

Diagnostic Features : Body fairly compressed, moderately elongate, its depth about 4.5 to 5 times in standard length. Snout moderate, a little over 1/2 eye diameter; maxilla moderate, tip sharply pointed, reaching to or a little beyond hind border of pre-operculum; lower gillrakers 23 to 30 (usually 25 to 27); gill cover canals of walkerj-type. Anal fin fairly short, with iii 17 to 22 finrays, its origin before midpoint of dorsal fin base. Anus nearer to pelvic fin tips than to anal fin origin. A narrow silver stripe along flank, about pupil diameter, barely apparent in preserved material. Most closely resembles A. januaria, which may not occur to the north of Brazil and has the anal origin below the midpoint of dorsal fin base also A. cubana (maxilla longer, reaching to sub-operculum, the tip more acutely pointed and projecting more than 1/2 eye diameter beyond second supra-maxilla). Other Atlantic Anchoa species that overlap in both gillraker and anal finray counts are: A. hepsetus and A. tricolor (anus nearer to anal fin origin), A. lyolepis, A. marinii, A. filifera (pseudobranchs equal to eye or longer) and A. mitchilli and A. choerostoma (to north of area). See ENGR Ancho 4, Fishing Area 31.

Geographical Distribution : Western central Atlantic (Cuba and Jamaica to at least Puerto Rico, if not throughout Lesser Antilles; Yucatan to Colombia, Venezuela and Trinidad, but apparently not to the south of this).

Habitat and Biology : Marine, pelagic, coastal, schooling; enters saline lagoons and, if identified properly, then also in fresh water (e.g., the middle and upper flights of the Gatun Locks, Canal Zone vide FWNA, 1964:182). More data needed, based on correct identifications.

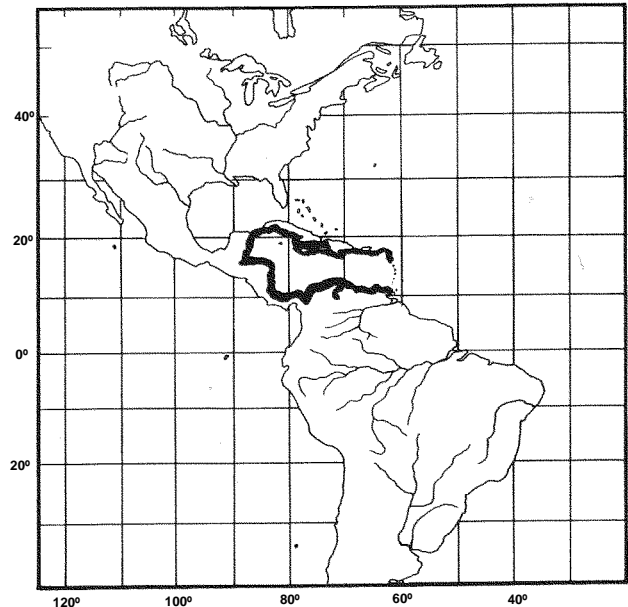
Size : To 6 cm standard length, usually 4 to 5 cm.

Interest to Fisheries : Probably slight.

Local Names : CUBA: Manjuá.

Literature :

Remarks : This species seems to replace A. mitchilli in the Caribbean, and itself to be replaced by A. januaria to the south of Trinidad. All three have the anus advanced and overlap in fairly similar gillraker and anal finray counts; the very similar A. cubana (anus also advanced) virtually spans the ranges of all three species.



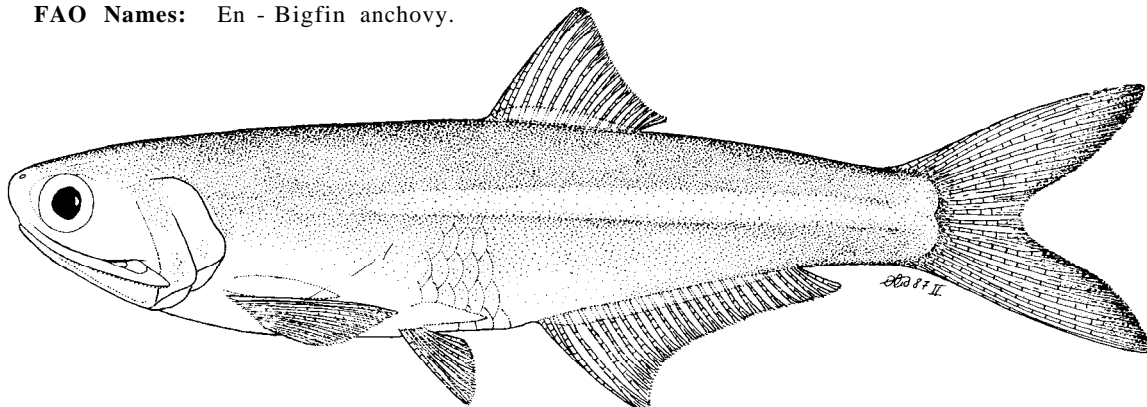
Anchoa pectoralis Hildebrand, 1943

ENGR Ancho 16

Anchoa Pectoralis Hildebrand, 1943, Bull.Bingham oceanogr.Coll., 8(2):52, fig.18 (Vigia, Brazil).

Synonyms : Anchoa ubatubae Hildebrand & Carvalho, 1948:290, fig.2 (Ubatuba, São Paulo State, Brazil); Menezes, 1974:216 (types of ubatubae); Carvalho, 1950a:54, pl.1, fig.2 (compiled); Anchoa pectoralis:Fowler, 1948:18 (compiled); Campos, 1948:55, pl.1, fig.3 (compiled).

FAO Names: En - Bigfin anchovy.



Diagnostic Features : Body fairly strongly compressed, moderately slender, its depth a little over 4 times in standard length. Snout short, about 1/2 eye diameter; maxilla shorter than in most other *Anchoa* species, tip pointed, not reaching beyond hind margin of pre-operculum; lower gillrakers 17 to 20 (rarely 21); gill cover canals of *walkeri*-type. Pectoral fins large, with i 14 to 16 finrays, reaching or almost reaching to pelvic fin origin; anal fin fairly long, with iii 22 to 25 finrays, its origin below or just before midpoint of dorsal fin base. 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; snout pointed), *A. lamprotaenia* (branched anal finrays 18 to 23), *A. cayorum* (Caribbean area) and *A. belizensis* (Caribbean area). From these four species *A. pectoralis* is distinguished by its short snout and large pectoral fins (rarely to i 14 in *A. lamprotaenia*).

Geographical Distribution : Brazil (mouth of Para River southward to about 25°S off Cananéia).

Habitat and Biology : Marine, pelagic, presumably schooling; along beaches and down to 22 m; a single specimen from Coqueiros at the mouth of the Paraguacu River, thus able to tolerate lowered salinities. More data needed.

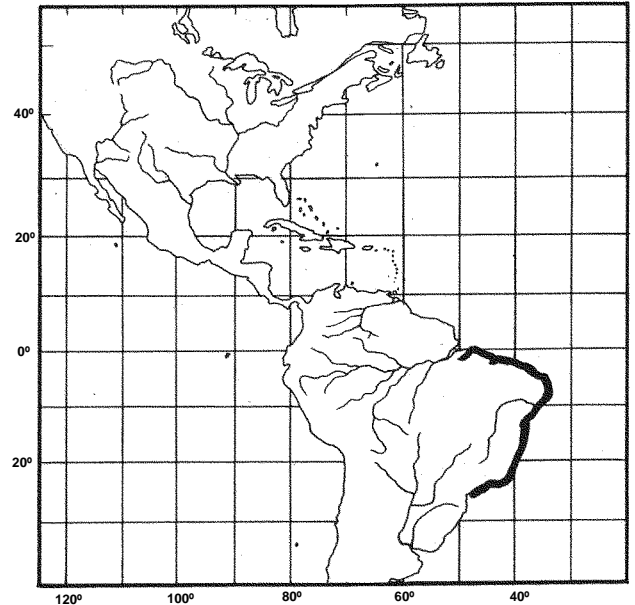
Size : To 6.8 cm standard length.

Interest to Fisheries : Unknown, probably none.

Local Names :

Literature :

Remarks : In describing *A. ubatubae*, Hildebrand seems to have forgotten his own *A. pectoralis* described five years earlier, or he would have attempted to distinguish the two - and failed!



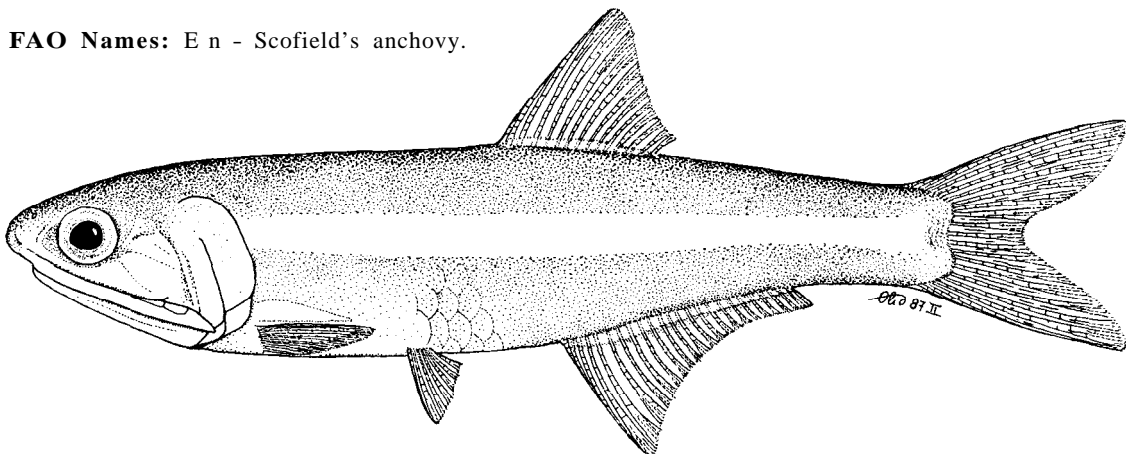
Anchoa scofieldi (Jordan & Culver, 1895)

ENGR Ancho 23

Stolephorus scofieldi Jordan & Culver, in Jordan, 1895, *Proc. Calif. Acad. Sci.*, (2)5:410 (Mazatlan, Mexico); *Idem*, in Jordan & Evermann, 1898, *Bull. U.S. Natn. Mus.*, (47)(3):2814 (repeat).

Synonyms : *Anchoa scofieldi*: Hildebrand, 1943:49, fig.16 (Mazatlan, Mexico and La Plata Island, Ecuador; misspelt); *Anchoa scofieldi*-Nelson, 1983:tab.1 (vertebrae).

FAO Names: E n - Scofield's anchovy.



Diagnostic Features : Body moderately elongate, strongly compressed, its depth about 4.5 times in standard length. Snout moderate, about 3/4 eye diameter; maxilla moderate, tip pointed, reaching onto inter-operculum, but not to edge of gill cover; lower gillrakers only 12 to 14; gill cover canals of *panamensis*-type. Anal fin moderate, with iii 21 to 25 finrays, its origin under or just before midpoint of dorsal fin base. A broad silver stripe along flank, about width of eye. Pacific *Anchoa* species that overlap in gillraker counts are: *A. spinifer* (branched anal finrays 28 to 34) and *A. eigenmannia* (branched anal finrays rarely 24, usually 25 or more, also anal fin origin well before midpoint of dorsal fin base and vertebrae 41 to 43, cf. 42 to 44).

Geographical Distribution : Eastern central Pacific (Mazatlan, Mexico; a single Ecuador specimen from La Plata Island reported by Hildebrand (1943:50), with no records between, but this should be treated with caution).

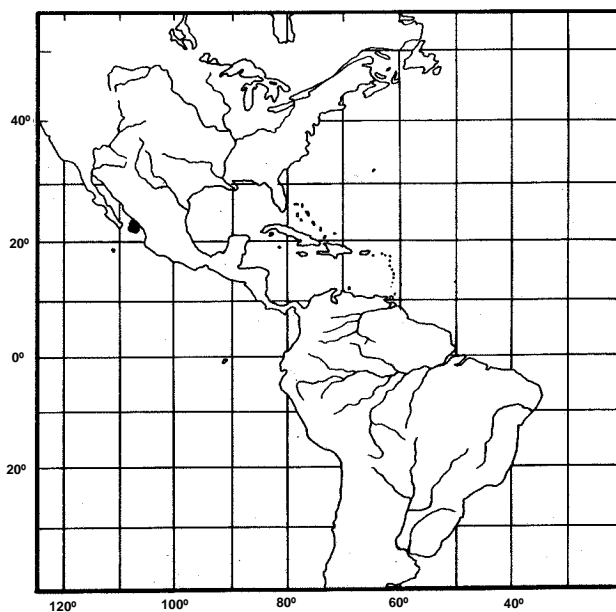
Habitat and Biology : Marine, pelagic, coastal. More data needed.

Size : To about 6.2 cm standard length, or 8.0 cm total length (Hildebrand, 1943:50).

Interest to Fisheries : No data.

Local Names : MEXICO: Anchoa.

Literature :



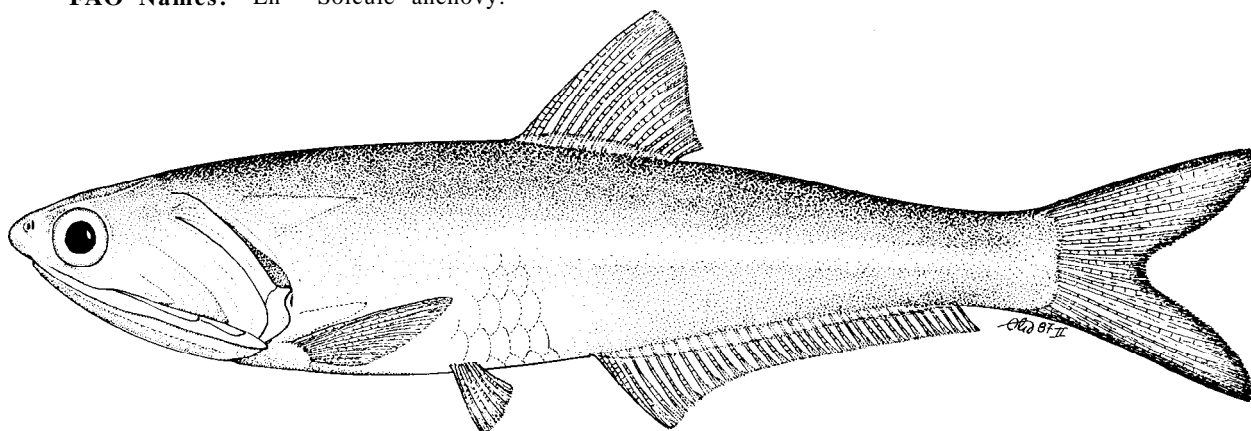
Anchoa spinifer (Valenciennes, 1848)

ENGR Ancho 5

Engraulis spinifer Valenciennes, 1848 (Sept.), *Hist.nat.pois.*, 21:39 (Cayenne).

Synonyms : *Engraulis thrissoides* Müller & Troschel, 1849 (March):639 (Cuyuni River, Guyana); ? *Anchoa panamensis*:Chirchigno, 1963:17, fig.9 (Puerto Pizarro, etc., northern Peru - see **Remarks**); *Anchovia spinifera* Gilbert & Starks, 1904:45, pl.8, fig.15 (Panama Bay; misspelling or unjustified emendation of *spinifer*); Meek & Hildebrand, 1923:207 (compiled); *Anchoviella spinifera*:Jordan & Seale, 1926:409 (Panama; Cachoeira, Brazil); Jordan, Evermann & Clark, 1930:5 (range); *Anchoa spinifera*:Fowler, 1948:18, fig.8 (compiled); Carvalho, 1950a:52, pl.1, fig.1 (compiled); Figueiredo & Menezes, 1978:31, fig. 40 (Panama to Santos, São Paulo, Brazil - compiled); *Anchoa argenteus* Schultz, 1949:45, fig.5 (Lake Maracaibo, Venezuela); FWNA, 1964:169, fig.28 (argenteus-type only); Cervigón, 1969:213, fig.4 (Lake Maracaibo); *Stolephorus spinifer*:Eigenmann, 1912:449 (Guyana); *Anchoviella (Stolephorus) spinifer*:Lowe (McConnell), 1962:693 (Guyana); *Anchoa spinifer*-Hildebrand, 1943:38, fig.10 (Panama, both coasts, also Brazil); Peterson, 1956:160 (Gulf of Nicoya, Costa Rica); FWNA, 1964:169, fig.28 (synopsis); Cervigón, 1966:143, fig.58 (mouth of Orinoco River); Whitehead, 1967a:129, fig.11 (gill cover) (lectotype of *spinifer*); Cervigón, 1969:210, fig.3 (Panama, Venezuela, Guianas, Ceará, Rio de Janeiro); Roux, 1973:52, fig.7 (just south of Rio de Janeiro); Whitehead, 1973:114, fig.42 (Guyana, Surinam); Palacio, 1974:22 (Punta Espada, Colombia); Chirichigno, 1976:6, 56 (northern Peru at 3°34'S); Cervigón, 1980:224, fig.2.75B (Surinam, photo, biol.); *Idem*, 1982:214 (Orinoco); Whitehead & Bauchot, 1986:33 (lectotype of *spinifer*).

FAO Names: En - Soicule anchovy.



Diagnostic Features : Body strongly compressed, fairly deep, its depth about 3 to 4 times in standard length. Snout about 3/4 eye diameter; maxilla long, tip pointed, reaching to or a little beyond edge of gill cover; tower gillrakers 12 to 19, the anterior gillrakers mere stumps; hind border of gill cover with a small triangular projection (on sub-operculum); gill cover canals of panamensis-type. Pectoral fins long, reaching beyond pelvic fin base; anal fin long, with iii 31 to 37 finrays, its origin below midpoint of dorsal fin base. A silver stripe along flank in small individuals, disappearing with age. The very long anal fin, compressed body and small triangular projection on the gill cover distinguish this species from all other Atlantic or Pacific Anchoa species. Lycengraulis species have canine-like teeth; Pterengraulis atherinoides has the anal fin origin below the dorsal fin origin, or a little in front. See ENGR Ancho 5, Fishing Area 31.

Geographical Distribution : Western central and South Atlantic (Panama to Trinidad and south to at least Santos, Brazil, perhaps further) and eastern central Pacific (Costa Rica south to northern border of Peru at 3°34'S, perhaps further. See Remarks).

Habitat and Biology : Marine, pelagic, coastal, apparently forming quite large schools; trawled down to 40 m, but usually in shallower water and entering river mouths, with one record from about 16 km up the Suriname River (Whitehead, 1973a:116, batch c') and apparently common in brackish and fresh water in the Orinoco delta at Tucupita (Cervigón, 1982:214), also abundant in the fresh water Pedro Miguel Lock, Panama (FWNA, 1964:168); not taken by beach seine in Costa Rica (Peterson, 1956:160). Feeds on small fishes, including clupeoids, and on prawns. Peterson (1956:161) suspected an extended spawning season in Costa Rica (small fishes caught in February, September and October). More data needed.

Size : To 18.6 cm standard length, usually about 14 or 15 cm.

Interest to Fisheries : Reported abundant in several areas and evidently contributes to artisanal fisheries, especially at river mouths.

Local Names :

Literature : Cervigón (1966 - food, ecology).

Remarks : Cervigón (1966:212) noted the rather patchy occurrence of A. spinifer along Venezuelan coasts and the same is perhaps true off Brazil. He also showed slight differences in gillraker, anal finray and vertebral counts between his A. spinifer and the Lake Maracaibo A. argenteus; since the two overlap in Lake Maracaibo and especially in view of the difference in vertebrae (spinifer 42 to 44; argenteus 41), Cervigón may have been correct to keep them distinct species.

Anchoa spinifer is the only anchovy species known from both the Atlantic and Pacific coasts of the Americas. Pacific specimens seem to be more slender and to have slightly more gillrakers, but more material should be studied.

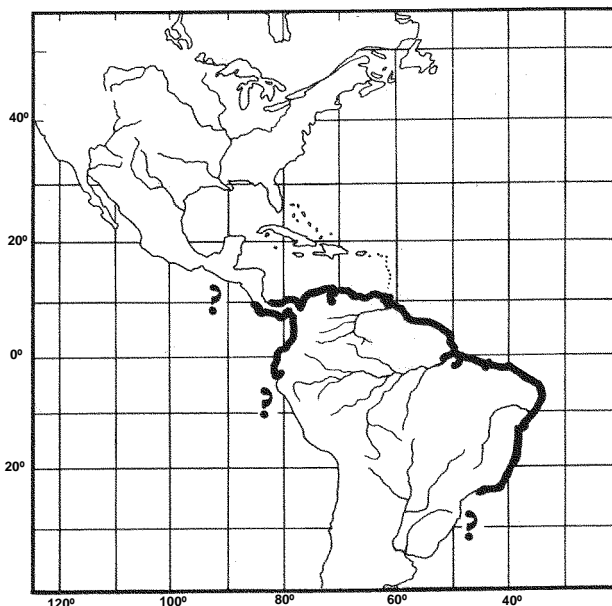
The southward extension of range from Panama Bay is not well documented. Chirichigno (1976:58) recorded 3 specimens from off Caleta La Cruz, Peru (3°40'S) and distinguished it from A. panamensis; perhaps her earlier record of A. panamensis (Chirichigno, 1963:17, fig.9) from northern Peru was actually A. spinifer. The possible occurrence of the rather similar A. walkeri to the south of Panama cannot be excluded, however, especially as Chirichigno's photograph (fig.9) shows the anal fin origin below the dorsal fin origin (below about midpoint of dorsal fin base in A. spinifer).

Anchoa starksi (Gilbert & Pierson, 1898)

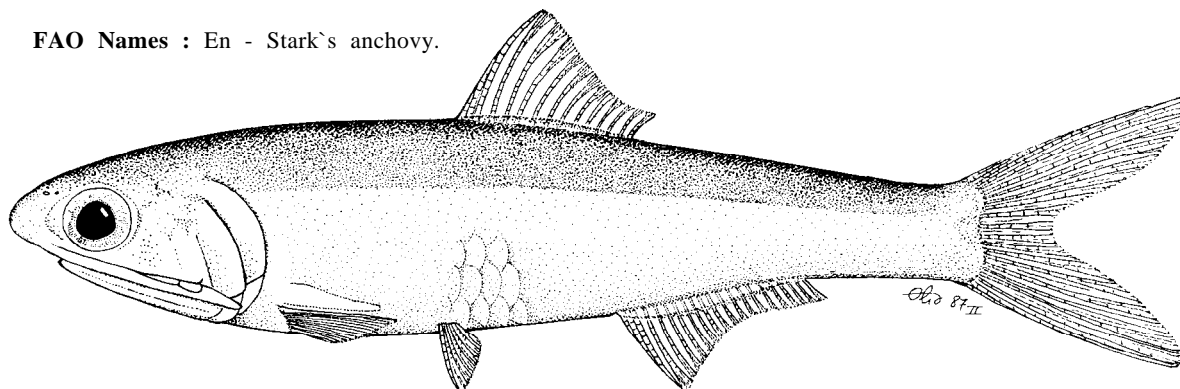
ENGR Ancho 26

Stolephorus starksi Gilbert & Pierson, in Jordan & Evermann, 1898, Bull.U.S.natn.Mus., (47)(3):2813 (Panama Bay).

Synonyms : Engraulis clarki Hildebrand, 1943:19, fig.5 (Balboa, Gulf of Panama); Anchoa ischana:Meek & Hildebrand, 1923:203, p.13, fig.2(Panama); Anchovia starksi:Gilbert & Starks, 1904:43 (Panama); Anchoa starksi-Hildebrand, 1943:72, fig.29 (El Salvador, Panama and one from the Rio Dagua, Colombia); Peterson, 1956:166, fig.7 (gillrakers) (Costa Rica, also Ecuador); ? Cobo & Massay, 1969:8, fig.9 (Ecuador, listed); ? Chirichigno, 1976:6, 58 (Zorritos, Gulf of Guayaquil, Peru at 3°40'S); Nelson, 1983:tab.1 (vertebrae); Idem., 1986:891 (types, clarki a synonym).



FAO Names : En - Stark's anchovy.



Diagnostic Features : Body moderately deep, more so in larger fishes, its depth 4 to 5 times in standard length. Snout moderate, about 3/4 eye diameter; maxilla quite long, tip pointed, reaching almost to edge of gill cover; lower gillrakers 22 to 27 (increasing in larger fishes); pseudobranch long, extending onto inner face of operculum; gill cover canals of panamensis-type. Anal fin rather short, with iii 16 to 22 finrays, its origin under posterior third of dorsal fin base. A broad silver stripe along flank, lost in larger fishes. Pacific Anchoa species that overlap in both gillraker and anal finray counts are: A. ischana (gillrakers not more than 22), A. curta and A. delicatissima (branched anal finrays not less than 19 or 20, and walkeri-type canals, as also in A. exigua, which like all the previous species has a short pseudobranch, not more than eye diameter); Anchoa nasus has a long pseudobranch, but anal fin origin under or behind base of last dorsal finray.

Geographical Distribution : Eastern central Pacific (El Salvador to Panama, perhaps also south to Ecuador and northern Peru).

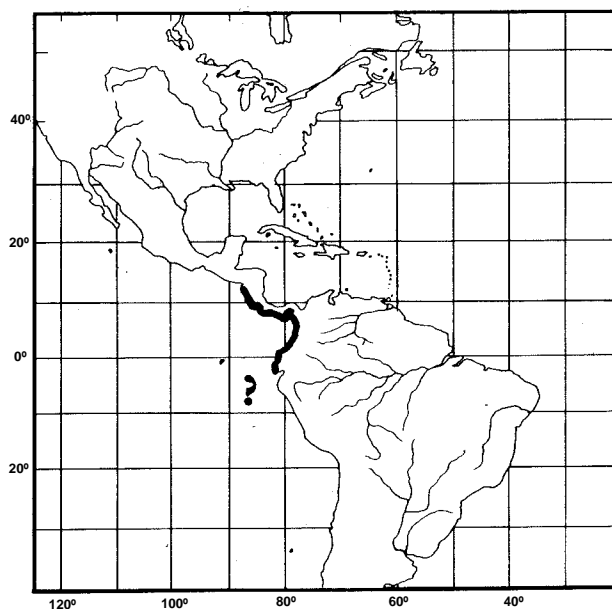
Habitat and Biology : Marine, pelagic, coastal, apparently tolerating lowered salinities since confined to inner parts of Gulf of Nicoya, Costa Rica (Peterson, 1956).

Size : To 7.7 cm standard length.

Interest to Fisheries : No data.

Local Names : COLOMBIA: Carnada, Mejúa; COSTA RICA: Anchoa; ECUADOR: Carnada azul, Carnada Verde; EL SALVADOR, PERU: Anchoa.

Literature :



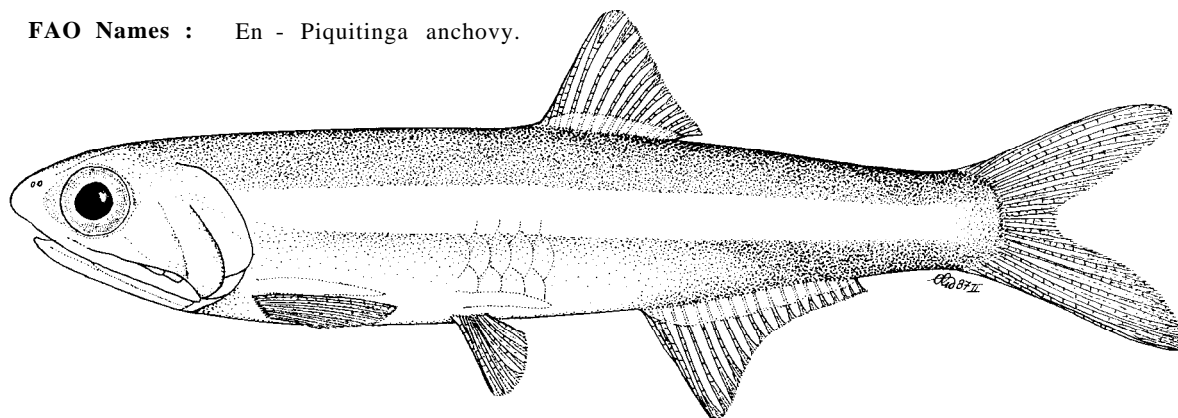
Anchoa tricolor (Agassiz, 1829)

ENGR Ancho 10

Engraulis tricolor Agassiz, in Spix & Agassiz, 1829, Select gen.spec.pisc.Bras., 51, pl.23, fig.1 (Bahia, Brazil).

Synonyms : Engraulis lemniscatus Cuvier, 1829 (March):323 (on Spix drawing; nomen oblitum); Engraulis piquitinga Spix, in Spix & Agassiz, 1829 (May):p1.23, fig.1 (published as a synonym by Agassiz, thus a nomen nudum); Anchoviella salvatoris Fowler & Bean, 1923:6 (Rio de Janeiro); Anchoviella banaiensis Marini, 1935:446 (Mar del Plata, Argentina; nomen nudum); Anchoa tricolor-Carvalho, 1950a:58, pl.1, fig.5 (compiled); Hildebrand, 1943:74, fig.30 (Natal, Brazil to Mar del Plata, A-a); Hildebrand & Carvalho, 1948:286 (Rio de Janeiro); FWNA, 1964:186, fig.36 (synopsis); Whitehead, 1967a:131 (lemniscatus a synonym); Cervigón, 1969:227, figs 10, 22 (maxilla) (Brazil; not in Venezuela); Whitehead & Myers, 1971:487, 495, 496 (authorship of tricolor and lemniscatus, dating); Eskinazi, 1972:291, tab.1 (Santa Cruz canal, Pernambuco, Brazil); Figueiredo & Menezes, 1978:32, fig. 43 (Ceará to Argentina, compiled); Kottelat, 1984:146 (tricolor, types in Neuchâtel); Whitehead & Bauchot, 1986:48 (status of lemniscatus).

FAO Names : En - Piquitinga anchovy.



Diagnostic Features : Body somewhat compressed, elongate, its depth about 5 times in standard length. Snout long and pointed, about 3/4 eye diameter; maxilla moderate, tip not sharply pointed, not or only just reaching to hind border of pre-operculum; lower gillrakers 23 to 28 (usually 24 to 27); gill cover canals of panamensis-type. Anal fin short, with iii 16 to 19 finrays, its origin below or behind midpoint of dorsal fin base. A broad silver stripe along flank, about 3/4 eye diameter. Anchoa species in the same area that overlap in both gillraker and anal finray counts are: A. hepsetus (maxilla sharply pointed, longer, almost to gill cover; also, gillrakers usually 24 or less), A. cubana, A. januaria and A. parva (walkeri-type canals, maxilla tip sharply pointed, anus nearer to pelvic fin tips).

Geographical Distribution : Western South Atlantic (from about Ceará, Brazil southward to Mar de Plata, Argentina).

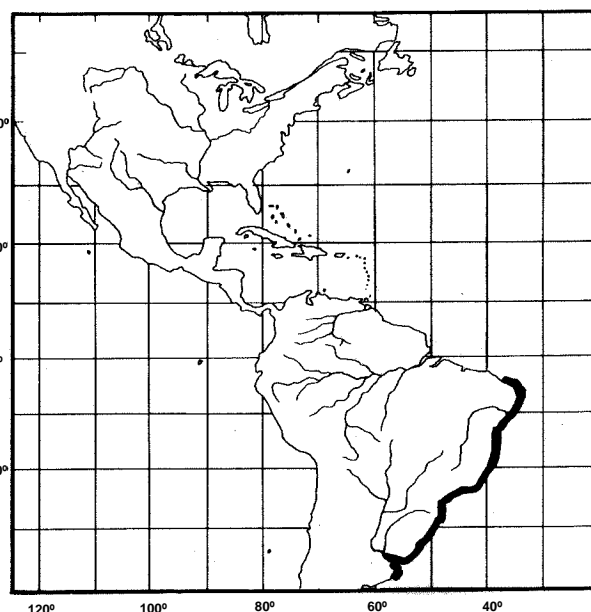
Habitat and Biology : Marine, pelagic, coastal, schooling, also entering brackish water (e.g., down to 18‰ in the Santa Cruz canal in Pernambuco, Brazil fide Eskinazi, 1972:tab.1 - but only to 29‰ cited in text, p.291). More data needed.

Size : To about 9 cm standard length, usually 6 to 7 cm.

Interest to Fisheries : Reported seen frequently in markets in Rio de Janeiro (FWNA, 1964:188) and said to be abundant off Ceará and Pernambuco, Brazil, where it is sun-dried with other anchovies (Cervigón, 1969:228).

Local Names : BRAZIL: Tungão (Pernambuco).

Literature : Cervigón (1969 - some fishery data), Eskinazi (1972 - salinity tolerance).



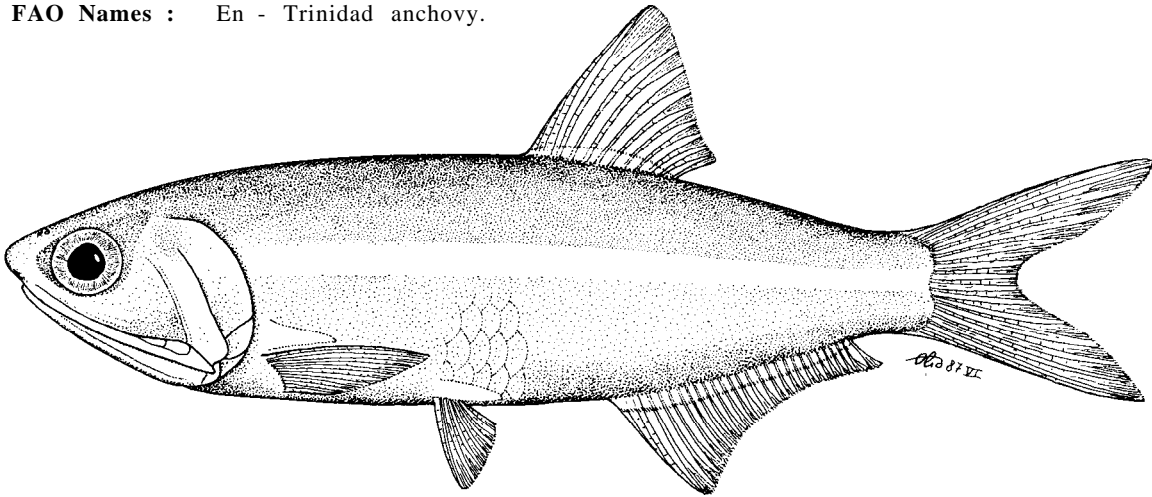
Anchoa trinitatis (Fowler, 1915)

ENGR Ancho 6

Anchoa trinitatis Fowler, 1915, Proc.Acad.nat.Sci.Philad., 527, fig.3 (Port-of-Spain, Trinidad).

Synonyms : Anchoviella trinitatis:Fowler, 1931b:392 (Vessigny, Trinidad); Anchoa trinitatis- Hildebrand, 1943:96, fig.40 (synopsis); Schultz, 1949:44 (synopsis); FWNA, 1964:171, fig.29 (Trinidad, eastern Caribbean coast of Venezuela - synopsis); Cervigón, 1966:142 (lagoons, eastern Venezuela); Idem., 1969:215, fig.5 (Gulf of Venezuela and Margarita Island); ? Dahl, 1971:163, fig.199 (Cartagena, Colombia); whitehead, 1973a:121, fig.46 (synonymy, no Guianas specimens); Perez et al., 1975:228 et seq., figs 1-4 (electrophoretograms), tab.1 (analysis of proteins, relationships, Venezuela); Cervigón, 1980:226, fig.2.76C (photo).

FAO Names : En - Trinidad anchovy.



Diagnostic Features : Body somewhat compressed and moderately deep, its depth about 4 times in standard length. Snout sharply pointed but short, less than eye diameter; maxilla long, tip pointed, reaching almost to gill opening; lower gillrakers 18 to 22; gill cover canals of *panamensis*-type. Anal fin moderate, with iii 23 to 27 finrays, its origin below or just before midpoint of dorsal fin base. A silver stripe along flank, less than eye diameter. Atlantic *Anchoa* species that overlap in both gillraker and anal finray counts are: *A. belizensis* (fresh water, Belize, Honduras), *A. pectoralis* (Brazil), *A. lamprotaenia* (branched anal finrays 18 to 23, gill cover canals of *walkeri*-type), *A. cayorum* (*walkeri* canals) and *A. mitchilli* (gillrakers 21 to 25, not south of Yucatan). See ENGR Ancho 6, Fishing Area 31.

Geographical Distribution : Caribbean area (Trinidad and westward to Margarita Island and the Gulf of Venezuela, in lagoons; if Dahl (1971) is correct, then westward to Cartagena, Colombia).

Habitat and Biology : Marine, coastal, in shallow water (to 2 m), sometimes in large schools; also in mangrove-lined lagoons in turbid water; on the southern coast of Margarita Island they appear mainly in February to May at 5 to 7 cm standard length, while larger individuals occur throughout the year in the interior of lagoons (Cervigón, 1969:216-7). More data needed on food and breeding.

Size : To 11.5 cm standard length.

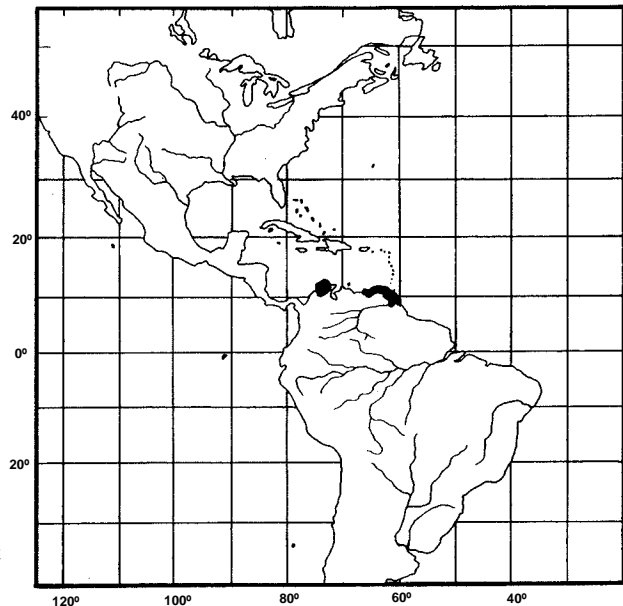
Interest to Fisheries : Unknown, but presumably contributes to clupeoid catches since often abundant.

Local Names :

Literature : Cervigón (1966, 1969 - data on habitat in Venezuela).

Remarks : Cervigón (1969) noted slightly higher anal and pectoral finray counts in his Gulf of Venezuela specimens than in those from Margarita Island (iii 25 to 30 and i 12 to 14; cf. iii 23 to 27 and i 12 to 13).

A Wagner-tree analysis of the protein data published by Perez *et al.* (1975 - haemoglobin, esterases, lactate dehydrogenase and some non-enzymatic proteins) showed that *A. trinitatis* is only distantly related to the other species of *Anchoa* tested (*A. lamprotaenia*, *A. hepsetus*, *A. colonensis*, *A. parva*).



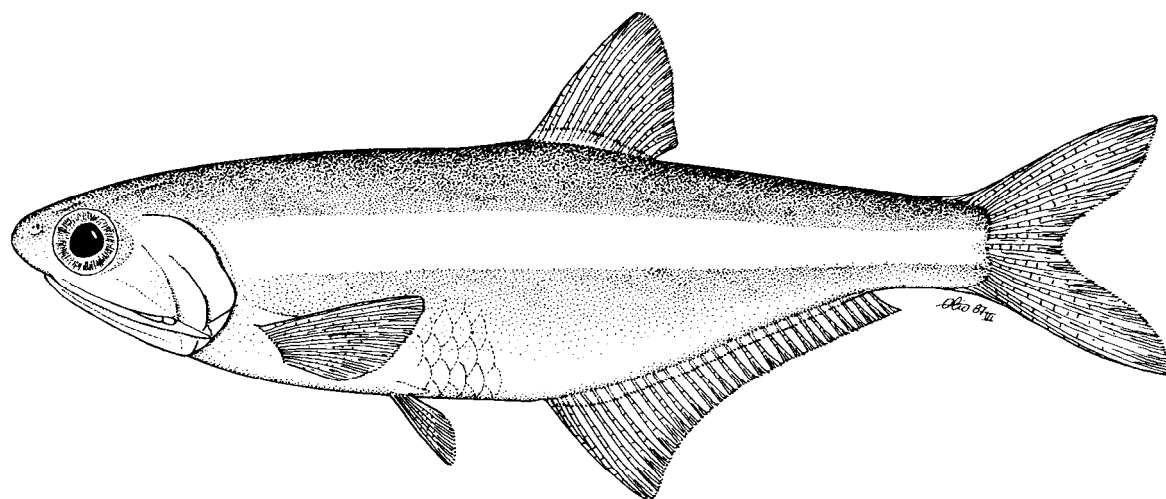
Anchoa walkeri Baldwin & Chang, 1970

ENGR Ancho 30

Anchoa walkeri Baldwin & Chang, 1970, Pacif.Sci.,24:140, figs 1,2 (maxilla) (San Blas, Nayarit, Mexico; also northern Gulf of California at San Felipe, Sonora, Sinaloa, Honduras, Costa Rica, Panama).

Synonyms : Anchoa walkeri-Nelson, 1983:52, fig.1 (gill cover canals), tab.1 (vertebrae) (3 mundeola-types this species); Nelson & Sonoda, 1987:tabs 1-3 (meristics, types).

FAO Names : En - Walker's anchovy.



Diagnostic Features : Body compressed, moderately deep, its depth about 4 times in standard length. Snout moderately pointed, about 3/4 eye diameter; maxilla long, tip sharply pointed, reaching to or just beyond gill opening, but shorter and more blunt at 4 to 5 cm standard length; lower gillrakers 17 to 22; gill cover canals of walkeri-type. Pectoral fins large, tip reaching to beyond pelvic fin base; anal fin long, with iii 23 to 32 finrays, its origin below dorsal fin origin or a little behind. Silver stripe along flank, as wide as eye in some places. Pacific Anchoa species that overlap in both gillraker and anal finray counts are: A. mundeoloides, A. mundeola and A. panamensis (maxilla tip more blunt, usually not to gill opening, and panamensis-type canals), A. spinifer (triangular projection on lower edge of gill cover and panamensis-type canals, as also in A. chamensis, which has a short and blunt maxilla), A. curta (gillrakers usually 23 or more, branched anal finrays 23 or less), and A. lucida (anal fin origin under or behind midpoint of dorsal fin base).

Geographical Distribution : Eastern central Pacific (Gulf of California at San Felipe, Baja California and along Sonora and Sinaloa coasts, Mexico, south to Honduras, Costa Rica and Panama; possibly it reaches further south. See Remarks).

Habitat and Biology : Marine, pelagic and coastal, presumably schooling; most often in warm, murky waters near shore and in bays near river mouths (no data on salinity tolerance, but specimens taken some km up the Rio Santiago, Nayarit, Mexico). Ovarian eggs elliptical.

Size : To 12 cm standard length.

Interest to Fisheries : No data.

Local Names :

Literature : Baldwin & Chan (1970 - ecology, ovarian eggs, relationships).

Remarks : Extension of the range of A. walkeri to the south of Panama is possible, but Peruvian records of 'panamensis' (Hildebrand, 1946:99 and Chirichigno, 1963: 17, Fig.9) could equally apply to A. spinifer (see Remarks under that species).

