **Lapillus (small earstone) enlarged, more than half of sagitta (large earstone)**. Scales on body and top of head ctenoid (comb-like), cycloid on cheek (opercles); basal half of soft dorsal fin and 3/4 of anal fin scaled; lateral-line scales 54 to 59. **Colour:** greyish above, silvery below; faint dark streaks on sides, oblique above, longitudinal below lateral line; dorsal and caudal fins greyish with dark margin, anterior part of anal fin speckled.

Size: Maximum 35 cm; common to 25 cm.

Habitat, biology, and fisheries: Usually found in coastal waters over muddy and sandy bottoms, normally between 16 and 40 m (rare in deeper water); also in brackish waters. Feeds mainly on crustaceans and fishes. No special fishery; caught mainly with bottom trawls, gill nets, and seines as bycatches; also with cast nets in mangrove swamps, one of the dominant demersal species off Venezuela; in Colombia the stocks are reported to be greatly reduced by fishing with dynamite. Large specimens are marketed fresh; due to its great abundance, some consider it as a potential resource for the manufacture of byproducts.

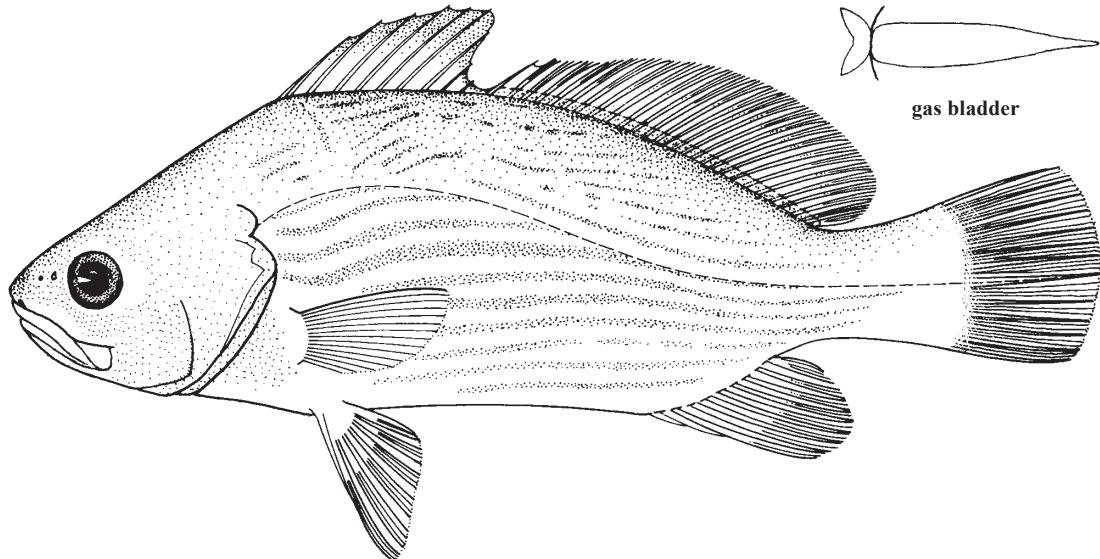
Distribution: Shallow waters throughout the Caribbean Sea; southward to southeast Brazil.



***Corvula batabana* (Poey, 1860)**

Frequent synonyms / misidentifications: *Bairdiella batabana* (Poey, 1860) / None.

FAO names: En - Blue croaker; Fr - Mamselle bleue; Sp - Corvineta azul.



Diagnostic characters: A small fish, body oblong and compressed. Eye moderately large, 4.0 to 4.5 in head length. **Mouth subterminal, slightly oblique;** teeth small-set in narrow bands on jaws, outer row in upper jaw and inner row in lower jaw slightly enlarged. **Chin without barbel** but with 5 mental pores; snout with 8 pores (3 rostral and 5 marginal). Gill rakers moderately long and slender, 18 to 22 on first arch. **Preopercle margin finely serrate without strong spines.** Spinous dorsal fin with 10 or 11 spines, **posterior portion with 1 spine and 25 to 29 soft rays.** Anal fin with 2 spines and 7 or 8 soft rays, **second spine moderately strong, but less than 2/3 of first soft ray height.** Caudal fin rounded. **Gas bladder with 2 chambers; anterior one yoke-shaped, without appendages, posterior chamber carrot-shaped.** **Lapillus enlarged, more than half size of sagitta.** Scales on body ctenoid; basal half of soft dorsal and anal fins scaled; lateral-line scales 50. **Colour:** a distinctive bluish grey in life, with scattered dark spots on back and upper sides; longitudinal stripes below lateral line.

Size: Maximum 25 cm; common to 20 cm.

Habitat, biology, and fisheries: Found usually in clear water over vegetated shallow mud flats and in coral reef areas. This species prefers highly saline waters (32 to 37%) being rare at salinity lower than 30%. Feeds mainly on crustaceans. No special fishery, caught mainly with bottom trawls, seines, and by anglers. Separate statistics are not reported for this species. Marketed mostly fresh at least in part of the Greater Antilles; not exploited in the USA.

Distribution: Reported from the Bay of Campeche (Mexico), both coasts of Florida, and most of the Greater Antilles. The actual range is probably wider.

Note: *Bairdiella batabana* is reassigned to the genus *Corvula*, Jordan 1889.

