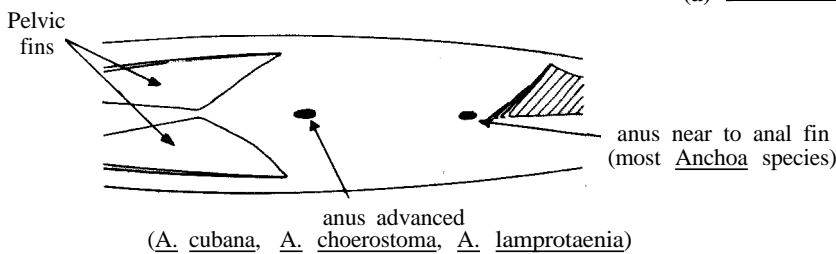
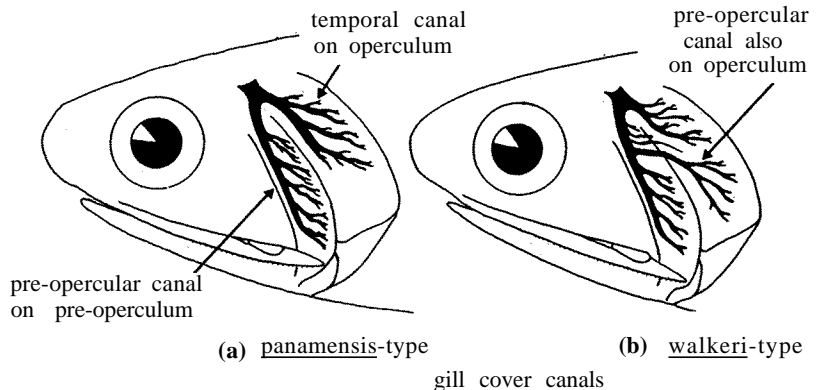
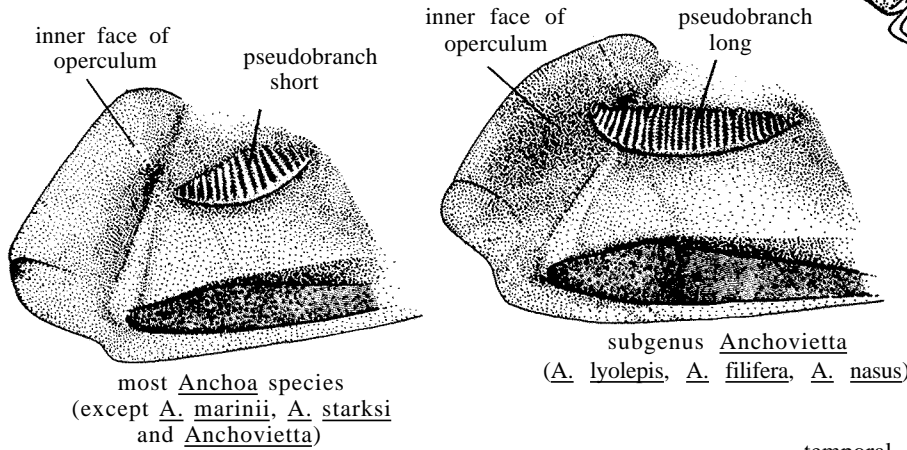
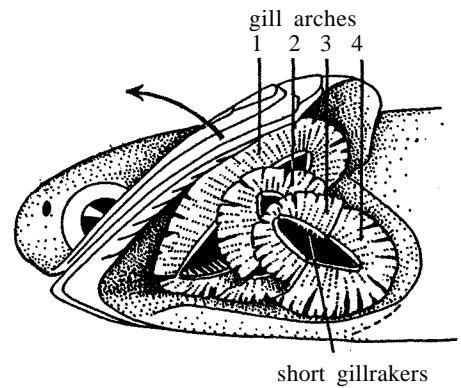
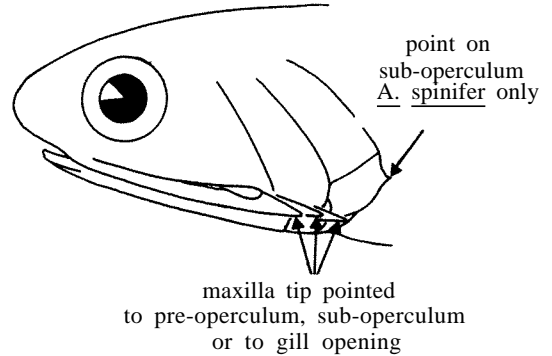


Anchoa Jordan & Evermann, 1927

ENGR Ancho

Anchoa Jordan & Evermann, 1927, Proc.Calif.Acad.Sci.,4(16):501, as subgenus of Anchoviella (type: Engraulis compressus Girard, 1858).

Diagnostic Features : Fairly small, slightly or quite strongly compressed anchovies (to about 13 cm standard length, usually 6 to 10 cm). Snout fairly pointed (strongly pointed in subgenus Anchovietta); maxilla long (reaching beyond front margin of pre-operculum), tip pointed, reaching well beyond tip of second supra-maxilla; fine teeth on lower jaw; gillrakers slender, increasing in larger fishes in some species (lower gillrakers as few as 12 to 14 or 19 in some, usually 17 to about 24, but to 28 in some and to 32 in A. delicatissima); gillrakers present on hind face of third epibranchial. Pseudobranch usually short, but longer than eye and extending onto inner face of operculum in A. marinii, A. starksi and the subgenus Anchovietta. Canals on gill cover with (walkeri-type) or without (panamensis-type) a pre-opercular branch passing back onto the operculum to run downward parallel to the temporal canal. Dorsal fin origin at about midpoint of body; anal fin short, moderate or long (14 to 22 branched finrays in some species, usually about 20 to 27, but up to 34 to 37 in other species); its origin usually below dorsal fin base (occasionally just in front, and in the subgenus Anchovietta below or behind the base of the last dorsal finray). The rather long maxilla and its pointed tip distinguishes Anchoa from Anchoviella (maxilla blunt, its tip barely extending beyond tip of second supra-maxilla).



Biology, Habitat and Distribution : Marine, estuarine and some species penetrating into freshwater; Atlantic and Pacific coasts and lower parts of rivers of North, central and South America. Some species filter-feed on small planktonic organisms, those with few gillrakers feeding on larger animals (prawns, small fishes, etc.).

Species : Hildebrand (1943), in the first comprehensive revision of the genus, recognized 36 species. More recent studies (Whitehead, 1973a; Nelson, 1983, 1986; Nelson & Sonoda, 1987) have removed some of Hildebrand's species to other genera, or included others placed by him in other genera or in synonymies, to make 16 Atlantic species, 17 Pacific species, and one common to both areas (total 34 species). Nelson (1986) has proposed the subgenus *Anchoiotta* for the species *nasus*, *lyolepis* and *filifera*. To aid identification, the species are arranged geographically (north to south) for each region:

Subgenus *Anchoa* (pseudobranch short (except in *marinii*, *starksi*); anal fin origin below or just before dorsal fin base).

Atlantic and Pacific :

A. spinifer (Valenciennes, 1848) Western central and South Atlantic, and eastern central Pacific

Atlantic only :

A. mitchilli (Valenciennes, 1848) Western North and central Atlantic

A. hepsetus (Linnaeus, 1758) Western North, central and South Atlantic

A. belizensis (Thomerson & Greenfield, 1975) Western central Atlantic

A. cavorum (Fowler, 1906) Western central Atlantic

A. choerostoma (Goode, 1874) Bermuda only

A. colonensis Hildebrand, 1943 Western central Atlantic

A. parva (Meek & Hildebrand, 1923) Western central Atlantic

A. trinitatis (Fowler, 1915) Western central Atlantic

A. cubana (Poey, 1868) Western central and South Atlantic

A. lamprotaenia Hildebrand, 1943 Western central and South Atlantic

A. januaria (Steindachner, 1880) Western South (possibly also central) Atlantic

A. marinii Hildebrand, 1943 Western South Atlantic

A. pectoralis Hildebrand, 1943 Western South Atlantic

A. tricolor (Agassiz, 1829) Western South Atlantic

Pacific only :

A. compressa (Girard, 1858) Northern part of eastern central Pacific

A. delicatissima (Girard, 1856) Northern part of eastern central Pacific

A. helleri (Hubbs, 1921) Northern part of eastern central Pacific

A. mundeoloides (Breder, 1928) Northern part of eastern central Pacific

A. scofieldi (Jordan & Culver, 1895) Northern part of eastern central Pacific (? also Ecuador)

A. argentivittata (Regan, 1904) Whole eastern central Pacific

A. curta (Jordan & Gilbert, 1882) Whole eastern central Pacific

A. exigua (Jordan & Gilbert, 1882) Whole eastern central Pacific

A. ischana (Jordan & Gilbert, 1882) Whole eastern central Pacific

A. lucida (Jordan & Gilbert, 1882) Whole eastern central Pacific

A. mundeola (Gilbert & Pierson, 1898) Whole eastern central Pacific

A. walkeri Baldwin & Chang, 1970 Whole eastern central Pacific

A. chamensis Hildebrand, 1943 Southern part of eastern central Pacific

A. eigenmannia (Meek & Hildebrand, 1923) Southern part of eastern central Pacific

A. panamensis (Steindachner, 1876) Southern part of eastern central Pacific

A. starksi (Gilbert & Pierson, 1898) Southern part of eastern central Pacific

Subgenus *Anchoiotta* (pseudobranch longer than eye, reaching onto inner face of operculum; anal fin origin under or behind base of last dorsal finray)

A. lyolepis (Evermann & Marsh, 1902) Western central and South Atlantic

A. filifera (Fowler, 1915) Western central and South Atlantic

A. nasus (Kner & Steindachner, 1866) Eastern central and South Pacific

Remarks : The definition of the genus *Anchoa* has relied mainly on the rather long and pointed maxilla (cf. short and blunt in *Anchoviella*, *Engraulis*) coupled the absence of those specialized features that characterize certain other New World genera (*Anchovia*, *Cetengraulis*, *Lycengraulis*, *Pterengraulis*). Nelson (1986) split off *lyolepis*, *filifera* and *nasus* as an apparently natural group, subgenus *Anchovieta*. Undoubtedly other groups will be recognized and probably the separation of *Anchoa* and *Anchoviella* solely on the basis of maxilla form will prove to be artificial (e.g., *analis*, here placed in *Anchoviella* because of its short and blunt maxilla, seems more allied to the long-finned *panamensis*-group of *Anchoa*).

Identification of *Anchoa* species is difficult; the key given by Hildebrand (1943) is no longer reliable and his combination of Atlantic and Pacific species makes it unnecessarily complicated. However, by using the geographical area to narrow the choice of possible species, most can then be identified by counting the lower gillrakers and the branched anal finrays. The form of the cutaneous canals that branch across the gill cover is also useful, although not always easy to see unless the head of the specimen is dried thoroughly. The following characters may be of help:

Pseudobranch longer than eye: *A. filifera*, *A. lyolepis* and *A. marinii* of Atlantic; *A. nasus* and *A. starksi* of Pacific.

Anus advanced, near to pelvic fin tips: *A. choerostoma*, *A. cubana*, *A. lamprotaenia*, *A. januaria*, *A. mitchilli*, *A. parva* and *A. trinitatis* of Atlantic; no data for Pacific.

Lower gillrakers few: *A. spinifer* (12 to 19) of Atlantic and Pacific; *A. eigenmannia* (12 to 14) and *A. scofieldi* (12 to 14) of Pacific.

Lower gillrakers many (to 28 or more): *A. cubana*, *A. januaria* and *A. parva* of Atlantic; *A. nasus* (rare) and *A. delicatissima* (26 to 32) of Pacific.

Anal finrays many (to 29 or more); *A. spinifer* (31 to 37) of Atlantic and Pacific; *A. compressa* (27 to 31), *A. eigenmannia* (rare), *A. mundeola* (27 to 33) *A. mundeoloides* (26 to 31), *A. panamensis* (28 to 35) and *A. walkeri* (23 to 32) of the Pacific.

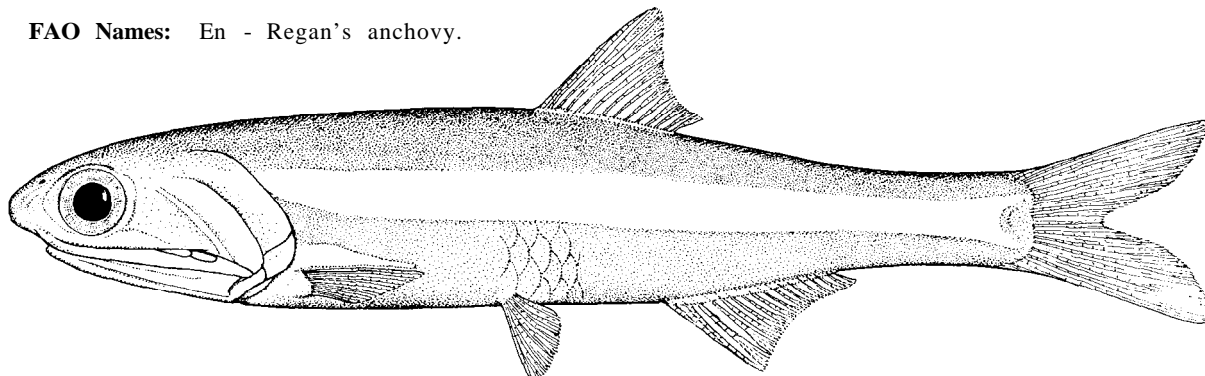
Anchoa argentivittata (Regan, 1904)

ENGR Ancho 24

Engraulis (*Stolephorus*) *argentivittatus* Regan, 1904, *Ann.Mag.nat.Hist.*, (7)8:255 (Las Peñas, Jalisco = Puerto Vallarta, Mexico).

Synonyms : *Anchoa arenicola* Meek & Hildebrand, 1923:201, p1.13, fig.1 (Chame Point, Taboga Island, Naos Island and Balboa, Panama); Hildebrand, 1943:68, fig.27 (Panama, Colombia, Ecuador); Peterson, 1956:165 (Mazatlán, Costa Rica; Galapagos Islands wrongly cited); Cabo & Massay, 1969:8 (Ecuador, listed); *Anchoa argentivittata*-Nelson, 1983:48, tab.1 (vertebrae)(types; *arenicola* a synonym).

FAO Names: En - Regan's anchovy.



Diagnostic Features : Body fairly elongate, its depth 5.5 to 6.5 times in standard length. Snout long, about equal to eye diameter; maxilla moderate, tip rather bluntly pointed, reaching onto inter-operculum, but not to edge of gill cover; lower gillrakers 17 to 20; gill cover canals of *panamensis*-type. Anal fin very short, with iii 14 to 17 finrays, its origin below or behind last dorsal finray base. A silver stripe along flank, about 3/4 eye diameter. Pacific *Anchoa* species that overlap in both gillraker and anal finray counts are: *A. helleri* of the northern Gulf of California (not less than 19 gillrakers or 17 branched anal finrays, also vertebrae 40 to 42, rarely 43, cf. 44 to 46), and *A. ischana* (silver stripe narrower, about 3/4 to 2/3 eye diameter, maxilla more narrowly pointed, reaching only sub-operculum, vertebrae usually 42 to 44).

Geographical Distribution : Eastern central Pacific (southern half of Gulf of California south to Ecuador; but not to Galapagos Islands vide Nelson, 1983).

Habitat and Biology : Marine, pelagic, coastal and schooling, caught over sand or gravel in the Gulf of Nicoya, but not in inner parts of Gulf (Peterson, 1956). May spawn over a protracted period in Gulf of Nicoya; eggs oval (Peterson, loc.cit.).

Size : To 10 cm standard length, or 12.5 cm total length (Hildebrand, 1943).

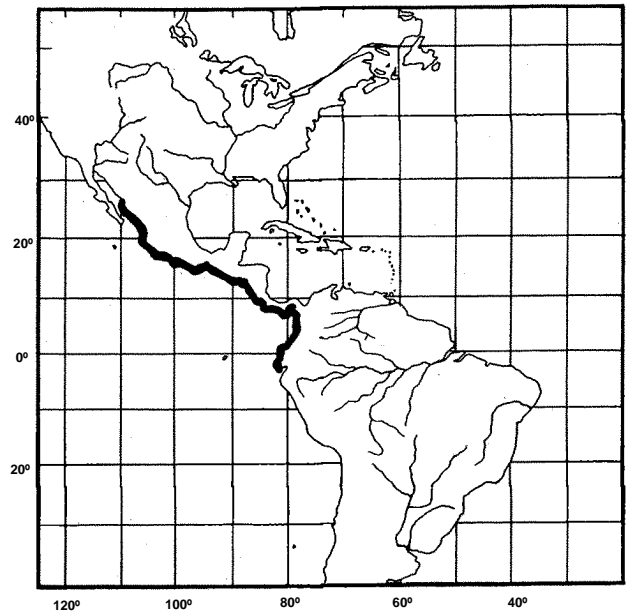
Interest to Fisheries : No data.

Local Names :

Literature : Peterson (1956 - some brief notes on ecology and breeding, as A. arenicola).

Remarks : Nelson (1983) resurrected the name argentivittata for this species, which had previously been referred to as arenicola; Hildebrand (1943:65) had tentatively placed argentivittata in the synonymy of Anchoa lyolepis (Atlantic), but the name was otherwise ignored.

Nelson (1983) accepted the separation of A. argentivittata from the very similar A. ischana, citing the distinctions found by Peterson (1956:158, key) in Gulf of Nicoya specimens. However, the less sharply angled cheek in A. ischana and the presence of a dark stripe along the back are not apparent in Galapagos specimens (identified by Dr Nelson), although Peterson seems to have correctly noted the narrower silver stripe. This, and the rather more narrowly pointed maxilla tip, seem the best means of separating A. ischana from A. argentivittata.



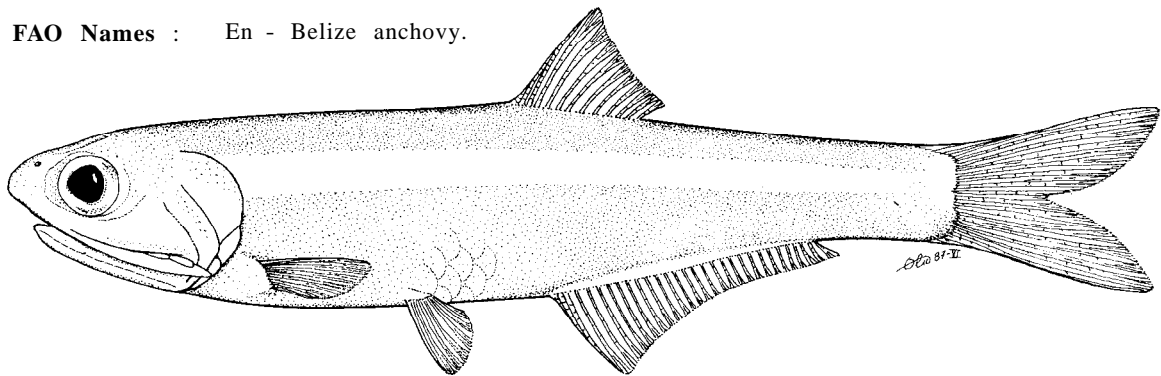
Anchoa belizensis (Thomerson & Greenfield, 1975)

ENGR Ancho 15

Anchoiella belizensis Thomerson & Greenfield, 1975, Copeia, (1):50, fig.1 (Sibun River, near Freetown, Belize).

Synonyms : None.

FAO Names : En - Belize anchovy.



Diagnostic Features : Body somewhat compressed, slender, its depth about 5 times in standard length. Snout less than eye diameter; maxilla long, tip pointed, reaching almost to gill opening; lower gillrakers 17 to 20; gill cover canals of walkeri-type. Anal fin rather long, with iii 23 to 28 finrays, its origin before midpoint of dorsal fin base. A pair of narrow dark lines along back, from occiput to tail; a silver stripe along flank, less than eye diameter. Atlantic Anchoa species that overlap in both gillraker and anal finray counts are: A. trinitatis (Venezuela, Trinidad; gill cover canals of panamensis-type), A. pectoralis (Brazil) and A. lamprotaenia (branched anal finrays 17 to 23); the most similar species is A. cayorum, reported to be sympatric in the Sibun river, Belize (anal fin origin below midpoint of dorsal fin base).

Geographical Distribution : Caribbean area, fresh-water (Belize, in Sibun River 20 km from sea; Guatemala, Rio Dulce, Lake Yzabel; ? eastern rivers of Honduras).

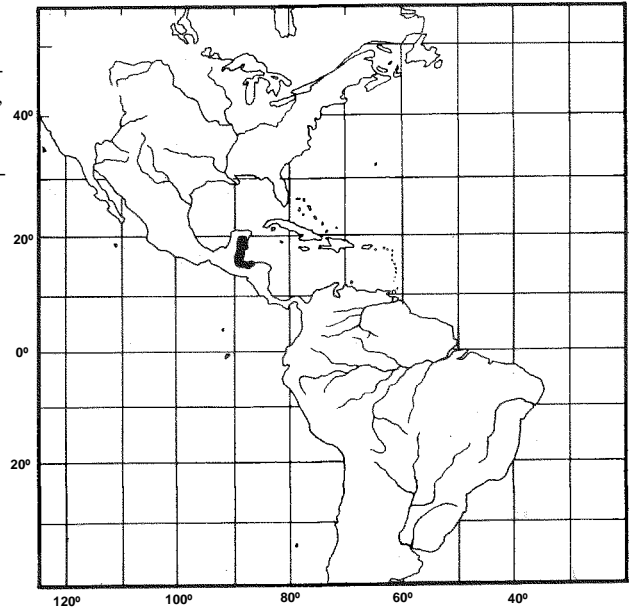
Habitat and Biology : Apparently entirely fresh-water, presumably schooling. More data needed.

Size : To 5.8 cm standard length.

Interest to Fisheries : Unknown; probably little.

Local Names :

Literature :



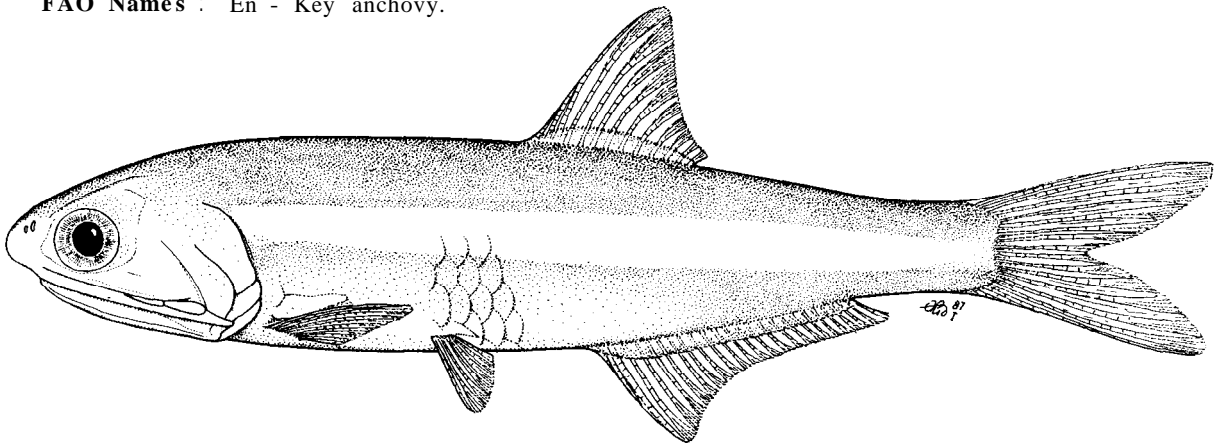
Anchoa cayorum (Fowler, 1906)

ENGR Ancho 12

Anchovia choerostoma cayorum Fowler, 1906, Proc.Acad.nat.Sci.Philad., 58:85, fig.4 (Hailer's Rock, Florida Keys).

Synonyms : Stolephorus mitchilli:Bean, 1890:206 (Cozumel, Yucatan); Anchovia cayorum:Fowler, 1911:219 (types); Anchoa cayorum-Hildebrand, 1943:50, fig.17 (synopsis); FWNA, 1964:173, fig.30 (Florida Keys to Cuba, Yucatan and Belize - synopsis); Cervigón,1969:217, fig.6 tabs 6, 19 (Los Roques Archipelago, Venezuela); Thomerson & Greenfield, 1973:52 (Sibun River, Belize - freshwater, if identification correct).

FAO Names : En - Key anchovy.



Diagnostic Features : Body somewhat compressed, slender, its depth about 5 times in standard length. Snout less than eye diameter; maxilla long, tip pointed, reaching almost to gill opening; lower gillrakers 16 to 19; gill cover canals of walkeri-type. Anal fin moderately long, with iii 21 to 26 finrays, its origin below about midpoint of dorsal fin base. A silver stripe along flank, a little less than eye diameter. Atlantic Anchoa species that overlap in both gillraker and anal finray counts are: A. trinitatis (Venezuela, Trinidad; gill cover canals of panamensis-type, gillrakers 17 to 22), A. pectoralis (Brazil) and A. lamprotaenia (branched anal finrays 18 to 23); the most similar species is the freshwater A. belizensis (anal fin origin well before midpoint of dorsal fin base); A. lyolepis and A. filifera have a long pseudobranch.

Geographical Distribution : Caribbean area (Florida Keys, Cuba, Bahamas, Antilles, also Los Roques Archipelago off Venezuela; from Yucatan, possibly to western Venezuela; not in Gulf of Mexico).

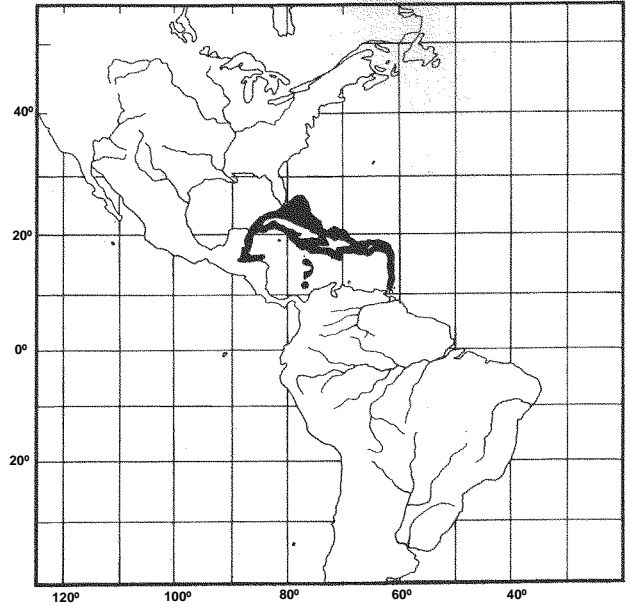
Habitat and Biology : Marine, pelagic, schooling, apparently preferring clear oceanic waters (Cervigón, 1969:218); if correctly identified, then in Sibun River, Belize (Thomerson & Greenfield, 1975).

Size : To 8.5 cm standard length.

Interest to Fisheries : Unknown, probably little.

Local Names : CUBA: Manjuá; USA: Key anchovy (AFS list).

Literature : See synonymy.



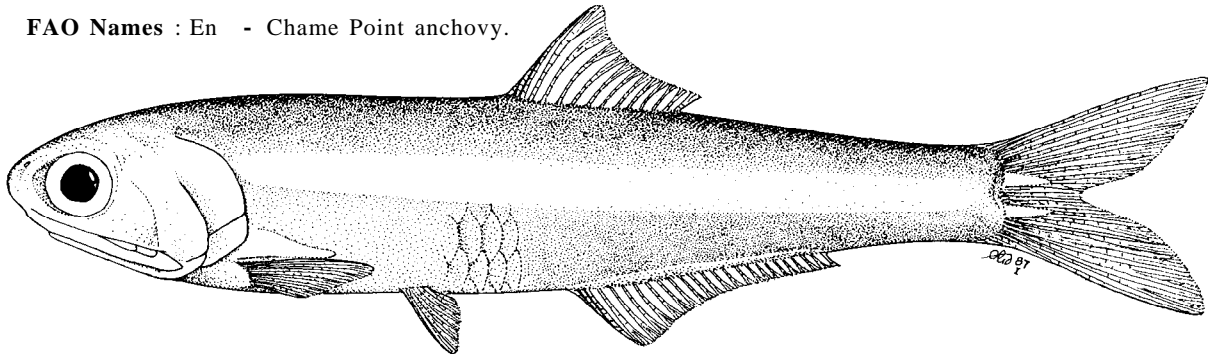
Anchoa chamensis Hildebrand, 1943

ENGR Ancho 25

Anchoa chamensis Hildebrand, 1943, *Bull.Bingham oceanogr.Coll.*, 8(2):54, fig.19 (Chame Point, Panama).

Synonyms : *Anchoa chamensis*-Nelson, 1983:tab.1 (vertebrae).

FAO Names : En - Chame Point anchovy.



Diagnostic Features : Body rather elongate, compressed, its depth about 5 times in standard length. Snout very short, about 1/2 eye diameter; maxilla short, tip bluntly pointed, just reaching onto inter-operculum; lower gillrakers 18 to 23; gill cover canals of *walkeri*-type. Anal fin moderate, with iii 21 to 24 finrays, its origin below about middle of dorsal fin base. A silver stripe along flank, about 3/4 eye diameter (above anal fin base); a distinct dark line along back and on edge of tail. Pacific *Anchoa* species that overlap in both gillrakers and anal finray counts are: *A. curta* (gillrakers usually not less than 2.31, *A. walkeri* and *A. lucida* (branched anal finrays not less than 22 or 23) and *A. delicatissima* (not south of Baja California).

Geographical Distribution : Eastern central Pacific (Panama Hay only).

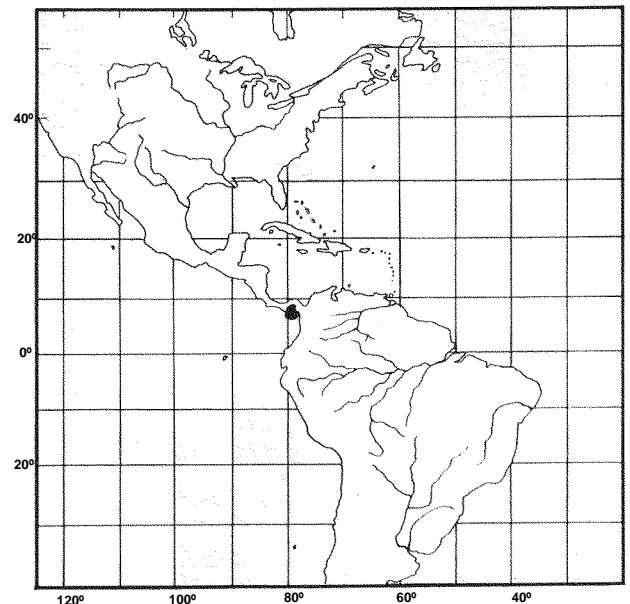
Habitat and Biology : Marine, pelagic, coastal; more data needed.

Size : To 6 cm standard length.

Interest to Fisheries : No data.

Local Names:

Literature :



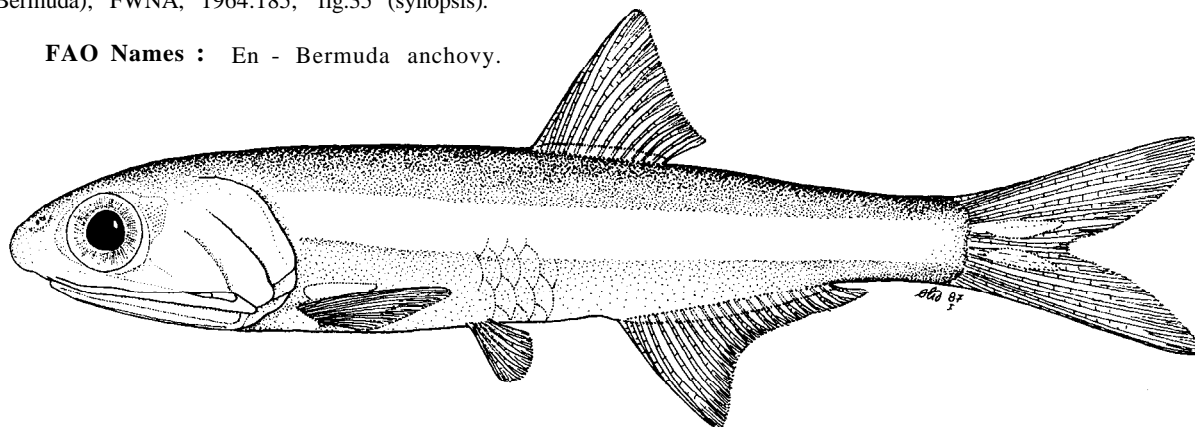
Anchoa choerostoma (Goode, 1874)

ENGR Ancho 13

Engraulis choerostoma Goode, 1874, *Am.J.Sci.*, 8:125 (Bermuda).

Synonyms : *Stolephorus choerostoma*: Jordan & Evermann, 1896:444 (on Goode's description); Barbour, 1985:113 (Bermuda; Puerto Rico incorrect); Bean, 1906:34 (Bermuda); *Anchoiella choerostoma*: Jordan, Evermann & Clark, 1930:48 (Bermuda); Fowler, 1930:146 (Bermuda); *Anchoa choerostoma*-Hildebrand, 1943:71 fig.28 (Bermuda); FWNA, 1964:185, fig.35 (synopsis).

FAO Names : En - Bermuda anchovy.



Diagnostic Features : Body moderately compressed, slender, its depth about 5 to 5.5 times in standard length. Snout short, about 3/4 eye diameter; maxilla long, tip sharply pointed, reaching almost to gill opening; lower gillrakers 24 to 27; gill cover canals of *walkeri*-type. Anal fin moderate, with iii 19 to 22 finrays, its origin below or behind midpoint of dorsal fin base. A silver stripe along flank, about 3/4 eye diameter. Although overlapping many other Atlantic *Anchoa* species in gillraker and anal finray counts, the only other Bermudan *Anchoa* is *A. lyolepis* (pseudobranch longer than eye, anal fin origin below base of last dorsal finray). Of species with *walkeri*-type canals in the western central Atlantic, it comes close to *A. cubana* and *A. parva*.

Geographical Distribution : Bermuda only.

Habitat and Biology : Marine, pelagic, coastal, schooling; apparently common (at least in August, but not July *fide* FWNA, 1964:186). Specimens with well-developed eggs were taken in June, 1927 (FWNA), suggesting a summer spawning period.

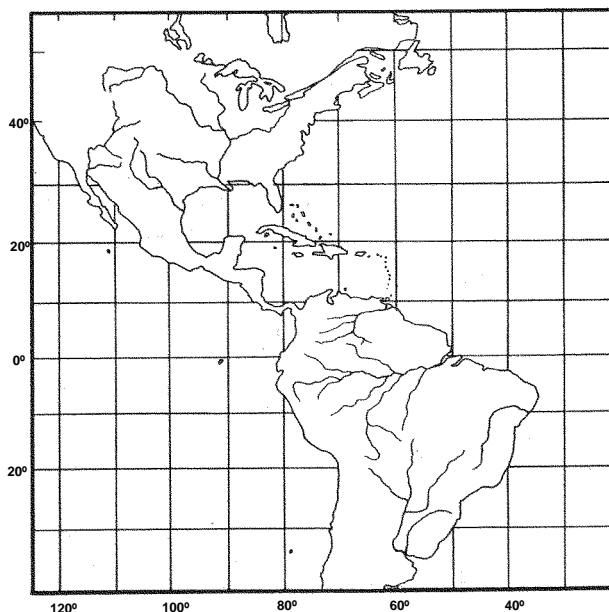
Size : To 7.5 cm standard length.

Interest to Fisheries : Probably little, but will school under a light and might be of value as a baitfish.

Local Names :

Literature :

Remarks : The Panama and Puerto Rico specimens reported by Jordan & Seale (1926:404) were not this species, but perhaps *Anchoa lyolepis* (FWNA, 1964:186).



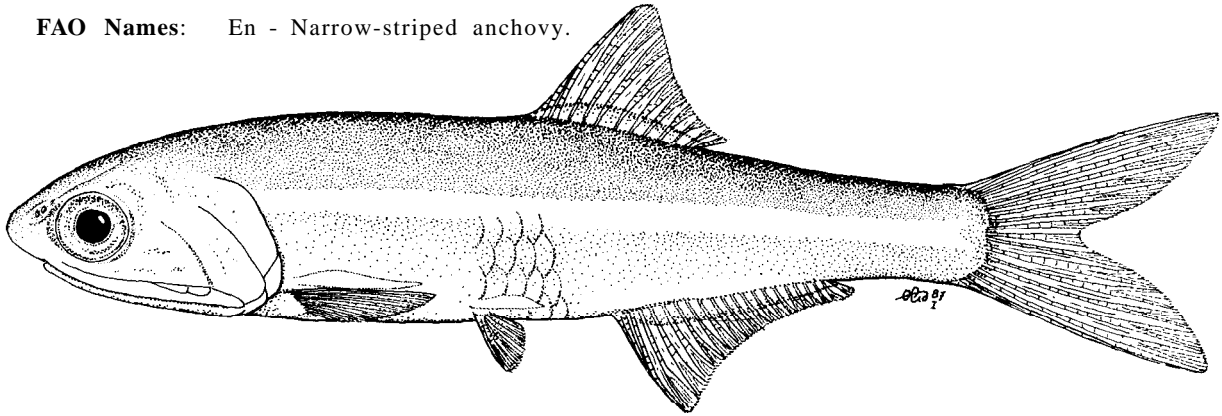
Anchoa colonensis Hildebrand, 1943

ENGR Ancho 9

Anchoa hepsetus colonensis Hildebrand, 1943, *Bull.Bingham oceanogr.Coll.*, 8(2):60, fig.22 (Colon, Panama).

Synonyms : *Anchoa hepsetus*: presumably all Caribbean references apply to *A. colonensis*; Cervigón, 1969:234, fig.14 (Gulf of Venezuela, the banda estrecha element only); Whitehead, 1973a:132, fig.51a, 52a (maxilla) (Trinidad, French Guiana, but not batch b, which was true *A. hepsetus*); Cequea & Pérez, 1974:4 *et seq.*, figs 1-6 (electrophoretograms) (separation from *A. hepsetus* on proteins, Venezuela); Cervigón, 1980:226, fig. 2.768 (photo, as banda estrecha); *Anchoa hepsetus colonensis* Hildebrand, 1943:60, fig.22 (Colon and Porto Bello, Panama); FWNA, 1964:197, fig.41 (separation from *A. hepsetus hepsetus*); Pérez *et al.*, 1975:228 *et seq.*, figs 1-4 (electrophoretograms), tab.1 (analysis of proteins, relationships Venezuela).

FAO Names: En - Narrow-striped anchovy.



Diagnostic Features : Body somewhat compressed, elongate, its depth about 5 times in standard length. Snout pointed, about 3/4 eye diameter; maxilla long, tip pointed, reaching to hind margin of pre-operculum; lower gillrakers 19 to 22; gill cover canals of panamensis-type. Anal fin short, with iii 17 to 21 finrays. Anus nearer to anal fin origin than to pectoral fin tips. A narrow silver stripe along flank, about width of pupil. Very closely resembles A. hepsetus, which has a broader silver stripe (about 3/4 eye diameter). Other Atlantic Anchoa species that overlap in both gillraker and anal finray counts are: A. marinii (Brazil; gillrakers and anal finrays at upper limit of range and beyond), A. michilli (gillrakers not less than 21, branched anal finrays not less than 20, also anus nearer to pectoral fin tips than to anal fin origin), A. lamprotaenia (anus also advanced; also the walkeri-type gill cover canals); A. lyolepis and A. filifera have a long pseudobranch.

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

Habitat and Biology : Marine, pelagic, coastal, forming dense schools, often in shallow water close to shore. Other aspects of its biology probably similar to those of A. hepsetus.

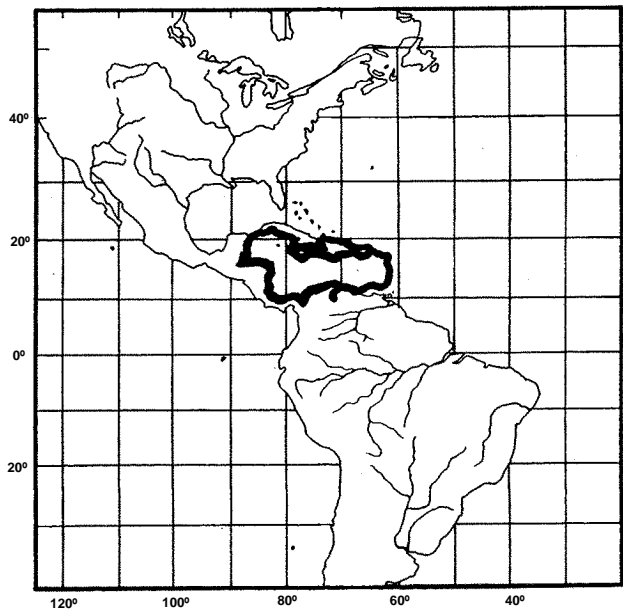
Size : To 10.2 cm standard length (thus a smaller species than A. hepsetus).

Interest to Fisheries : Unknown.

Local Names : CUBA: Manjda.

Literature : Not separated from A. hepsetus until recently, but reference to Caribbean 'hepsetus' may refer to A. colonensis.

Remarks : See under A. hepsetus for further separation from that species.



Anchoa compressa (Girard, 1858)

ENGR Ancho 17

Engraulis compressus Girard, 1858, Fishes.U.S.Senate Misc.Doc., (78)(4):336 (San Diego, California).

Synonyms : Stolephorus compressus:Eigenmann, 1893:140, pl.10, figs 1-5 (San Diego, California); Jordan & Evermann, 1896:447; Anchoviella compressa:Jordan & Seale, 1926:407 (San Diego; Mexico incorrect); Barnhart, 1936:16, fig.51 (southern California); Anchoa compressa-Hildebrand, 1943:39, fig.11 (San Diego and San Pedro, California); Chapman, 1944:311 et seq. (osteology); Miller & Lea, 1972:56, 57 (fig.) (compiled); Hubbs, Follett & Dempster, 1979:6 (listed); Horn & Allen, 1981:2, tab.1 (Newport Bay, California); Nelson, 1983:tab.1 (vertebrae); Eschmeyer, Herald & Hammann, 1983:74, pl.7 (California).