

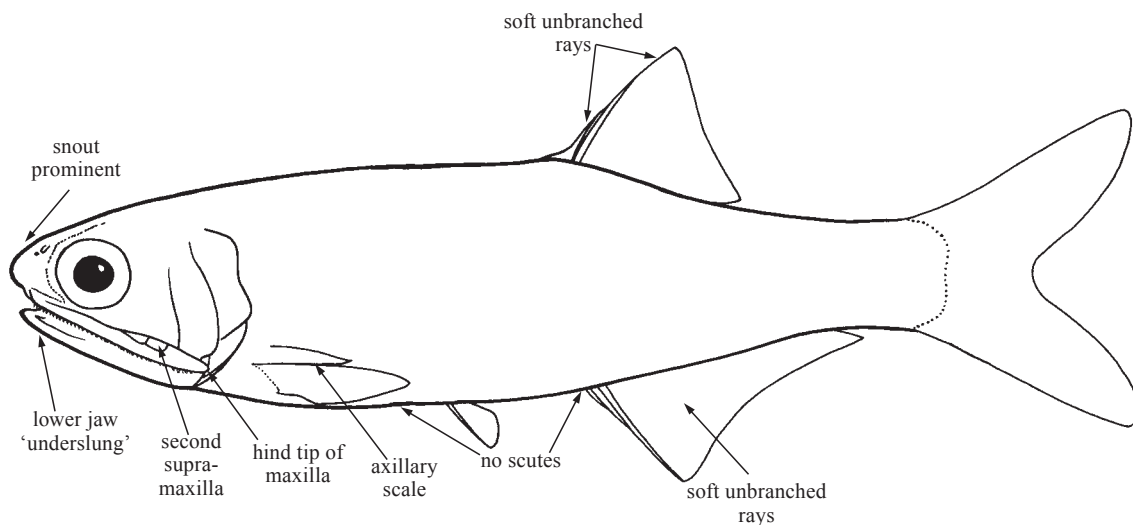
Order CLUPEIFORMES

ENGRAULIDAE

Anchovies

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National Museum of Natural History, Washington D.C., USA

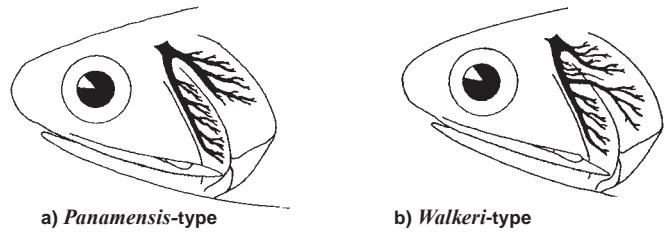
Diagnostic characters: Small to moderate-sized silvery fishes (to 30 cm standard length, commonly 8 to 15 cm standard length), usually with fusiform, subcylindrical bodies but sometimes quite strongly compressed; **no scutes present along abdomen in New World species (except for plate-like scute at pelvic-fin bases)**. Characterized by a **usually prominent pig-like snout projecting beyond tip of lower jaw**. **Lower jaw almost always long and slender and characteristically 'underslung'; its articulation extending posterior to vertical through posterior margin of eye, and usually extending to point well beyond vertical through posterior margin of eye**. Typically with 2 supramaxillae. Maxilla (posterior tip of upper jaw) short and rounded or long and pointed; **jaw teeth usually small or minute, but sometimes absent (*Cetengraulis*) or canine-like (*Lycengraulis*)**. Eyes large, with adipose eyelid completely covering eyes. **Pseudobranch (gill-like structure on inner face of gill cover) present**. Branchiostegals usually 11 or 12 (but only 8 in *Cetengraulis*). **Gill rakers usually short and not numerous (but long and up to 100 or more in *Anchovia*)**. **No spiny rays in fins; dorsal fin single, short, and usually near midpoint of body (far back in *Pterengraulis*)**; anal fin short or moderate; caudal fin forked; pectoral fins set low on body; pelvic fins usually inserted about midway between pectoral-fin base and anal-fin origin. **Scales always cycloid (smooth to touch), moderate, with posterior striae or striations, very often shed upon capture; no lateral line**. **Colour:** typically dorsum blue-green or translucent grey, **sides wholly silver or with a bright silver midlateral stripe**; darker markings may include stripe down side and duskiness of fins, especially distal margin of caudal fin.



Habitat, biology, and fisheries: Most anchovies are marine, but some can tolerate low salinities and a number of species either regularly migrate into rivers to spawn or are confined to fresh water. Most are plankton filter-feeders and are major forage species in the natural food chain. Some brackish-water species are bottom-living carnivores. Although usually small (mostly 8 to 15 cm), many species school in such numbers that they form the basis of sizeable fisheries. Some species are valued as food fishes, while others are used as bait or as fish meal. Although all species are edible, transportation and large-scale marketing of these fishes is difficult because of the soft consistency of their flesh, especially for smaller species of *Anchoa* and *Anchoviella*, which are only consumed locally. Presence of anchovies in markets has been steadily increasing in the past few years. The total reported catch of engraulid species for the area from 1995 to 1999 ranged between 903 and 1 762 t. The major fishery was for *Cetengraulis edentulus* (41 t in 1995; Venezuela only). Anchovies are usually caught with fine-meshed beach seines.

Remarks: Some authors have found the branching pattern of cutaneous canals across the gill cover to be a useful character for identification of species of *Anchoa* and *Anchoviella*. These canals, however, are not easy to see and may or may not be a useful field character. Information is provided here for completeness. The *panamensis*-type refers to canals on the gill cover in which the pre-opercular branch is only on the

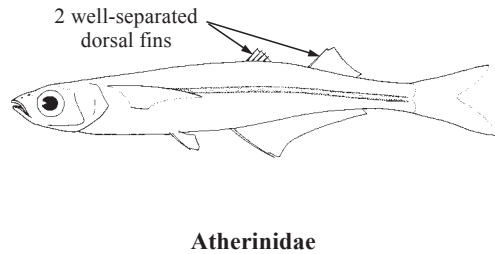
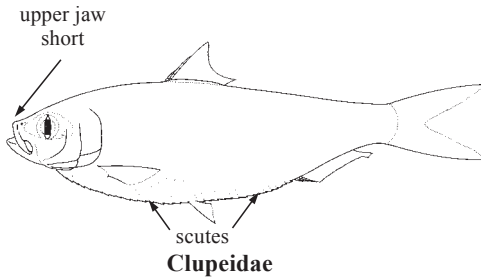
preoperculum and does not pass onto the operculum. The *walkeri*-type refers to the form in which the preopercular branch passes back onto the operculum and runs downward and parallel to the temporal canal. Those species with *panamensis*-type gill cover canals include: *Anchoa colonensis*, *A. filifera*, *A. hepsetus*, *A. lyolepis*, *A. mitchilli*, *A. spinifer*, *A. trinitatis*, *Anchoviella blackburni*, *An. brevirostris*, *An. cayennensis*, *An. elongata* and *An. perfasciata*. Species possessing *walkeri*-type gill cover canals are: *Anchoa cayorum*, *A. choerostoma*, *A. cubana*, *A. januaria*, *A. lamprotaenia*, *A. parva*, *Anchoviella guianensis* and *An. lepidentostole*.



gill covers showing canal patterns

Similar families occurring in the area

Clupeidae: upper jaw short, lower jaw deep, and in most cases, scutes forming distinct keel along abdomen.
 Atherinidae: mouth terminal, upper jaw short, 2 dorsal fins, and no scutes.



Key to the species of Engraulidae occurring in the area

- 1a. Anal-fin origin equal with or posterior to vertical at dorsal-fin origin; pectoral fins short, not reaching posteriorly beyond pelvic-fin base → 2
- 1b. Anal-fin origin anterior to vertical at dorsal-fin origin (Fig. 1); pectoral fins long, reaching posteriorly beyond pelvic-fin base *Pterengraulis atherinoides*

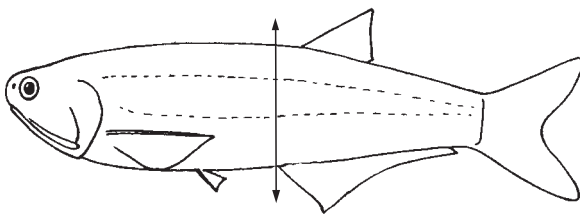


Fig. 1 anal fin origin

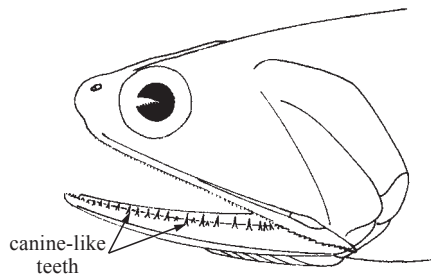


Fig. 2 *Lycengraulis*

- 2a. Teeth on lower jaw small and evenly spaced or absent → 3
- 2b. Teeth on lower jaw enlarged and canine-like (Fig. 2) (*Lycengraulis*) → 24
- 3a. Lower gill rakers on first arch less than 45 → 4
- 3b. Lower gill rakers on first arch greater than or equal to 45 → 26

- 4a. Maxilla short, tip blunt, not reaching or just reaching anterior margin of preoperculum (Fig. 3) → 5
- 4b. Maxilla long, tip pointed, reaching onto or beyond preoperculum (Fig. 4). (*Anchoa*) → 12

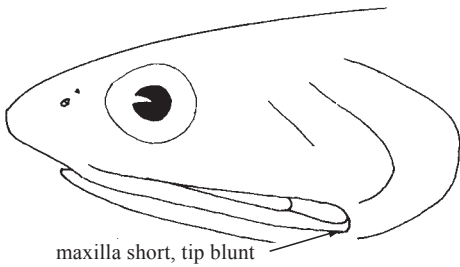


Fig. 3

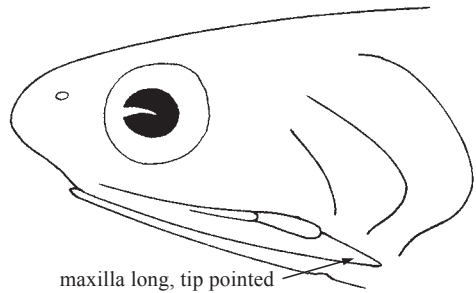


Fig. 4

- 5a. Pseudobranch short, less than eye diameter (Fig. 5, 6a) (*Anchoviella*) → 6
- 5b. Pseudobranch long, greater than eye diameter (Fig. 5, 6b). *Engraulis eurystole*

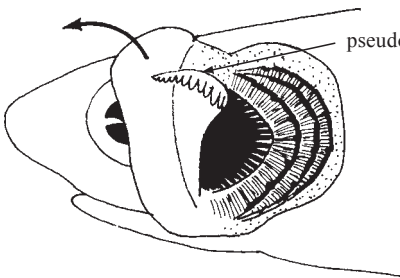
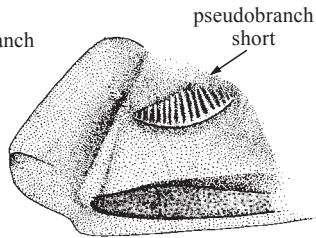
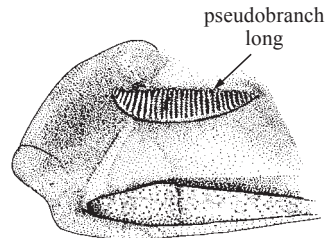


Fig. 5 location of pseudobranch with gill cover folded forward



a) *Anchoviella*



b) *Engraulis eurystole*

Fig. 6 inner side of gill cover

- 6a. Maxilla failing to reach anterior margin of preoperculum by 1/3 to 1/2 pupil diameter. → 7
- 6b. Maxilla longer; reaching to anterior margin of preoperculum → 11
- 7a. Anal-fin origin slightly in advance of body midpoint *Anchoviella blackburni*
- 7b. Anal-fin origin posterior to body midpoint → 8
- 8a. Snout very short; projecting only slightly beyond lower jaw; lower jaw symphysis almost at tip of snout *Anchoviella brevirostris*
- 8b. Snout longer, projecting beyond lower jaw; lower jaw symphysis more posterior, not at tip of snout → 9
- 9a. Axillary scale of pectoral fin reaching only to about midpoint of fin *Anchoviella guianensis*
- 9b. Axillary scale of pectoral fin reaching beyond midpoint but failing to reach tip of fin. → 10
- 10a. Snout 1/2 eye diameter; lower gill rakers 29 to 35 *Anchoviella cayennensis*
- 10b. Snout 3/4 eye diameter; lower gill rakers 24 to 30 *Anchoviella perfasciata*

- 11a. Axillary scale of pectoral fin about half as long as fin; body more moderately compressed (5 to 6 times in standard length); silver stripe narrow, less than eye diameter throughout entire length. *Anchoiella elongata*
- 11b. Axillary scale of pectoral fin reaching beyond midpoint but failing to reach tip of fin; body deeper (4 to 5 times in standard length); silver stripe wide, greater than eye diameter below about middle of dorsal fin *Anchoiella lepidentostole*
- 12a. Pseudobranch long, greater than eye diameter, extending onto inner face of operculum (Fig. 6b) → 13
- 12b. Pseudobranch short, not extending onto inner face of operculum (Fig. 6a) → 14
- 13a. Pectoral fin with first ray extended as a filament (often broken) *Anchoa filifera*
- 13b. Pectoral fin without first ray extended as a filament. *Anchoa lyolepis*
- 14a. Posterior margin of gill cover with small triangular projection on suboperculum (Fig. 7) *Anchoa spinifer*
- 14b. Posterior margin of gill cover without small triangular projection on suboperculum → 15

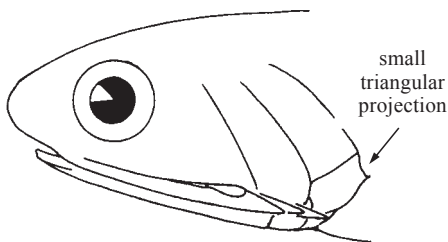


Fig. 7 *Anchoa spinifer*

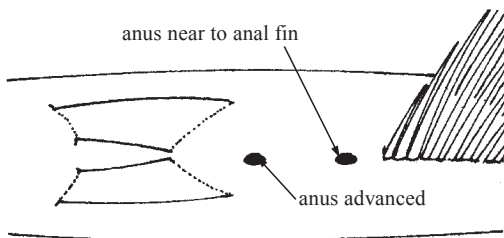


Fig. 8 ventral view of body

- 15a. Anus closer to anal-fin origin than to pelvic-fin tips (Fig. 8) → 16
- 15b. Anus opening nearer to pelvic-fin tips than to anal-fin origin (Fig. 8) → 18
- 16a. Anal fin moderately long with 21 to 26 rays *Anchoa cayorum*
- 16b. Anal fin shorter with less than 21 rays → 17
- 17a. Maxilla reaching to posterior margin of preoperculum; silver stripe narrow (about width of pupil) *Anchoa colonensis*
- 17b. Maxilla longer, reaching beyond posterior margin of preoperculum; silver stripe broad (about 3/4 eye diameter) *Anchoa hepsetus*
- 18a. Anal-fin origin at vertical through dorsal-fin origin *Anchoa mitchilli*
- 18b. Anal-fin origin more posterior, at or near vertical through midpoint of dorsal fin → 19
- 19a. Anal fin with more than 25 rays *Anchoa trinitatis*
- 19b. Anal fin with 25 rays or less → 20
- 20a. Lower gill rakers 17 to 21 *Anchoa lamprotaenia*
- 20b. Lower gill rakers 23 to 30 → 21

- 21a. Axillary scale of pectoral fin only reaching midpoint of fin; distribution limited to Bermuda
 *Anchoa choerostoma*
- 21b. Axillary scale of pectoral fin reaching beyond midpoint of fin; not found in Bermuda → 22

- 22a. Maxilla moderate, not reaching or just reaching posterior margin of preoperculum . . *Anchoa januaria*
- 22b. Maxilla longer, reaching beyond posterior margin of preoperculum. → 23

- 23a. Body compressed (body depth 5 to 6 times in standard length); maxilla projecting at least 1/2 eye diameter beyond second supramaxilla, reaching beyond posterior margin of preoperculum; snout about 3/4 eye diameter *Anchoa cubana*
- 23b. Body deeper (body depth 4.5 to 5 times in standard length); maxilla reaching to or just beyond posterior margin of preoperculum; snout shorter, about 1/2 eye diameter. *Anchoa parva*

- 24a. Lower gill rakers 12 to 15 *Lycengraulis batesii*
- 24b. Lower gill rakers more than 15 → 25

- 25a. Body depth 23 to 24.5% standard length; maxilla reaching margin of operculum; pelvic fin usually inserted nearer to anal-fin origin than to pectoral-fin base, occasionally equidistant between these points; total gill rakers on first arch 30 to 36 *Lycengraulis grossidens*
- 25b. Depth of body 21 to 23% standard length (in specimens greater than 100 mm total length); maxilla not reaching margin of operculum; pelvic fin inserted nearer to pectoral-fin base than to anal-fin origin; total gill rakers on first arch 37 to 42 *Lycengraulis limnichthys*

- 26a. Branchiostegal membrane broadly joined across isthmus (Fig. 9a); branchiostegal rays 8 *Cetengraulis edentulus*
- 26b. Branchiostegal membrane not broadly joined across isthmus (Fig. 9b); branchiostegal rays 9 or more → 27

- 27a. Maxilla short, not extending beyond end of second supramaxilla; anal fin moderate (20 to 25 rays), its origin about at vertical through middle of dorsal-fin base *Anchovia surinamensis*
- 27b. Maxilla moderate, extending beyond end of second supramaxilla and reaching onto preoperculum; anal fin long (28 to 35 rays); its origin at vertical through anteriormost dorsal-fin rays *Anchovia clupeioides*

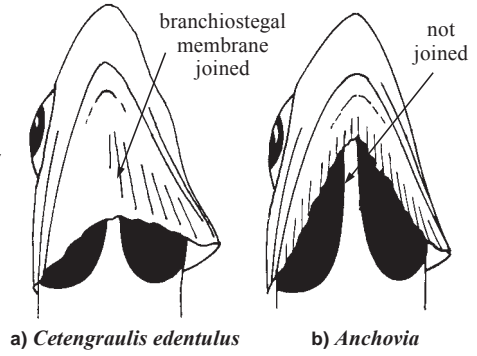



Fig. 9 ventral view of head

List of species occurring in the area

The symbol  is given when species accounts are included.

-  *Anchoa cayorum* (Fowler, 1906).
-  *Anchoa choerostoma* (Goode, 1874).
-  *Anchoa colonensis* Hildebrand, 1943.
-  *Anchoa cubana* (Poey, 1868).
-  *Anchoa filifera* (Fowler, 1915).
-  *Anchoa hepsetus* (Linnaeus, 1758).
-  *Anchoa januaria* (Steindachner, 1879).
-  *Anchoa lamprotaenia* Hildebrand, 1943.
-  *Anchoa lyolepis* (Evermann and Marsh, 1900).
-  *Anchoa mitchilli* (Valenciennes in Cuvier and Valenciennes, 1848).
-  *Anchoa parva* (Meek and Hildebrand, 1923).
-  *Anchoa spinifer* (Valenciennes in Cuvier and Valenciennes, 1848).
-  *Anchoa trinitatis* (Fowler, 1915).
-  *Anchovia clupeoides* (Swainson, 1839).
-  *Anchovia surinamensis* (Bleeker, 1866).
-  *Anchoviella blackburni* Hildebrand, 1943.
-  *Anchoviella brevirostris* (Günther, 1868).
-  *Anchoviella cayennensis* (Puyo, 1946).
-  *Anchoviella elongata* (Meek and Hildebrand, 1923).
-  *Anchoviella guianensis* (Eigenmann, 1912).
-  *Anchoviella lepidentostole* (Fowler, 1911).
-  *Anchoviella perfasciata* (Poey, 1860).
-  *Cetengraulis edentulus* (Cuvier, 1829).
-  *Engraulis eurystole* (Swain and Meek, 1885).
-  *Lycengraulis batesii* (Günther, 1868).
-  *Lycengraulis grossidens* (Agassiz in Spix and Agassiz, 1829).
-  *Lycengraulis limnichthys* Schultz, 1949.
-  *Pterengraulis atherinoides* (Linnaeus, 1766).

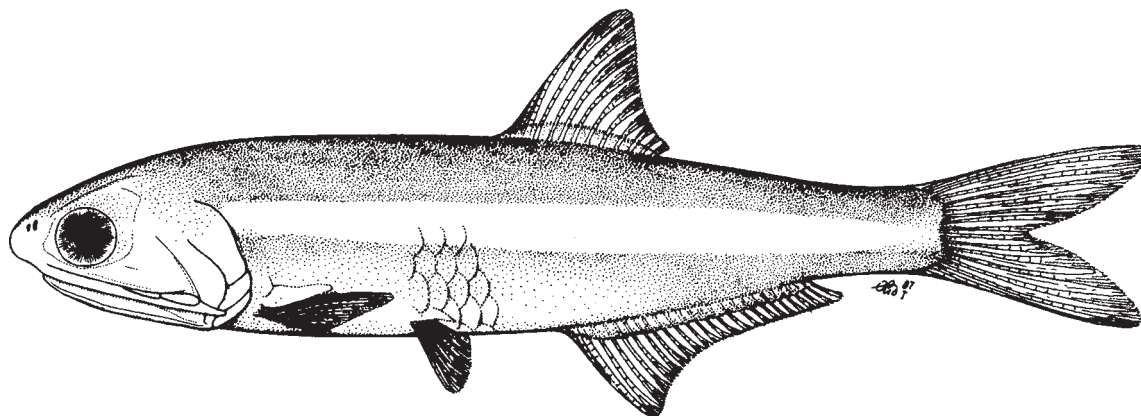
References

- Cervigón, F. 1991. *Los peces marinos de Venezuela*. Vol. 1. Fundación Científica Los Roques, Venezuela. 425 p.
- Cervigón, F., R. Cipriani, W. Fischer, L. Garibaldi, M. Hendrickx, A.J. Lemus, R. Márquez, J.M. Poutiers, G. Robaina, and B. Rodríguez. 1993. *FAO species identification sheets for fishery purposes. Field guide to the commercial marine and brackish-water resources of the northern coast of southern America*. Rome, FAO, 513 p.
- Whitehead, P.J.P., G.J. Nelson, and T. Wongratana. 1988. FAO species catalogue. Vol. 7. Clupeoid fishes of the world (Suborder Clupeoidei). An annotated and illustrated catalogue of the herrings, sardines, pilchards, sprats, anchovies and wolf-herrings. Part 2. Engraulidae. *FAO Fish. Synop.*, (125)Vol.7,Pt.2:305-579.

Anchoa cayorum (Fowler, 1906)

Frequent synonyms / misidentifications: None / None.

FAO names: **En** - Key anchovy; **Fr** - Anchois de banc; **Sp** - Anchoa de cayo.

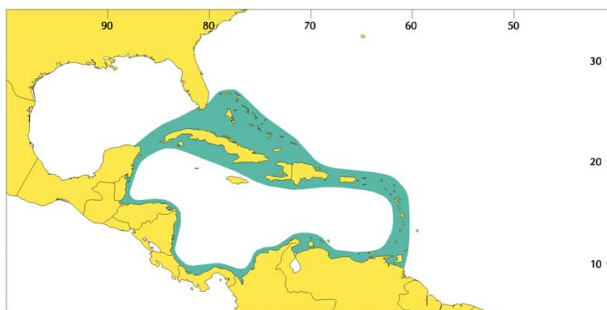


Diagnostic characters: Body somewhat compressed, slender, body depth about 5 times in standard length. Snout less than eye diameter; **maxilla long, tip pointed, reaching almost to gill opening**; jaw teeth small. **Pseudobranch short**, not extending onto inner face of operculum. Lower gill rakers 16 to 19; gill cover canals of *walkeri*-type. **Anal fin moderately long, with 21 to 26 branched rays**, its origin about equal to vertical through midpoint of dorsal-fin base. **Anus closer to anal-fin origin than to pelvic-fin tips**. **Colour:** midlateral silver stripe, width slightly less than eye diameter.

Size: Maximum about 9 cm total length.

Habitat, biology, and fisheries: Marine, pelagic, in coastal shelf areas as well as clear oceanic waters. A plankton-feeding species, often occurring in dense schools. Probably of little interest to fisheries. Caught occasionally with beach seines.

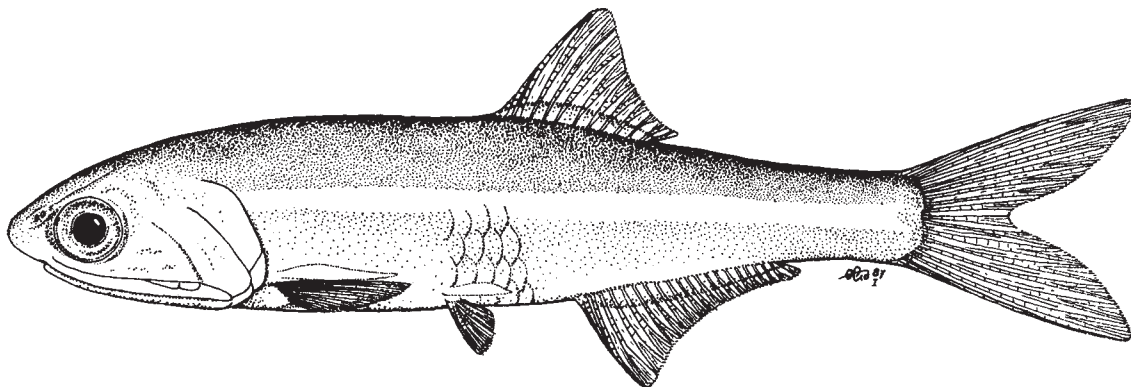
Distribution: Caribbean area (Florida Keys, Cuba, Bahamas, Antilles, also Los Roques Archipelago off Venezuela; from Yucatán to northern coasts of Venezuela and Colombia; Trinidad and Tobago; not in Gulf of Mexico).



Anchoa colonensis Hildebrand, 1943

Frequent synonyms / misidentifications: *Anchoa hepsetus colonensis* Hildebrand, 1943 / *Anchoa hepsetus* (Linnaeus, 1758).

FAO names: **En** - Narrowstriped anchovy; **Fr** - Anchois à bande étroite; **Sp** - Anchoa banda estrecha.

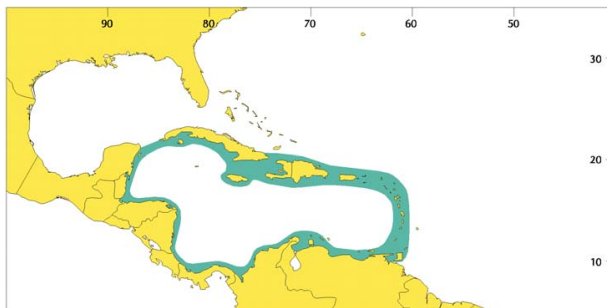


Diagnostic characters: Body somewhat compressed, elongate, body depth about 5 times in standard length. Snout pointed, about 3/4 eye diameter; **maxilla long, tip pointed, reaching to posterior margin of preoperculum**; jaw teeth small. **Pseudobranch short**, not extending onto inner face of operculum. Lower gill rakers 19 to 22; gill cover canals of *panamensis*-type. **Anal fin short, with 17 to 21 branched rays. Anus nearer to anal-fin origin than to pelvic-fin tips.** **Colour:** dorsum blue-green, with narrow midlateral silver stripe, about width of pupil.

Size: Maximum 14 cm total length, commonly to 10 cm total length.

Habitat, biology, and fisheries: Marine, pelagic, coastal, forming dense schools, often in shallow water close to shore. Other aspects of its biology probably similar to those of *Anchoa hepsetus*. Interest to fisheries is unknown. Taken occasionally in beach seines. Because of its larger size, it is one of the anchovy species best suited for marketing purposes in regions along northern coast of South America.

Distribution: Caribbean area (Greater and Lesser Antilles to Trinidad; Venezuela westward to Panama and Yucatán), where it replaces the more widespread *A. hepsetus*.

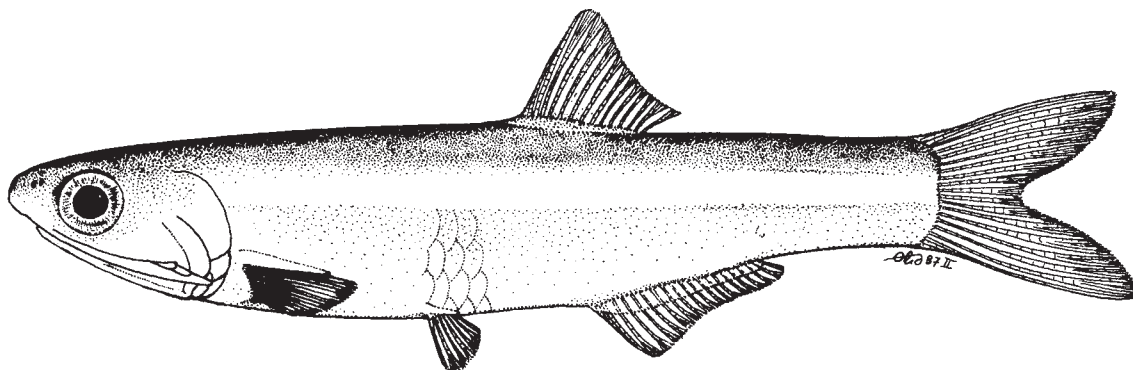


Anchoa cubana (Poey, 1868)

EAU

Frequent synonyms / misidentifications: *Anchoviella astilbe* (Jordan and Rutter, 1897) / None.

FAO names: En - Cuban anchovy; Fr - Anchois cubain; Sp - Anchoa cubana.

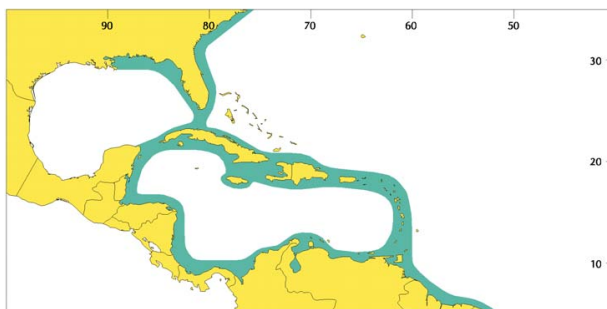


Diagnostic characters: Body somewhat compressed, elongate, **body depth 5 to nearly 6 times in standard length**. Snout pointed, about 3/4 eye diameter; **maxilla long, tip pointed and projecting at least 1/2 eye diameter beyond second supramaxilla, reaching beyond posterior margin of preoperculum**; jaw teeth small. **Pseudobranch shorter than eye diameter**, not extending onto inner face of operculum. **Lower gill rakers 24 to 30**; gill cover canals of *walkeri*-type. **Anal fin short, with 16 to 21 branched rays, its origin about at vertical through midpoint of dorsal-fin base. Axillary scale of pectoral fin almost reaching tip of pectoral fin. Anus nearer to pelvic-fin tips than to anal-fin origin.** **Colour:** narrow midlateral silver stripe, width about equal to pupil diameter, disappearing on preservation. Dorsum usually with dusky punctulations not arranged in definite longitudinal series. Side of head silvery.

Size: Maximum 10 cm total length, commonly to 8 cm total length.

Habitat, biology, and fisheries: Marine, pelagic, coastal, forming dense schools along beaches in water of 1 m or less; occurs down to about 60 m. Also reported from clear waters around islands. Feeds on plankton. Perhaps of local interest to fisheries since it forms dense schools. Caught occasionally with beach seines.

Distribution: Western central Atlantic (North Carolina, both coasts of Florida, northern part of Gulf of Mexico (but perhaps throughout), Cuba and probably throughout the Greater and Lesser Antilles, Yucatán south and east to Venezuela and Suriname) and western South Atlantic (entire coast of Brazil south to at least Santos).

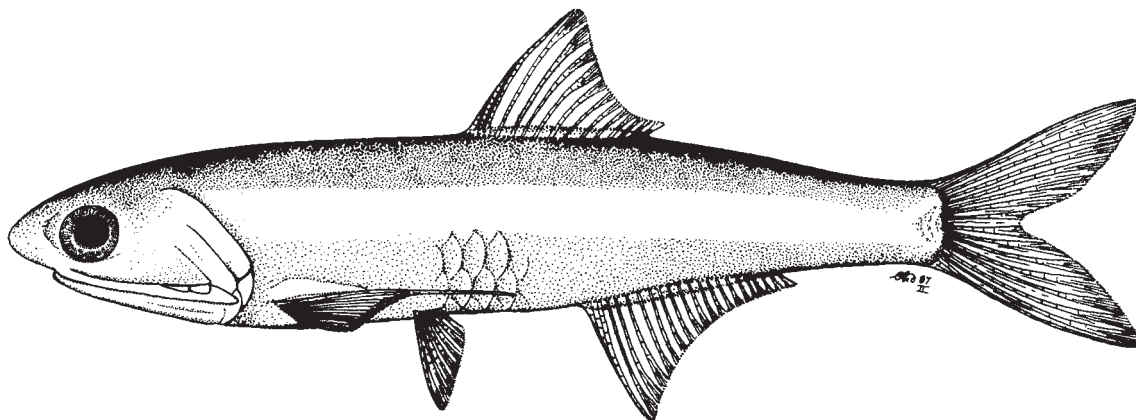


Anchoa filifera (Fowler, 1915)

EAF

Frequent synonyms / misidentifications: *Anchoa howelli* Hildebrand, 1943 / None.

FAO names: En - Longfinger anchovy; Fr - Anchois fil; Sp - Anchoa de hebra.

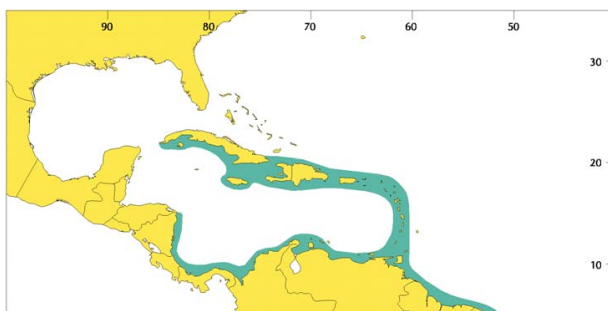


Diagnostic characters: Body moderately round, elongate, body depth about 5 to 5.5 times in standard length. Snout long and pointed, only slightly less than eye diameter; maxilla long, tip pointed, reaching almost to gill opening, teeth near tip somewhat enlarged. **Pseudobranch longer than eye diameter**, with 30 or more filaments, extending onto inner face of operculum. Lower gill rakers 21 to 27; gill cover canals of *panamensis*-type. Anal fin short, with 17 to 21 branched rays, its origin at or posterior to vertical through base of last dorsal-fin ray; **pectoral fin with first ray extended as a filament reaching as far as vertical through dorsal-fin origin in larger fishes** (but often broken). **Colour:** broad midlateral silver stripe, about as wide as eye, apparently without dark line above it. Side of head and lower part of side silvery. Upper parts of head and dorsum with numerous punctulations not arranged in lateral series.

Size: Maximum 12 cm total length, commonly to 10 cm total length.

Habitat, biology, and fisheries: Marine, pelagic, coastal in continental shelf areas as well as in clear waters around islands; trawled down to depths of 25 m off Brazil, but equally taken in shore seines and recorded in brackish water (7.94 to 8.21‰) in the Canal de Santa Cruz, Pernambuco. A plankton-feeding species often occurring in large schools. Caught occasionally in beach seines. Contributes to total clupeoid catches, but no special fishery.

Distribution: Western Atlantic (Antilles, Trinidad and south to Brazil, apparently as far south as 24°58'S; also Venezuela to Panama and Honduras, but not in Gulf of Mexico).

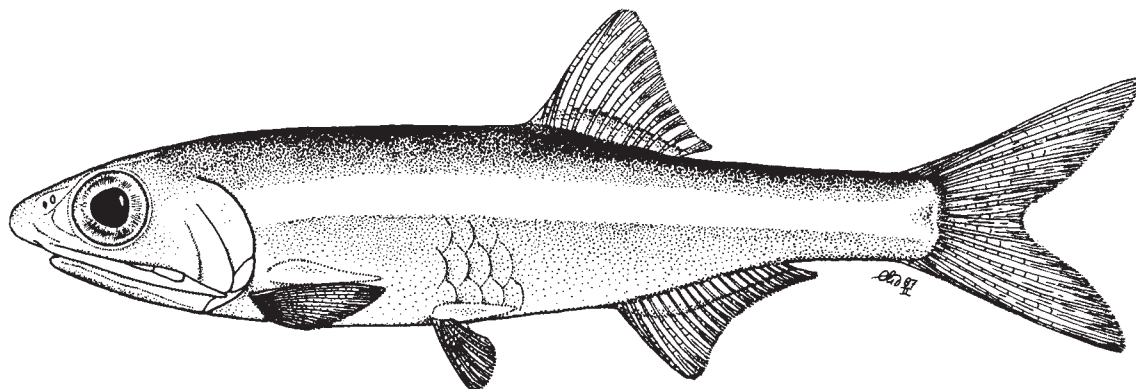


Anchoa hepsetus (Linnaeus, 1758)

ENP

Frequent synonyms / misidentifications: *Engraulis hepsetus* (Linnaeus, 1758) / *Anchoa lamprotaenia* Hildebrand, 1943.

FAO names: **En** - Broad-striped anchovy (AFS: Striped anchovy); **Fr** - Anchois rayé; **Sp** - Anchoa legítima.

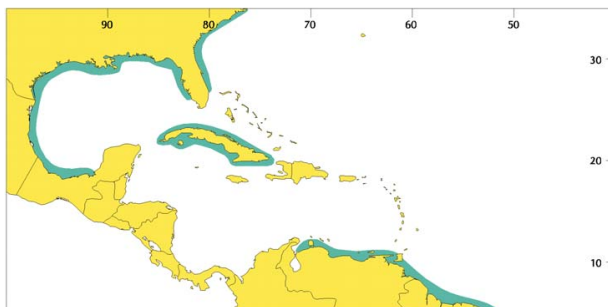


Diagnostic characters: Body fusiform, slightly compressed, elongate, body depth about 5 times in standard length. Snout prominent and pointed, about 3/4 eye diameter; **maxilla long, posterior tip of maxilla pointed, reaching beyond posterior margin of preoperculum**, sometimes almost to gill opening; jaw teeth small. **Pseudobranch shorter than eye**. Lower gill rakers 19 to 25; gill cover canals of *panamensis*-type. **Anal fin short with 16 to 23 branched rays, its origin anterior to vertical through last dorsal-fin ray. Anus nearer to anal-fin origin than to pelvic-fin tips.** **Colour:** dorsum blue-green, with **broad midlateral silver stripe** (a dark line above) of uniform width (about 3/4 eye diameter) except narrowed immediately behind gill opening.

Size: Maximum 15 cm total length, commonly 9 to 11 cm total length.

Habitat, biology, and fisheries: Inhabits shallow coastal waters, but also reported from depths as great as 70 m; often forms large schools. Apparently able to tolerate a wide range of salinities, from hypersaline to almost fresh; frequently found in brackish-water bays and estuaries. Spawns in harbours, estuaries, and sounds, as well as offshore (innercontinental shelf) during spring and summer; in Terminos Lagoon, Mexico, eggs restricted to polyhaline waters close to the Puerto Real inlet and central zone of the lagoon. Eggs elliptical (about 1.4 to 1.6 mm by 0.7 to 0.85 mm), transparent, without oil globule, yolk appearing 'cellular'. Relative fecundity and minimum size at maturity for females in Terminos Lagoon, Mexico, estimated to be 1 298 eggs/g and 85.5 mm, respectively. Feeds on copepods when young, then also on gastropods, foraminifera, ostracods, and an occasional annelid. Adults feed on small planktonic and bottom-living animals. No special fishery; it does not appear to be widely exploited. Caught with beach and boat seines; also with fine-mesh trawls. Used as a foodfish to the north of the area, perhaps also in this area. Separate statistics are not reported for this species.

Distribution: Probably occurs throughout the area, but more abundant in northern part; reaches northward to Massachusetts (or even Nova Scotia) and southward to Florida (not the Florida Keys) and to southern Gulf of Mexico; Cuba; also western Venezuela to Brazil.

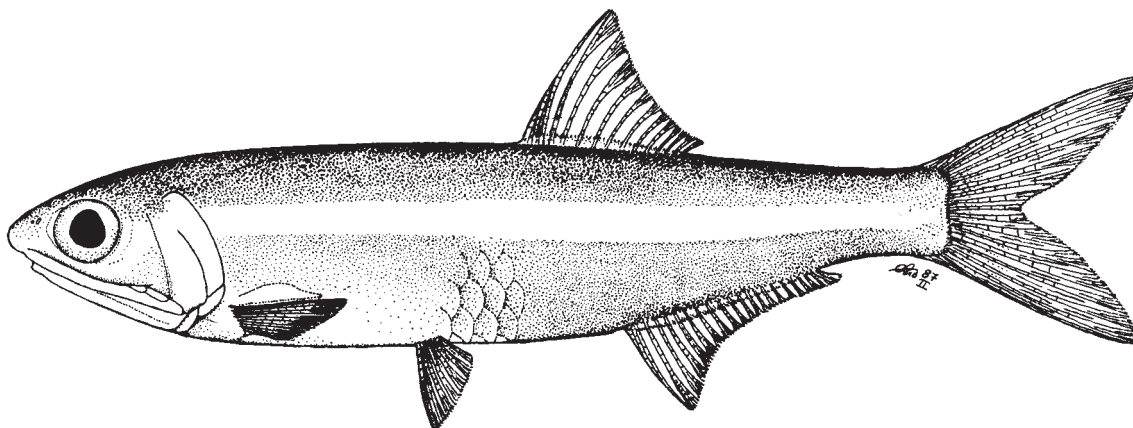


Anchoa januaria (Steindachner, 1879)

EAJ

Frequent synonyms / misidentifications: None / None.

FAO names: En - Rio anchovy.

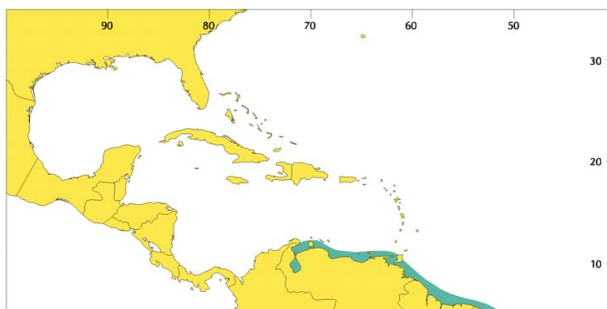


Diagnostic characters: Body somewhat compressed, moderately elongate, body depth about 5 times in standard length. Snout moderate, about 1/2 eye diameter or slightly more; **maxilla** moderate, tip not sharply pointed, **not or only just reaching posterior margin of preoperculum**; jaw teeth small. Pseudobranch shorter than eye. **Lower gill rakers 24 to 29**; gill cover canals of *walkeri*-type. **Anal fin fairly short**, with 19 to 25 (usually 22 to 24) branched rays, its **origin about at vertical through midpoint of dorsal-fin base**. **Axillary scale of pectoral fin reaching beyond midpoint of fin**. **Anus advanced, nearer to pelvic-fin tips than to anal-fin origin**. **Colour:** narrow midlateral silver stripe, width about 1/2 eye diameter or a little more.

Size: Maximum to 8 cm total length, commonly 5 to 6 cm total length.

Habitat, biology, and fisheries: Marine, pelagic, coastal, entering estuaries; schooling. In Santa Cruz canal, Pernambuco, the species was recorded in salinities of 7.9 to 31.3‰. Feeds preferentially on zooplankton, especially copepods and their larvae; phytoplankton seldom represent principle food items. More data needed on this species, based on correct identifications.

Distribution: Lake Maracaibo (the western region of Venezuela) and western south Atlantic (Brazil, from Ceará and the Santa Cruz canal, Itamaracá, Pernambuco, northeast of Brazil, coastally to Santa Catarina and São Paulo (southern Brazil). More intensive collecting is needed to determine the full extent of the range.

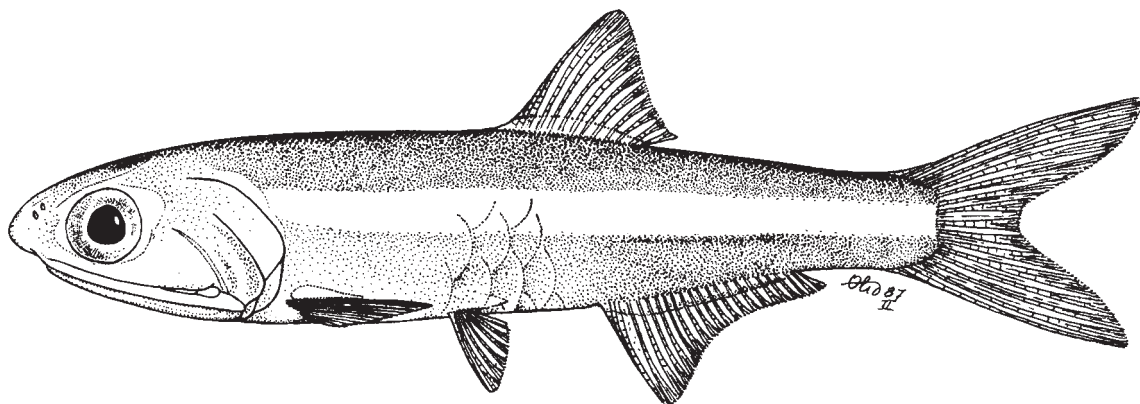


Anchoa lamprotaenia Hildebrand, 1943

EAL

Frequent synonyms / misidentifications: None / *Anchoa hepsetus* (Linnaeus, 1758).

FAO names: **En** - Bigeye anchovy; **Fr** - Anchois caraïbe; **Sp** - Anchoa ojona.

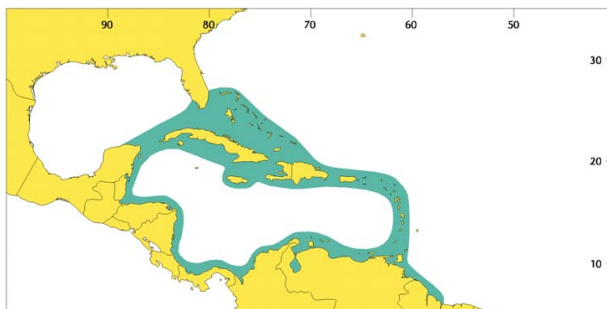


Diagnostic characters: Body somewhat compressed, elongate, body depth about 5 times in standard length. Snout pointed, about 3/4 eye diameter; maxilla long, tip pointed, reaching to posterior margin of preoperculum; jaw teeth small. Pseudobranch short, not extending onto inner face of operculum. **Lower gill rakers 17 to 21** (rarely 22); gill cover canals of *walkeri*-type. **Anal fin moderate**, with 18 to 23 (rarely 24) branched rays; its **origin about equal to vertical through midpoint of dorsal-fin base**. **Anus advanced, nearer to pelvic-fin tips than to anal-fin origin**. **Colour:** broad midlateral silver stripe, width about 3/4 eye diameter, a dark line above.

Size: Maximum 12 cm total length; commonly to 10 cm total length.

Habitat, biology, and fisheries: Marine, coastal, pelagic in continental shelf areas, and in clear waters around islands; not entering mangrove-lined lagoons of Venezuelan mainland, but the dominant species of the Los Roques Archipelago and there found as much in the lagoons as outside them. A zooplankton-feeding species occurring in dense schools. Frequently collected in mixed schools (with *Anchoa mitchilli*) in the Miami area. Ripe females recorded off Florida in June and July. Caught occasionally with beach seines.

Distribution: Caribbean area (southern Florida, Cuba, Bahamas, Greater and Lesser Antilles, and Yucatán to Colombia and Venezuela); also Trinidad and Tobago, south to Guyana; possibly Brazil.

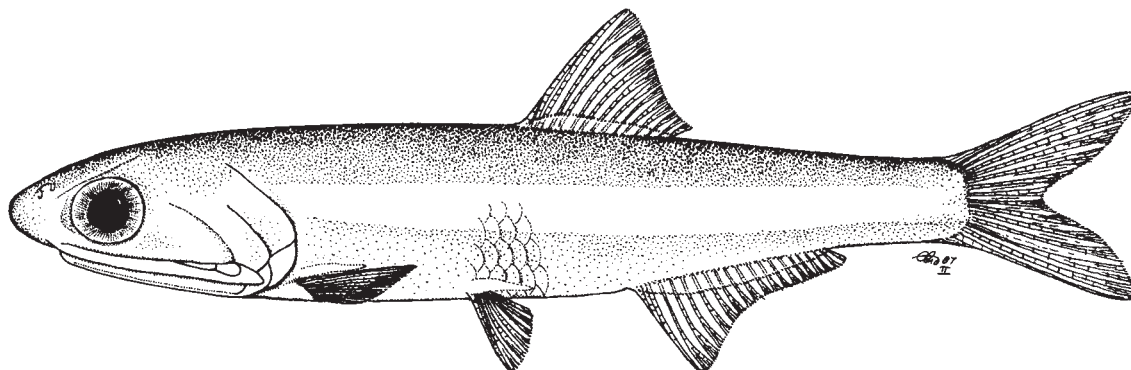


Anchoa lyolepis (Evermann and Marsh, 1900)

EAY

Frequent synonyms / misidentifications: *Anchoa nasuta* Hildebrand and Carvalho, 1948 / None.

FAO names: **En** - Shortfinger anchovy (AFS:Dusky anchovy); **Fr** - Anchois longnez; **Sp** - Anchoa trompalarga.

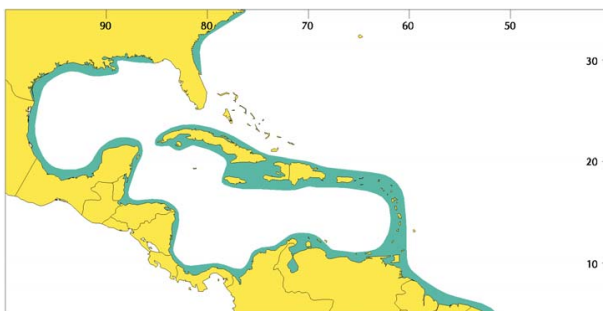


Diagnostic characters: Body fusiform, slightly compressed. Head long and pointed; snout prominent and obtusely pointed; **posterior tip of maxilla pointed, reaching beyond anterior margin of preoperculum**, almost to gill opening; jaw teeth small. **Pseudobranch longer than eye**, extending posteriorly onto operculum. Lower gill rakers 19 to 28 (the higher figures apply to Florida, Gulf of Mexico, and Venezuelan fishes); gill cover canals of *panamensis*-type. **Anal fin with 19 to 24 branched rays, its origin at or posterior to vertical through last dorsal-fin rays. Anus closer to origin of anal fin than to tip of pelvic fin.** **Colour:** dorsum dark translucent grey, sides with broad midlateral silver stripe in which the upper margin is sometimes darkly pigmented; dorsal, anal, and caudal fins with dark spots along fin rays and around their bases.

Size: Maximum 12 cm total length, commonly to 6 to 8 cm total length.

Habitat, biology, and fisheries: Shallow coastal waters, especially off beaches and mangrove-lined lagoons, and in harbours; also apparently trawled to depths of 25 to 55 m; absent in low salinity bays and estuaries. Often occurs in large, compact schools. No special fishery for this species. Caught with beach and boat seines, often using light (Venezuela); also in trawls. Not commonly used as a food fish, but mainly for bait (Colombia, Venezuela). Separate statistics are not reported for this species.

Distribution: Western Atlantic, New York south to Florida (rare on Gulf coast of Florida), northern Gulf of Mexico south to Yucatán, Panama, Venezuela; Antilles, Trinidad and south to Brazil.

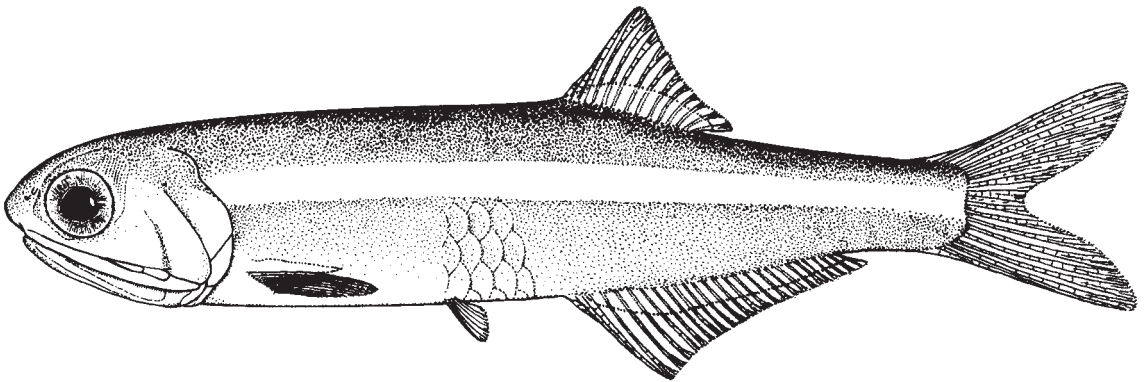


Anchoa mitchilli (Valenciennes, 1848)

ANB

Frequent synonyms / misidentifications: None / None.

FAO names: En - Bay anchovy; Fr - Anchois baie; Sp - Anchoa de caleta.

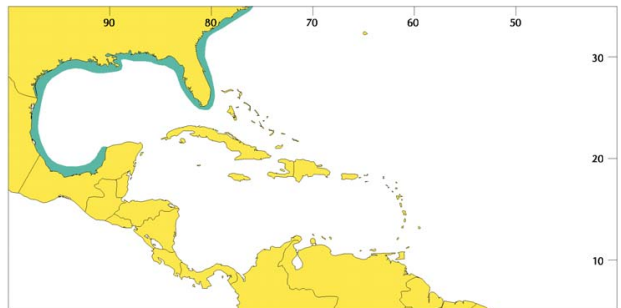


Diagnostic characters: Body fusiform, moderately compressed. **Snout fairly short and blunt; posterior tip of maxilla pointed, reaching beyond anterior margin of preoperculum;** jaw teeth small. **Pseudobranch shorter than eye.** Lower gill rakers 20 to 26; gill cover canals of *panamensis*-type. **Anal fin with 23 to 30 branched rays, its origin at vertical through anteriormost portion (unbranched rays) of dorsal fin. Anus advanced, opening nearer to pelvic-fin tips than anal-fin origin.** **Colour:** dorsum dark translucent grey, with narrow midlateral silver stripe (hidden until scales are shed).

Size: Maximum about 10 cm total length, commonly to 8 cm total length.

Habitat, biology, and fisheries: Pelagic, shallow coastal waters, estuaries, and lagoons; found along beaches down to 36 m, but more common in areas with muddy bottoms and brackish waters less than 25 m; tolerates wide range of salinities (virtually fresh to full salinity or hypersaline conditions). A schooling species; schools tend to be located near surface, but changes in depth distribution occur seasonally and diurnally that are not well understood. Serial spawner; spawning takes place in the evening from late April to mid-July, perhaps through August off North Carolina, from May to November or February in water less than 20 m deep off Texas, possibly year-round off Biscayne Bay, Florida. In Terminos Lagoon, Mexico, eggs of *A. mitchilli* were abundant, found in polyhaline waters, and present throughout the year, with peak abundance in August, September, and May. Relative fecundity and minimum size at maturity for females in Terminos Lagoon, Mexico, estimated to be 823.8 eggs/g and 37 mm, respectively; in Chesapeake Bay, Virginia, annual egg production was estimated to be 45 110 eggs/female (55 mm fork length), with average batch fecundity of 643 to 740 eggs/g. Eggs pelagic, transparent, barely elliptical, 0.84 to 1.11 mm. Feeds on zooplankton, predominately copepods, also on gastropods, isopods, mysid shrimps, and small fishes. No special fishery. Caught with beach seines, also with trawls. Mainly used as a baitfish and to a small extent for anchovy paste. In areas where abundant, extremely important in estuarine and coastal food webs; links secondary plankton production to fisheries output. Separate statistics are not reported for this species.

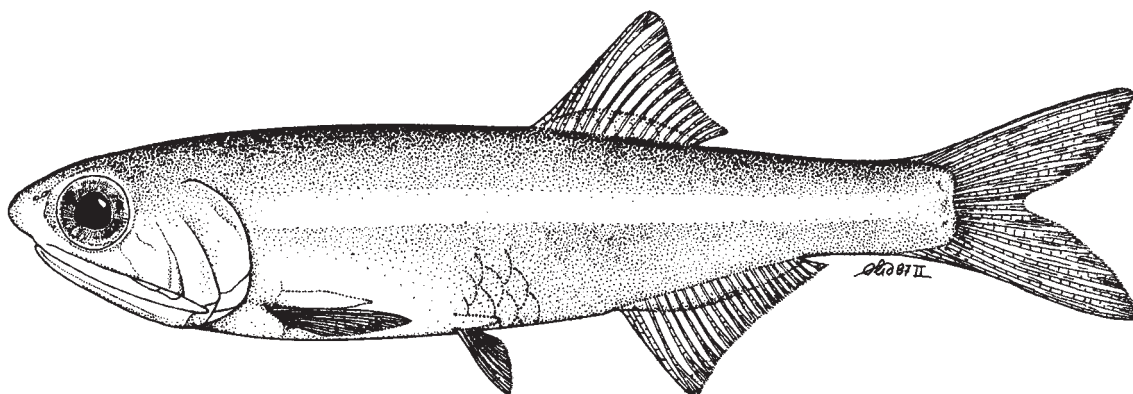
Distribution: Western north and central Atlantic (Maine south to the Florida Keys; westward around the Gulf of Mexico, south to Yucatán; probably not in the Antilles or the Caribbean).



Anchoa parva (Meek and Hildebrand, 1923)

Frequent synonyms / misidentifications: None / *Anchoa januaria* (Steindachner, 1879).

FAO names: **En** - Little anchovy; **Fr** - Anchois mignon; **Sp** - Anchoa chiquita.

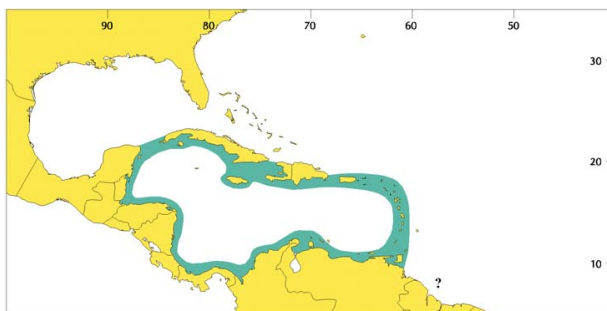


Diagnostic characters: Body fusiform, a little compressed, **body depth 4.5 to 5 times in standard length**. **Snout pointed, short (about 1/2 eye diameter); posterior tip of maxilla sharply pointed, just reaching beyond posterior margin of preoperculum;** jaw teeth small. **Pseudobranch shorter than eye. Lower gill rakers 24 to 29;** gill cover canals of *walkeri*-type. **Anal fin moderately short with 21 to 25 branched rays, its origin about at vertical through midpoint of dorsal-fin base. Axillary scale of pectoral fin reaching beyond midpoint of fin. Anus closer to pelvic-fin tips than to anal-fin origin.** **Colour:** dorsum dark translucent grey, with narrow midlateral silver stripe.

Size: Maximum about 8 cm total length, commonly to 5 cm total length.

Habitat, biology, and fisheries: Shallow coastal waters; especially abundant in brackish, mangrove-lined lagoons (eastern Venezuela); and apparently in fresh water. Average length at maturity for fishes off the Colombian coast was 4.5 to 4.8 cm total length. Batch fecundity off Colombia 450 to 2 250 eggs/female. Eggs are elliptical, translucent, 200 to 437 microns. Caught with seines. Hardly used for food, mainly a baitfish. No special fishery. Separate statistics are not reported for this species.

Distribution: Western central Atlantic (Cuba and Jamaica to Puerto Rico, the Lesser Antilles; Yucatán to Colombia, Venezuela, Trinidad and Tobago; probably southward to Brazil).

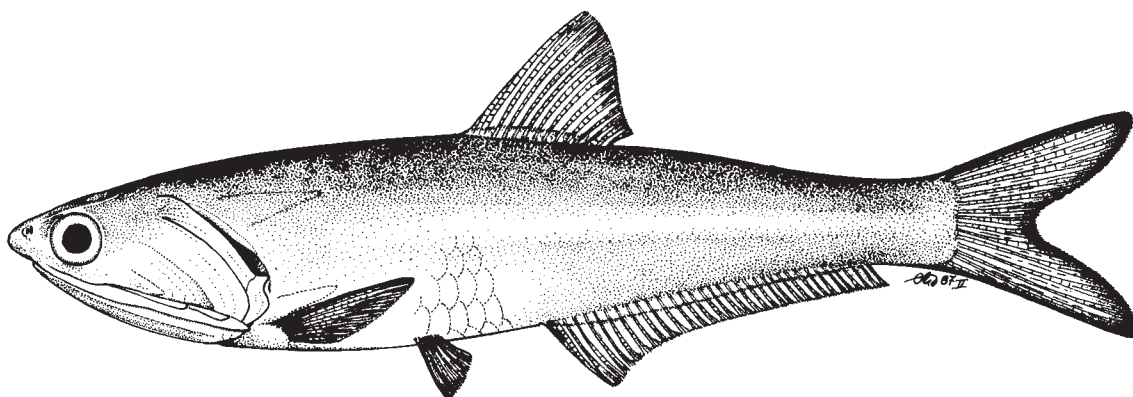


Anchoa spinifer (Valenciennes, 1848)

EAH

Frequent synonyms / misidentifications: *Anchoa argenteus* Schultz, 1949 / None.

FAO names: **En** - Spicule anchovy; **Fr** - Anchois de fond; **Sp** - Anchoa de fonda.



Diagnostic characters: Body fusiform, somewhat compressed; snout prominent, pointed; **posterior tip of maxilla pointed, reaching beyond anterior margin of preoperculum**, almost to gill opening; **small triangular projection at posterior margin of operculum (on suboperculum)** slightly above pectoral-fin base; jaw teeth small. **Pseudobranch shorter than eye**. Lower gill rakers 12 to 19, preceded by short stumps in larger fishes; gill cover canals of *panamensis*-type. **Anal fin long, with 36 to 40 branched rays**, its origin at vertical through midpoint of dorsal-fin base. **Colour:** large specimens yellow-orange or rosy orange, but smaller fishes paler and often with distinct midlateral silver stripe. Dorsal-fin tip and caudal-fin margin darkly pigmented.

Size: Maximum 24 cm total length, commonly to 16 to 20 cm total length.

Habitat, biology, and fisheries: Shallow coastal waters, lagoons, and mouths of rivers, usually at 5 to 30 m, but down to 50 m off the Orinoco mouth; also in brackish waters, and occasionally fresh water. Demersal over soft bottoms of the continental shelf. Carnivorous, feeding on small fishes and crustaceans. No special fishery; it is landed in large quantities and taken mainly as bycatch in the industrial trawl fishery for shrimps; also caught with seines, traps and trawls. Mainly used in the manufacture of byproducts. Also marketed fresh, although the market for human consumption is small at present. Separate statistics are not reported for this species.

Distribution: Western central and south Atlantic (Panama to Trinidad and south to at least Santos, Brazil); also eastern central Pacific (Costa Rica south to northern border of Peru).

