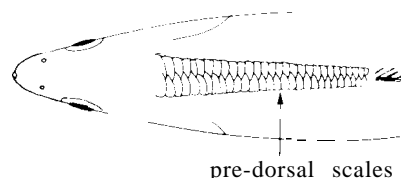


Brevoortia Gill, 1861

CLUP Brevo

Brevoortia Gill, 1861, Proc.Acad.nat.Sci.Philad.:37 (type: Brevoortia menhaden Gill = Clupea tyrannus Latrobe).

Diagnostic Features : Moderately large herring-like fishes (to 50 cm standard length, usually 25 to 35 cm). Farly deep-bodied and compressed, the belly fully keeled with scutes. Head large, especially the gill cover; mouth large, the upper jaw distinctly notched in the midline, the tip of the lower jaw fitting into this notch; no teeth in jaws in adults. Gillrakers long, fin and very numerous, increasing with size of fish, those on upper part of arch overlapping those on lower part at angle of arch. Dorsal and anal fins short, the latter beginning under or behind base of last dorsal finray; pelvic finrays i 6. Distinguished from all other shads by the modified pre-dorsal scales on either side of midline, forming a ridge; other body scales deeply overlapping and rather irregular, with the hind margin serrated or pectinate. The pre-dorsal scales and the notched upper jaw distinguish Brevoortia from all other clupeids.



Biology, Habitat and Distribution : Marine pelagic and forming large or extremely large schools, mainly in shallow coastal waters, but also down to 60 m or more. Feed by filtering small elements of plankton. Spawn in sea, eggs floating. Western Atlantic, from Nova Scotia southward to northern Argentina.

Interest to Fisheries : After Sardinops and Engraulis, often the third most exploited clupeoid genus. The total catch of Brevoortia in 1983 was 1 345 519 to fishing Areas 21, 31 and 41).

Species : Hildebrand (i.e. FWNA, 1964:345-346) recognized 7 species, but B. brevicaudata, known from only 8 specimens collected in 1874 and never recorded again, is here regarded as possibly a variant of B. tyrannus:

B. aurea (Spix & Agassiz, 1829) western Atlantic (Brazil, Argentina)

B. gunteri Hildebrand, 1948, western Atlantic (Gulf of Mexico)

B. patronus Goode, 1879, western Atlantic (Gulf of Mexico)

B. pectinata (Jenyns, 1842), western Atlantic (Brazil, Argentina)

B. smithi Hildebrand, 1941, western Atlantic (North Carolina to Florida, also eastern Gulf of Mexico)

B. tyrannus (Latrobe, 1802), western Atlantic (Nova Scotia to Florida).

Remarks : Geographically, the 6 species fall into three pairs (Atlantic, Gulf of Mexico, Brazil/Argentina); systematically, B. gunteri of the Gulf pairs with B. smithi of the Atlantic coasts (high gillraker forms, no spots on flank), while B. patronus of the Gulf pairs with the Atlantic B. tyrannus (low gillraker forms, spots along flanks).

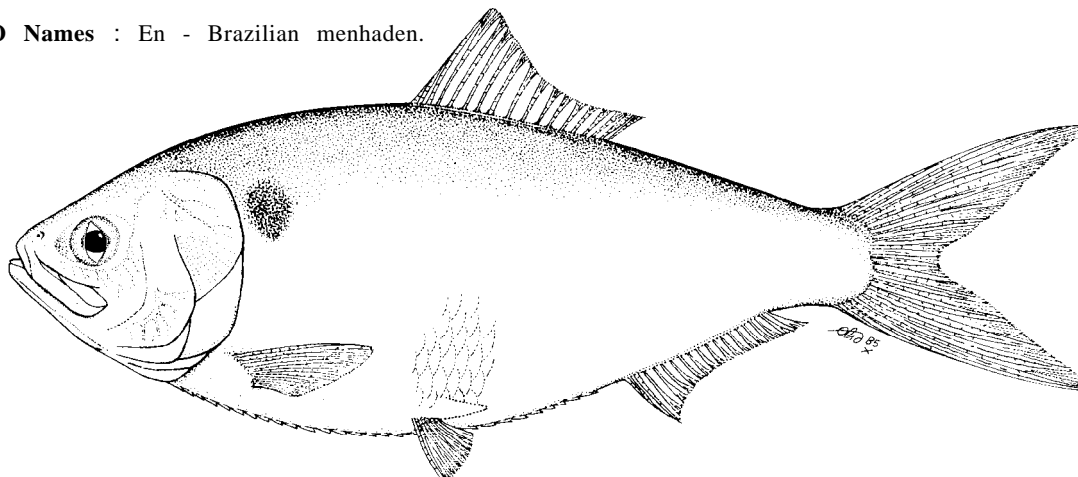
Brevoortia aurea (Spix & Agassiz, 1829)

CLUP Brevo 4

Clupanodon aureus Spix & Agassiz, 1829, Select.gen.spec.piscium Bras., 1:52, pl. 21 (Brazil) (authorship incorrectly given only to Spix by Whitehead & Myers, 1971:485 - see Kottelet, 1985).

Synonyms : Brevoortia aurea - Hildebrand, 1948:25, fig. 5 (Brazil); FWNA, 1964:346 (in key only). Figueiredo & Menezes, 1978:24 (São Paulo, Rio de Janeiro, Brazil); Menni, Ringuelet & Arámburu, 1984:107; (Argentina, on refs).

FAO Names : En - Brazilian menhaden.



Diagnostic Features : Body deep and compressed, scutes apparent along belly. Upper jaw with distinct median notch, no teeth. Pectoral fin tip short of pelvic fin base by width of 3 to 7 scales; pelvic fin with oblique and almost straight hind margin. Pre-dorsal scales modified; scales in lateral series 48 to 56, those on back and above base of anal fin not markedly smaller than rest. A black spot behind gill opening, but none along flank. Closely resembles B. pectinata, which has only 35 to 46 scales in lateral series and pectoral fin tips short of pelvic fin base by width of only 0 to 3 scales. Other Brevoortia species occur only to north of Brazil. Other clupeids lack the modified pre-dorsal scales.

Geographical Distribution : Brazil (Rio de Janeiro, São Paulo, Santa Catarina and Rio Grande do Sul), Argentina (probably to mouth of Rio de la Plata, but needs confirmation; based on Berg, 1895:20, followed by Devincenzi & Burattini, 1928:pl. 17, fig. 3 (Uruguay) and Pozzi & Bordale, 1935:155 (Argentina, name only).

Habitat and Biology : Marine, pelagic, schooling. No data on food or breeding.

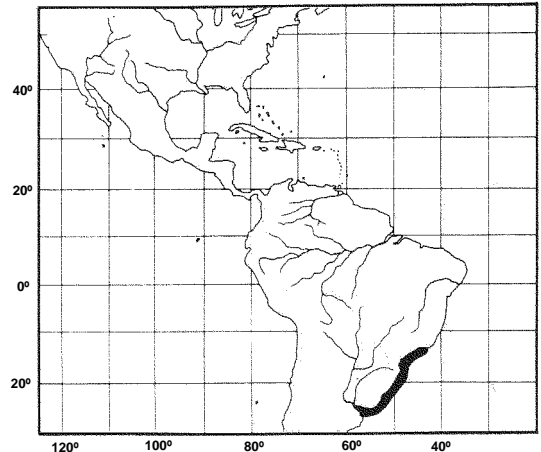
Size : To about 20 cm standard length (largest fish 26 cm in Museu de Zoologia, São Paulo).

Interest to Fisheries : Apparently not forming the enormous schools of B. tyrannus and B. patronus; catches in 1983 were 1 560 tons (Brazil).

Local Names : BRAZIL: Savelha; ARGENTINA: Lacha.

Literature : See under synonyms.

Remarks : More work is needed on this species, especially its separation from B. pectinata and relationship to the northern species.



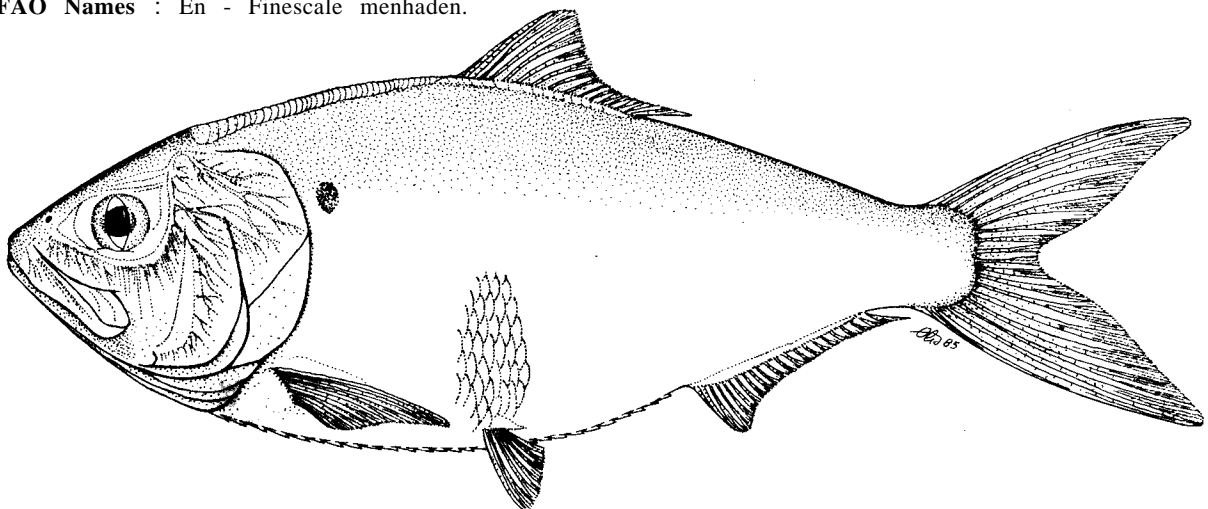
Brevoortia gunteri Hildebrand, 1948

CLUP Brevo 5

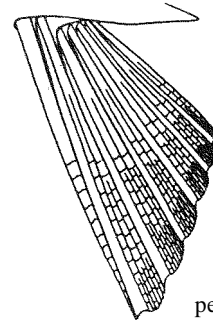
Brevoortia gunteri Hildebrand, 1948, Smithson.misc.Collns., 107(18):31, figs 7, 8 (scales), 9 (pelvic fin) (Louisiana, Texas, Gulf of Mexico).

Synonyms : Brevoortia gunteri- Suttkus, 1958:402 (Gulf of Mexico, distr.); Christmas & Gunter, 1960:339 (Gulf of Mexico, Gulf of Campeche); FWNA, 1964:376, fig. 93 (key, descr.,biol., etc.); Dahlberg, 1970:107 (key, descr., refs); Anon., 1976:68 (Mexico, south to Gulf of Campeche, key).

FAO Names : En - Finescale menhaden.



Diagnostic Features : Body deep and compressed, scutes apparent along belly. Upper jaw with distinct median notch, no teeth. Pelvic fin with oblique and almost straight hind margin, the inner finrays markedly shorter than the outer finrays when fin folded back. Pre-dorsal scales modified; scales in lateral series 60 to 77, small and numerous, those on back and above base of anal fin markedly smaller than rest. A black spot behind gill opening, but none along flank. Well distinguished from B. patronus of the Gulf of Mexico, which has fewer scales (42 to 48) and a rounded hind border to the pelvic fin (inner fin rays equal or nearly equal to outer when fin folded back). Very closely resembles B. smithi (Atlantic, also western coast of Florida), which has 30 to 32 scutes (cf. 27 to 29, infrequently 30 in B. gunteri) and the pectoral fin tip short of pelvic fin base by width of 3 to 5 scales (cf. only 1 or 2). Other clupeids lack the modified pre-dorsal scales.



pelvic fin

Geographical Distribution : Gulf of Mexico (Chandeleur Sound, Louisiana, to the Gulf of Campeche, Mexico), but no certain records from Caribbean.

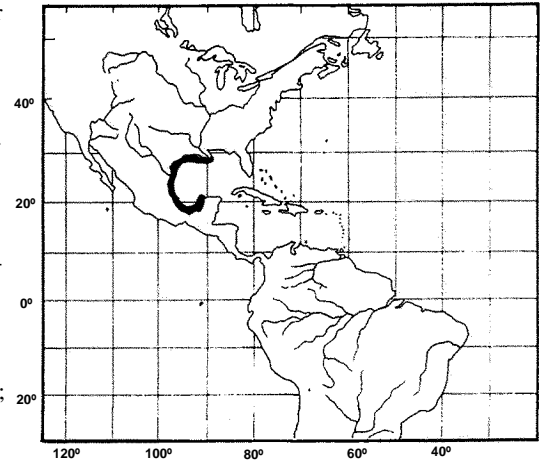
Habitat and Biology : Marine, pelagic, schooling in inshore waters, including bays (possibly euryhaline). Feeds on plankton. No data on breeding.

Size : To 26.4 cm standard length.

Interest to Fisheries : Of local importance, but not separated from B. patronus.

Local Names :-

Literature : Hildebrand (i.e. FWNA, 1964 - synopsis); Dahlberg (1970 - taxonomic and biol. data, refs).



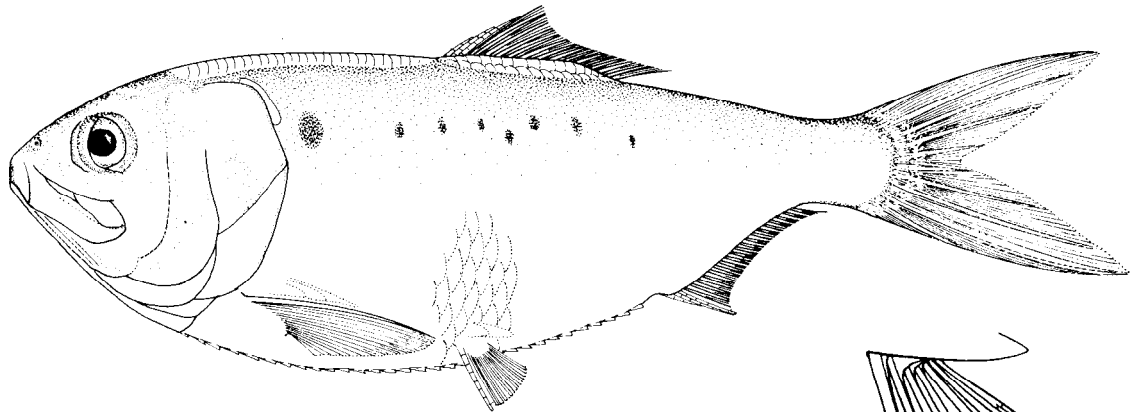
Brevoortia patronus Goode, 1878

CLUP Brevo 1

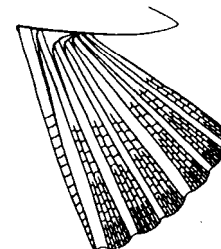
Brevoortia patronus Goode, 1878, Proc.U.S.natn.Mus.,1:39 (Brazos Santiago, Texas, but in part also "Mouth of the Rio Grande").

Synonyms : Brevoortia patronus - Hildebrand, 1948:13, fig. 3 (key, descr., biol., etc.); Suttkus, 1956:390, figs 1-20 (Louisiana, early life history Idem, 1958:402 (distr.); Christmas & Gunter, 1960:338 (distr.); Suttkus & Sundararaj, 1961:177 (reprod.); FWNA, 1964:365, fig. 91 (key, descr., biol., etc.); Dahlberg, 1970:102, fig. 2 (photo) (key, descr., refs); Swift, Verger & Parrish, 1977:21 (lower Ochlockonee River, Florida).

FAO Names : En - Gulf menhaden.



Diagnostic Features : Body fairly deep and compressed, scutes apparent along belly. Upper jaw with distinct median notch, no teeth. Pelvic fin with rounded hind margin, inner finrays equal or nearly equal to outer finrays when fin folded back. Pre-dorsal scales modified; scales in lateral series 42 to 48, large,



pelvic fin

those on back and above anal fin base only a little smaller and more irregular than rest. A black spot behind gill opening, followed by a series of spots along flank and often further spots above and below. Overlaps B. gunteri in range, but that species has more scales (60 to 77) and more pointed pelvic fins (inner rays markedly shorter than outer when fin folded back), also no line of spots on flank (the same characters separate it from B. smithi of Gulf coasts of Florida). Other clupeids lack the modified pre-dorsal scales. See CLUP Brevo 1, Fishing Area 31.

Geographical Distribution : Gulf of Mexico (Florida Bay, Gulf of Campeche, Mexico), but no certain records from Caribbean.

Habitat and Biology : Marine, pelagic, schooling, inshore in summer, but at least some moving out into deeper waters from October (Mississippi delta area), although adults have been recorded near shore in winter (Gulf coast of Florida); euryhaline, the commercial catch mostly in salinities of 5 to 24 ‰, but also in fully salt water and up to 60 ‰ in the hypersaline Laguna Madre, Texas, and down to 0.1 ‰ in Grand Lake, Louisiana. Feeds in dense schools, filtering phytoplankton, but probably also feeds at bottom (mud in stomach). Apparently breeds in winter (October to February suggested by Suttkus, 1956, based on larvae entering Lake Pontchartrain, Louisiana in December to March; a peak in January *vide* Suttkus & Sundararaj, 1961, based on gonad states off the Louisiana coast).

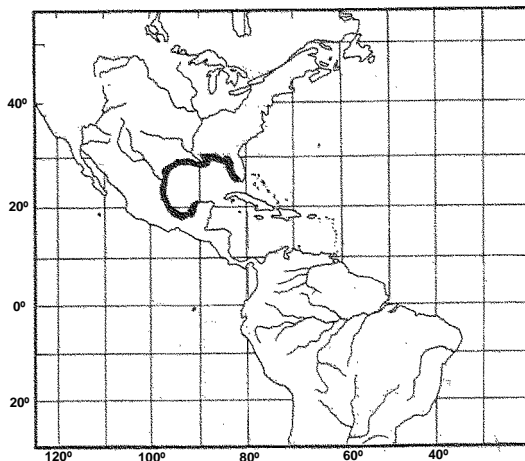
Size : 25 cm standard length, usually about 20 cm.

Interest to Fisheries : Probably contributes the major part of the Gulf of Mexico menhaden catches. The total catch in 1983 was 923 585 tons.

Local Names : USA: Largescale menhaden.

Literature : See synonymy, of which Hildebrand (i.e. FWNA, 1964) and Dahlberg (1970) are the best summaries.

Remarks : Hybrids with B. smithi were described by Dahlberg (1970 - common).



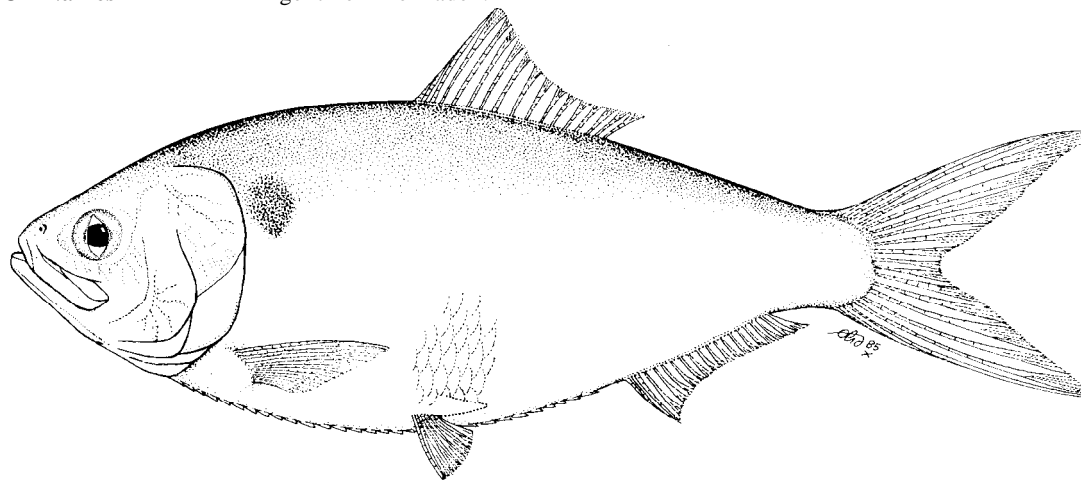
Brevoortia pectinata (Jenyns, 1842)

CLUP Brevo 6

Alosa pectinata Jenyns, 1842, Zool.voy.Beagle, fishes:135, pl. 25 (Bahia Blanca, Argentina).

Synonyms : Brevoortia pectinata - Hildebrand, 1948:21, fig. 4 (Brazil, Uruguay, Argentina); FWNA, 1964:345 (in key only); Figueiredo & Menezes, 1978:24, fig. 28 (São Paulo to Argentina, probably on refs only); Menni, Ringuelet & Arámburu, 1984 (Argentina, on refs).

FAO Names : En - Argentine menhaden.



Diagnostic Features : Body deep and compressed, scutes apparent along belly. Upper jaw with distinct median notch, no teeth. Pectoral fin tip to pelvic fin base or at most short by the width of 3 scales; pelvic fin with oblique and almost straight hind margin. Pre-dorsal scales modified; scales in lateral series 35 to 46, those on back and above base of anal fin not markedly smaller than rest. A black spot behind gill opening, but none along flank. Closely resembles B. aurea, which has more scales in lateral series (48 to 56) and pectoral fin tip short of pelvic fin base by width of 3 to 7 scales. Other Brevoortia species occur only to north of Brazil. Other clupeids lack the modified pre-dorsal scales.

Geographical Distribution : Brazil (apparently off Rio Grande do Sul, but needs confirmation), Uruguay (Uruguay River and Montevideo vide Hildebrand, 1948:24) and Argentina (Buenos Aires, Rio de la Plata vide Hildebrand, loc.cit., thus confirming Berg, 1895:18).

Habitat and Biology : Marine, pelagic, schooling, abundant in winter in La Plata region and entering rivers, but not above brackishwater (Berg, 1895). No data on food. In Lagôa dos Patos (southern Brazil) eggs were found mainly in spring and summer, in high salinity waters, but the larvae tolerate low salinities also.

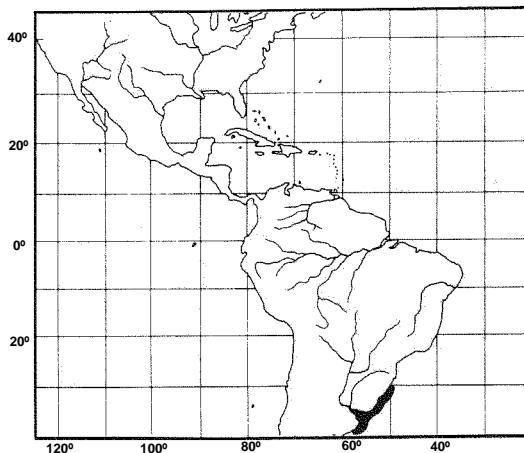
Size : To 30 cm standard length.

Interest to Fisheries : Perhaps of some local importance, but recorded catches for 1983 were only 29 tons (Uruguay).

Local Names : ARGENTINA: Lacha.

Literature : Weis & Krug (1977 - eggs and larvae in Lagôa dos Patos).

Remarks : More work needed to separate it from B. aurea and clarify if their ranges really overlap.



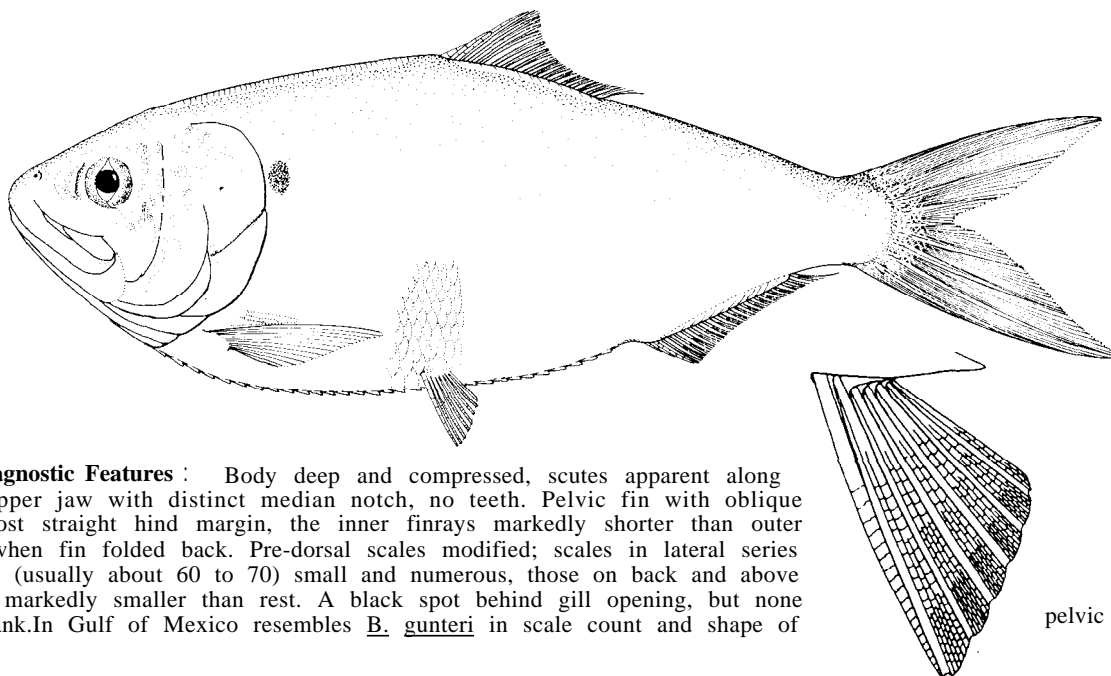
Brevoortia smithi Hildebrand, 1941

CLUP Brevo 2

Brevoortia smithi Hildebrand, 1941, Copeia, (4):224 (Beaufort, North Carolina).

Synonyms : Brevoortia smithi - Hildebrand, 1948:28, fig. 6 (key, descr.,biol., etc.); Christmas & Gunter, 1960:341 (Gulf of Mexico westward to Louisiana); Reintjes, 1962:93 (Sebastian, Florida, eggs and larvae); FWNA, 1964:372, fig. 92 (key, descr., biol., etc.); Dahlberg, 1970:104, fig. 1 (photo) (key, descr., refs).

FAO Names : En - Yellowfin menhaden.



Diagnostic Features : Body deep and compressed, scutes apparent along belly. Upper jaw with distinct median notch, no teeth. Pelvic fin with oblique and almost straight hind margin, the inner finrays markedly shorter than outer finrays when fin folded back. Pre-dorsal scales modified; scales in lateral series 54 to 80 (usually about 60 to 70) small and numerous, those on back and above anal fin markedly smaller than rest. A black spot behind gill opening, but none along flank. In Gulf of Mexico resembles B. gunteri in scale count and shape of

pelvic fin

pelvic fins, but that species has only 27 to 29, rarely 30 scutes (30 to 32 in *B. smithi*) and the pectoral fin tip short of pelvic fin base by width of 1 or 2 scales (cf. by 3 to 5 scales). Off Atlantic coasts resembles *B. tyrannus*, which has fewer scales (usually about 45 to 52) and spots along flanks (the same criteria separate it from *B. patronus* of Gulf). Other clupeids lack the modified pre-dorsal scales. See CLUP Brevo 2, Fishing Area 31.

Geographical Distribution : Atlantic coast (from Beaufort, North Carolina, to Indian River, Florida); Gulf of Mexico (Florida Bay to Louisiana, with possible break between Biscayne Bay and Florida Bay).

Habitat and Biology : Marine, pelagic, schooling (but perhaps not in northern part of range), inshore and in bays and estuaries; occurs in brackishwater. Feeds by filtering phytoplankton. Breeds in winter (eggs and larvae in plankton), probably November through to February or March (no data from Gulf of Mexico).

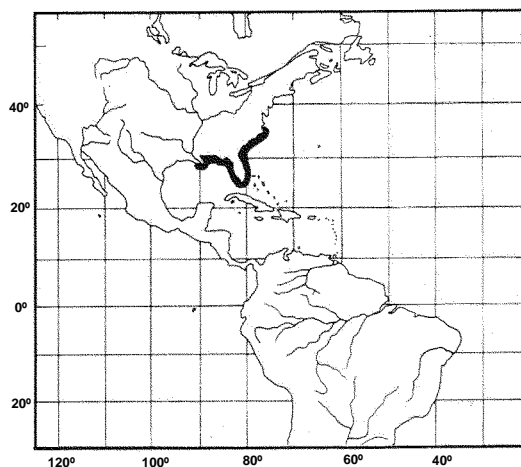
Size : To 29 cm standard length; usually about 20 cm.

Interest to Fisheries : Not of much importance. Less oily than *B. tyrannus*.

Local Names :-

Literature : Reintjes (1962 - eggs and larvae); Hildebrand (i.e. FWNA, 1964 - synopsis); Dahlberg (1970 - synopsis); Houde & Swanson (1975 - eggs and larvae).

Remarks : Hybrids with *B. tyrannus* and with *B. patronus* were described by Dahlberg (1970 - both hybrids common).



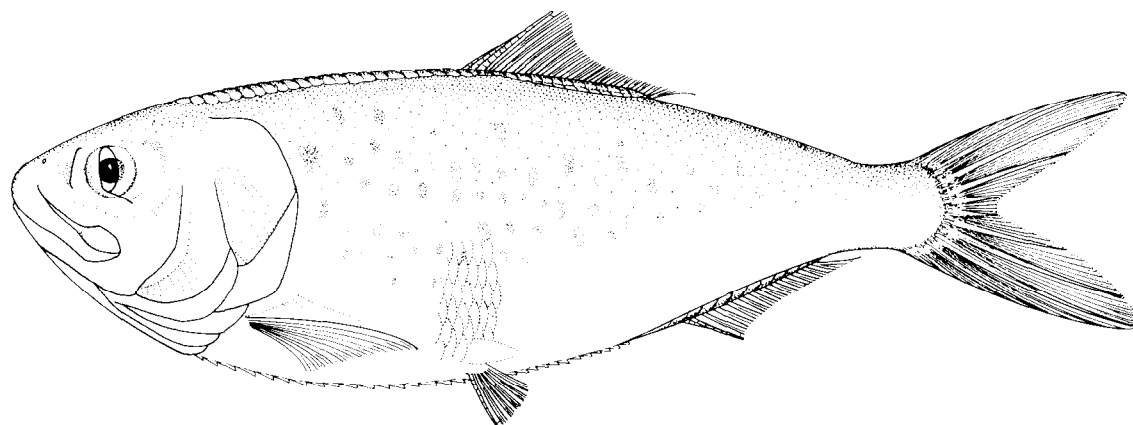
Brevoortia tyrannus (Latrobe, 1802)

CLUP Brevo 3

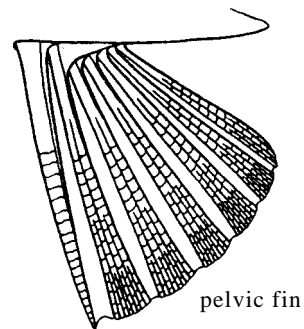
Clupea tyrannus Latrobe, 1802, Trans.Am.Phil.Soc., 5:77, pl. 1 (Chesapeake Bay; no descr., dorsal fin missing).

Synonyms : *Clupea menhaden* Mitchill, 1814:21 (presumed New York); *Clupea carolinensis* Gray, 1854:140 (South Carolina; on Ms name and description by Gronovius); Hildebrand, 1948:7, fig (key, descr., biol., etc.): FWNA, 1964:346, figs 86, 87, also 85 (scale), 88 (eggs and larvae), 89 (young) (key, descr., biol., etc.); Liem & Scott, 1966:93, fig. (Canada, infrequent); Reintjes, 1969:1, pl. (photo), fig. 1 (egg to juvenile) (synopsis of biol., fishery); Dahlberg, 1970:99, fig. 1 (photo) (key, descr., refs).

FAO Names : En - Atlantic menhaden.



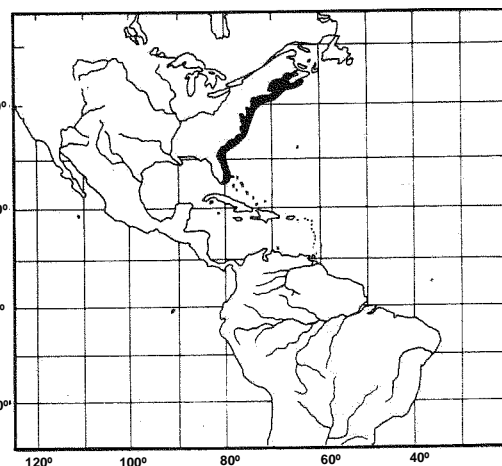
Diagnostic Features : Body deep and compressed, scutes apparent along belly. Upper jaw with distinct median notch, no teeth. Pelvic fin with rounded hind margin, inner finrays equal or nearly equal to outer finrays when fin folded back. Pre-dorsal scales modified; scales in lateral series 40 to 58 (usually about 45 to 52), those on back, above base of anal fin and at base of tail much smaller and irregularly placed. A black spot behind gill opening, followed along flank by a variable number of smaller spots forming up to 6 approximate lines. Easily distinguished from *B. smithi*, which has 54 to 80 (usually about 60 to 70) scales and no lines of spots on flank. Other *Brevoortia* species do not overlap in range. Other clupeids lack the modified pre-dorsal scales. See CLUP Brevo 3, Fishing Area 31.



Geographical Distribution : Atlantic coasts (Nova Scotia southward to Indian River, Florida).

Habitat and Biology : Marine, pelagic, schooling, inshore in summer, but at least some moving into deeper water in winter (but perhaps not in south of range); forms large and very compact schools, both of adults and juveniles (good aerial photo in Reintjes, 1969:fig. 3); north/south migrations (spring and summer *versus* autumn) occur, as also short-term migrations in and out of bays and inlets depending on tides, season and weather. Feeds by filtering phyto- and zooplankton (diatoms, copepods, euphausiids). Breeding season apparently limited by high water temperatures (20.5°C monthly mean maximum), spawning probably throughout year: spring spawners (April/May) in Cape Cod and Long Island waters, autumn spawners (October/November) from Long Island to North Carolina (plus some spawning June to August), probably winter spawners off Florida (December to March); nursery areas in estuaries.

Size : To about 38 cm standard length (reported to 50 cm total length), usually about 18 cm and 28 cm fork length in fisheries of northern and southern parts respectively.



Interest to Fisheries : The most important of the Atlantic coast menhadens, with a total catch in 1983 of 420 345 tons. Commercially caught by purse seines, but small numbers taken by other gear (pound nets, gillnets, etc.); the schools are often located from the air (see Reintjes, 1969, for good summary of fishing methods). Fishes principally used for production of oil and for fertilizer and fishmeal.

Local Names : USA: Bugfish, Bunker, Fatback, Menhaden, Mossbunker.

Literature : Extensive (see Reintjes, 1964), but well summarized by Hildebrand (i.e. FWNA, 1964) and Reintjes (1969).

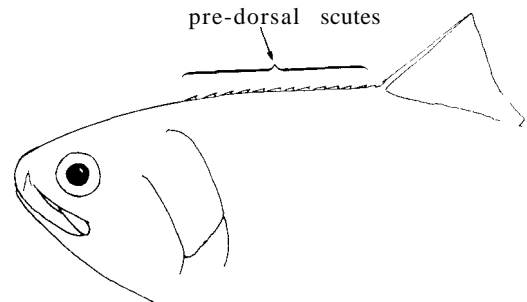
Remarks : Hybrids with *B. smithi* described by Dahlberg (1970).

Ethmidium Thompson, 1916

CLUP Ethm

Ethmidium Thompson, 1916, Proc.U.S.natn.Mus., 50:458 (type: Clupea (Alosa) notacanthoides Steindachner = Alausa maculata Valenciennes).

Diagnostic Features : Moderate-sized herring-like fishes (to about 30 cm standard length), fairly deep and compressed, with a keel of scutes along belly; a complete series of scutes also present on back, from occiput to dorsal fin. Upper jaw with a distinct median notch. Gillrakers long, fine and numerous, those of upper arch folding down over lower gillrakers at angle of first arch. Pelvic finrays i 6; anal fin short, well behind dorsal fin base. Scales adherent, hind border denticulate, about 50 to 60 in lateral series. Dark spots on flanks, usually vertically oval. Species of Sardinops have spots on the flanks, but are more slender, lack the notched upper jaw and have radiating bony striae on the operculum; Strangomera is also more slender and lacks the notch, also no spots on flank and pelvic finrays i 7.



Biology, Habitat and Distribution : See species.

Interest to Fisheries : See species.

Species : Modern authors have recognized a single species, at most considering Hildebrand's E. chilcae as a subspecies:

E. maculatum (Valenciennes, 1847), eastern South Pacific.

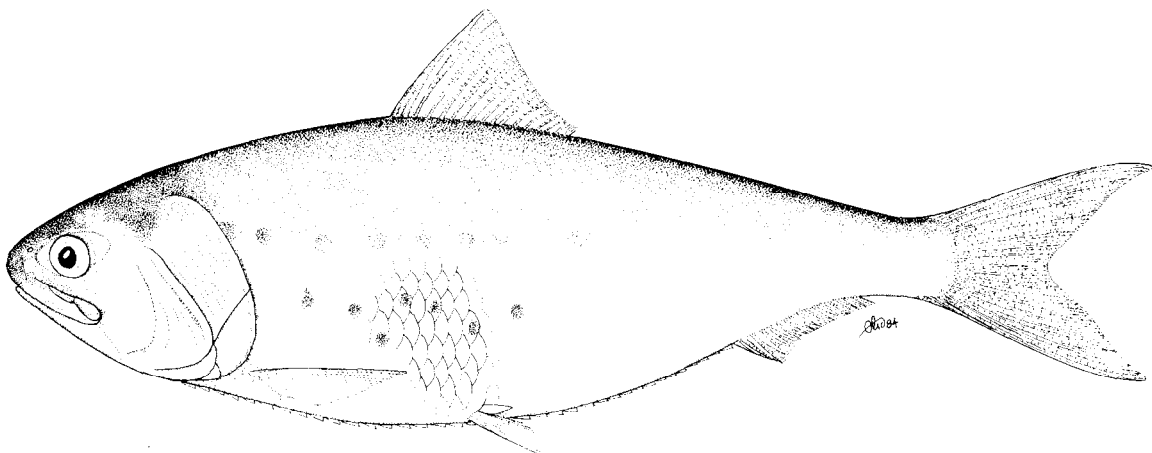
Ethmidium maculatum (Valenciennes, 1847)

CLUP Ethm 1

Alausa maculata Valenciennes, 1847, Hist.nat.poiss., 20:430 (Valparaiso, Chile).

Synonyms : ? Alausa coerulea Valenciennes, 1847:432 (Valparaiso, Chile; in part on drawing); Clupea notacanthus Günther, 1868:443 (valparaiso); Delfin, 1901:39 (on Günther); Clupea (Alosa) notacanthoides Steindachner, 1869:309, pl. 7 (Mazatlan - error); Clupea maculata: Delfin, 1901:39 (Tome, Valparaiso, Iquique); Ethmidium chilcae Hildebrand, 1946:82, fig. 17 (Chincha Island, Callao and Pisco Bay, Peru); Brevoortia (Ethmidium) maculata: De Buen, 1958:98, fig. 2 (gillrakers) (Valparaiso); Brevoortia maculata chilcae: Chirichigno, 1963:15, fig.70 (photo) (Pta Pizarro, Peru); Ethmidium maculatum - Fowler, 1945:4 (full refs); Mann, 1954:133, fig. (Arica to Talcahuano, Chile); Whitehead, 1967:88 et seq. (types of maculata, coerulea); Idem, 1970:18 (type of notacanthoides lost); Bore & Martinez, 1981:unpaged, fig. (photo) (Arica to Talcahuano, Chile); Leible & Alveal, 1982:16, figs 1-3 (same range); Whitehead & Bauchot, in press (types of maculata, coerulea, the latter lost).

FAO Names : En - Pacific menhaden.



Diagnostic Features : Body fairly deep, compressed, scutes present along back (before dorsal fin) as well as along belly. Upper jaw with median notch; no teeth. Gillrakers fine and slender, about 130 to 150 in lower limb. Pelvic finrays i 6; anal fin short, with iii 12 to 15 finrays, well behind last dorsal finray. Scales with pectinated hind border. A dark spot behind gill cover and up to 4 series of vertically oval spots along flank. Distinguished from all other clupeids in the area (*Opisthonema*, *Harengula*, *Lile* in north; *Strangomera*, *Sardinops* in south) by the notched upper jaw and pre-dorsal scutes: soots are absent in all except *Sardinops*, which is also more slender and has a striated operculum.

Geographical Distribution : Peru (Puerto Pizarro at 3°34'S in Gulf of Guayaquil to Callao and Pisco Bay; presumably to border with Chile, but no records) and Chile (whole coast south to Talcahuano at 36°40'S).

Habitat and Biology : Marine, pelagic, coastal, forming large schools. Feeds by filtering phytoplankton (diatoms, etc.) and zooplankton (especially copepods), but will also take small fishes and crustaceans (fide Leible & Alveal, 1982). Breeds in spring (Chile), depositing its eggs in coastal waters on sand, to which the sticky eggs cling, the larvae rising and joining the surface plankton on hatching.

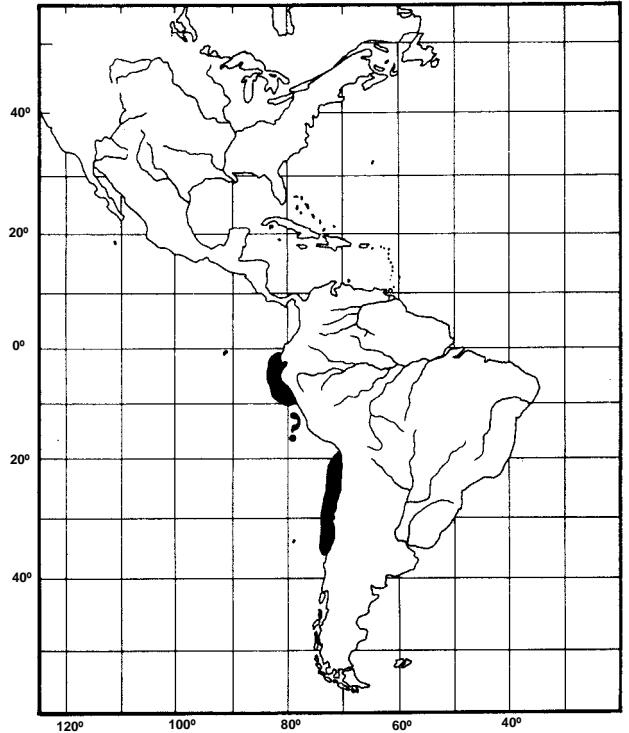
Size : To about 26 cm standard length, 35 cm total length.

Interest to Fisheries : A moderate contribution to clupeoid catches in the area, the total catch in 1983 being 6 213 tons (Peru 2 100 tons, Chile 4 113 tons). Caught by purse seines, both by commercial fleets and by artisanal fishermen. In 1978, 74.4% of the catch went for reduction, 21.8% was not processed, 2.7% was canned and 0.1% was frozen (Bore & Martinez, 1981).

Local Names :-

Literature : Leible & Alveal (1982 - synopsis).

Remarks : Authors have often recognized a Peruvian subspecies (*chilcae* of Hildebrand) as distinct from the Chilean form (*maculatum*); Mann (1954:134) stated that the geographic division between the subspecies was at Antofagasta, Chile. Because of size differences in the material studied by Hildebrand and others, Whitehead (1970:19) doubted that body depth, pectoral length and scale form could separate the subspecies, although there might be a slight difference in head length. More work is needed.



Ethmalosa Regan, 1917

CLUP Eth

Ethmalosa Regan, 1917, *Ann.Mag.nat.Hist.*, (8)19:302 (type: *Alausa dorsalis* Valenciennes = *Clupea fimbriata* Bowdih).

Diagnostic Features : Moderate-sized herring-like fishes (to 35 cm standard length), fairly deep and compressed, with a keel of scutes along the belly. Upper jaw with a distinct median notch. Gillrakers long, fine and numerous; upper gillrakers of first arch not overlapping lower gillrakers at angle of arch, the upper rakers strongly bent, V-shaped. Pelvic finrays i 7; anal fin well behind dorsal fin base. Scales adherent, hind border denticulate. Species of *Sardinella* have the upper jaw rounded, not notched, in the midline; also, the upper gillrakers are not V-shaped.

Biology, Habitat and Distribution : See species.

Interest to Fisheries : See species.

Species : A single species recognized:

E. fimbriata (Bowdich, 1825), West Africa.

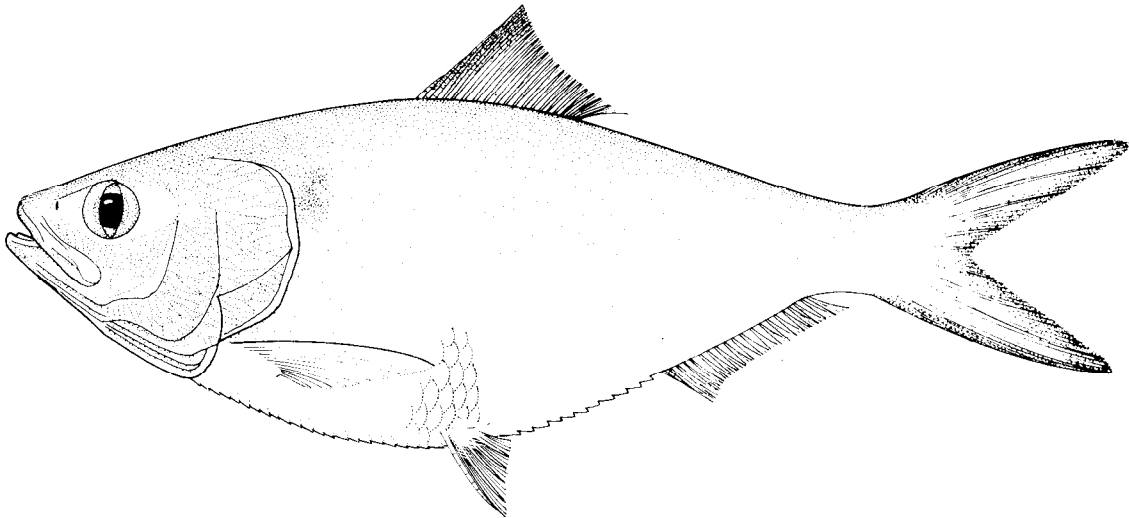
Ethmalosa fimbriata (Bowdich, 1825)

CLUP Eth 1

Clupea fimbriata Bowdich (S.), in Bowdich (T.E.), 1825, *Excurs.Madeira*:234 , fig. 44 (claimed Praia, S. Tiago, Cape Verde Islands, but most likely Gambia).

Synonyms : *Harengula forsteri* Valenciennes, 1847:299 (S. Tiago, Cape Verde Islands - probably on Bowdich); *Meletta senegalensis* Valenciennes, 1847:418 (Senegal); *Alausa dorsalis* Valenciennes, 1847:418 (Gorée, Senegal); *Alausa platycephalus* Bleeker, 1863:123 (Ghana); *Clupea setosa* Steindachner, 1870:311, pl. 6 (Liberia, Gabon); *Ethmalosa dorsalis*:Longhurst, 1971:353, 356 (West Africa, synopsis, biol. fishery); *Ethmalosa fimbriata* -Fowler, 1936:175, fig. 70 (Gambia, Congo River mouth); Whitehead, 1967:85 (types etc. of *forsteri*, *senegalensis*, *dorsalis*); *Idem*, 1970:17 (types of *setosa*); CLOFFA, 1984:42 (all refs in freshwater); CLOFETA, in press all marine and freshwater refs); Whitehead & Bauchot, in press (types etc. of *forsteri*, *senegalensis*, *dorsalis*).

FAO Names : En - Bonga shad.

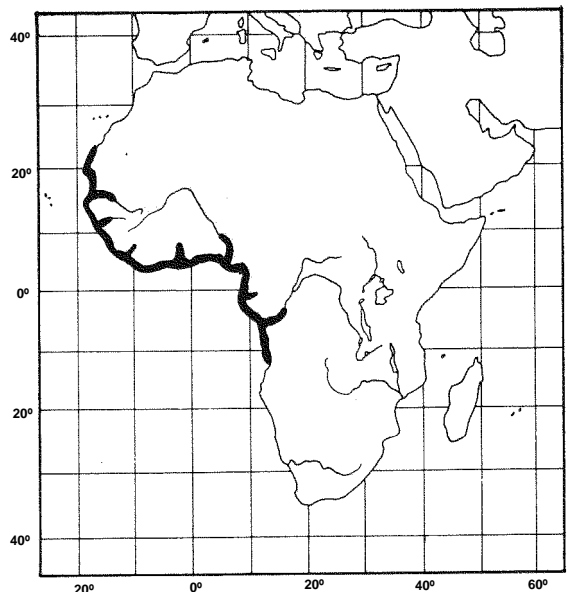


Diagnostic Features : Body fairly deep, compressed, scutes present along belly. Upper jaw with distinct median notch, into which tip of lower jaw fits. Lower gillrakers long, fine and numerous, about 3 times as long as gill filaments, upper gillrakers bent sharply upward, V-shaped. Pelvic finrays i 7; caudal fin tips long and pointed. A faint dark spot behind gill cover (sometimes followed by others); dorsal fin tip black; caudal fin deep chrome yellow; golden tints on body. Resembles *Sardinella aurita*, *S. rouxi* and especially *S. maderensis*, but these are more slender, have a rounded upper jaw (not notched) and the upper gillrakers are not bent upward like an elbow. *Alosa* species do not overlap *E. dorsalis* in the north of its range (also upper gillrakers not bent, pelvic finrays i 8). See CLUP Ethm 1, Fishing Areas 34, 47 (in part).

Geographical Distribution : Eastern central Atlantic (Dakhla, western Sahara, to at least Lobito, Angola - i.e. from 24° N to 12° S; dwarf population in Lake Nokoué, Benin). Records from Cape Verde Islands based on erroneous type locality for *E. fimbriata* by Bowdich - followed by later authors.

Habitat and Biology : Euryhaline, inshore waters, also lagoons and more than 300 km up rivers (e.g. Gambia River, where they move down during flooding, but up again during intrusion of seawater in the dry season). Feeds by filtering phytoplankton, chiefly diatoms (full analysis by Bainbridge, 1963). Breeds throughout year in waters of salinities 3.5 to 35‰, but with peaks in at least some areas (March, June/July and October/November at mouth of Gambia River - see Scheffers & Conand, 1976; July to September off Sierra Leone; November to May/June off Ivory Coast and Nigeria, i.e. progressively later to south); spawns in the sea, in estuaries and in rivers.

Size : To 35 cm standard length, usually about 20 to 25 cm.



Interest to Fisheries : The largest fisheries are in Senegal, Sierra Leone, Ivory Coast, Nigeria and Cameroun, mainly in the dry season. Total catches for 1983 were 88 121 tons (Nigeria 31 622, Sierra Leone 21 127 tons, Ivory Coast 14 618 tons). Caught by canoe fishermen using purse seines and encircling nets, also seine nets in lagoons and estuaries. Marketed fresh, also smoked and dried (the latter greatly preferred in Cameroun and perhaps elsewhere, but the Senegambian catch is mostly marketed fresh).

Local Names : WEST AFRICA: Bonga.

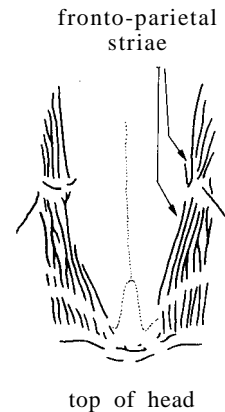
Literature : Bainbridge (1963 - food); Scheffers & Conand (1976 - Senegambian region - biol.); Whitehead (i.e. CLOFETA, in press - all refs to 1984).

Hilsa Reagan, 1917

CLUP Hils

Paralosa Regan, 1916, Ann.Durban Mus., 1(3):167 (type: Clupea durbanensis Regan = Clupea kelee Cuvier; pre-occupied by Paralosa Bleeker, 1868 = Sardinella). Hilsa Regan, 1917, Ann.Mag.nat.Hist., (8)9:303 (type: Clupea durbanensis Regan; to replace Paralosa Regan, 1916). Macrura Fowler, 1941, Bull.U.S.natn Mus., (100):626 (type: Clupea kelee Cuvier).

Diagnostic Features : Moderate-sized herring-like fishes (to 25 cm standard length, but usually to about 20 cm), fairly deep and compressed, with a keel of scutes along belly. Top of head with numerous longitudinal striae (fronto-parietal striae); upper jaw with a distinct median notch. Gillrakers fine and numerous, those on inner arches curled outward. Pelvic finrays i 7; anal fin short, well behind dorsal fin base. Scales moderate, 39 to 44 in lateral series, perforated. Resembles Tenulosa, which lacks striae on top of head, has more or less straight gillrakers on inner arches and no perforations on scales; species of Sardinella and Herklotsichthys have the upper jaw rounded, not notched, in the midline; gizzard shads (Nematalosa, etc.) have an inferior mouth and have a filamentous last dorsal finray.



Biology, Habitat and Distribution : See species.

Interest to Fisheries : See species.

Species : A single species recognized:

H. kelee (Cuvier, 1829), Indo-West Pacific.

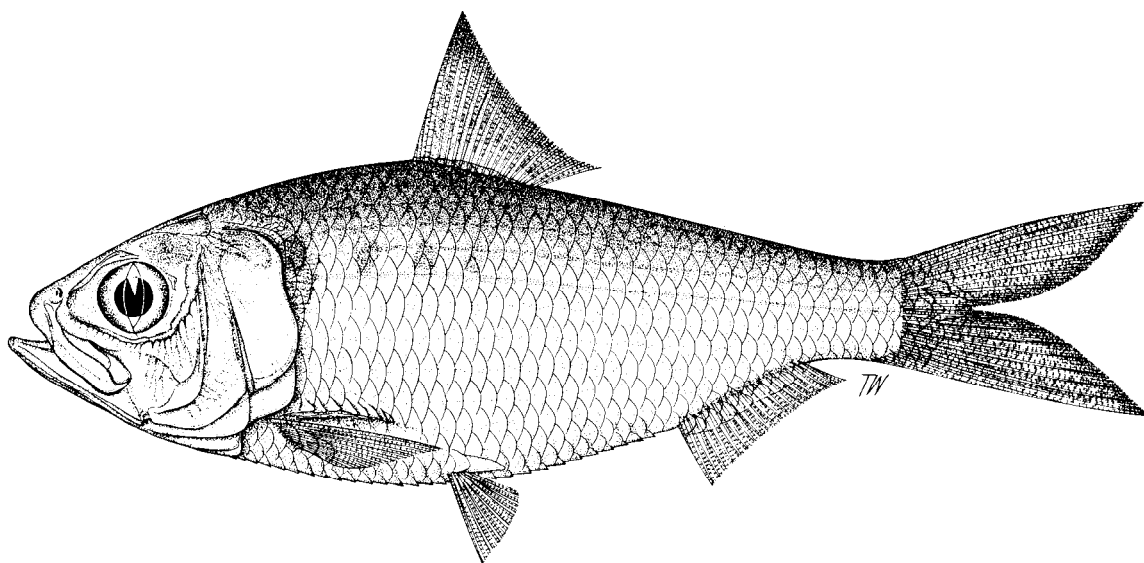
Hilsa kelee (Cuvier, 1829)

CLUP Hils 1

Clupea kelee Cuvier, 1829, Règne animal, 2nd ed., 2:320 (on keele of Russell, 1803; Vizagapatnam).

Synonyms : Clupea sinensis: Bloch, 1795:38, pl. 405 (name taken from Linnaeus, 1758 = ? Tenulosa reevesii; Bloch's specimen is H. kelee ex Tranquebar); Clupeonia blochii Valenciennes, 1847:353 (on Bloch's sinensis); Alosa brevis Bleeker, 1848:638 (Bima, Sumbawa Island); Alausa kanagurta Bleeker, 1852:13, 34 (Jakarta, Muntok); Alausa brachysoma Bleeker, 1853:527 (Padang); Alosa malayana Bleeker, 1866:294 (Java, Sumatra); Clupea platygaster Gunther, 1868:448 (Sumatra); Harengula (Paralosa) zeylanica Hubrecht, 1879 (nomen nudum); Clupea durbanensis Regan, 1906:4, pl. 4 (Durban Bay); Macrura kelee: Fowler, 1941:627-629 (also Macrura brevis, M. durbanensis); Macrura brevis: Munro, 1967:53, pl.5, fig. 59 (Papua New Guinea); Hilsa kelee - Whitehead, 1965:129 (revision); Whitehead et al., 1966:79, 80, pl 10, fig. 1 (types of zeylanica, malayana, brachysoma, brevis, kanagurta); Whitehead, 1967:90, 91 (types of kelee, blochii); Idem, 1969:267, pl. 1c (Bloch's sinensis); Idem, 1973b:197, fig. 26 (kev. synonymy, refs): Wongratana, 1980:156, pls 102, 103 (revision); SFSA, in press (South Africa); Whitehead & Bauchot, in press (types of kelee, blochii).

FAO Names : En - Keelee shad.



Diagnostic Features : Body fairly deep and compressed, belly with distinct keel of scutes. Top of head with numerous fronto-parietal striae; upper jaw with median notch. Gillrakers about 100 to 175, those on inner arches distinctly curled; outer row of gill filaments on first arch not more than half length of gillrakers. A series of small triangular scales above axil of pectoral fin; hind part of body scales perforated. A black spot behind gill cover, usually followed by up to 10 spots along flank. Deep-bodied *Sardinella* species have no notch in midline of upper jaw and no spots along flank; species of *Tenualosa* have no fronto-parietal striae, more or less straight gillrakers on inner arches and no perforations on scales; gizzard shads (*Nematalosa*, *Anodontostoma*) have an inferior mouth. See CLUP Hils 1, Fishing Area 51, also 57, 71.

Geographical Distribution : Indo-West Pacific (probably all coasts of Indian Ocean, from Gulf of Oman and Gulf of Aden south to Durban and Madagascar, across the Bay of Bengal, Gulf of Thailand, Java Sea and north to Hong Kong and east to Papua New Guinea and possibly further).

Habitat and Biology : Marine, pelagic, but entering estuaries and able to tolerate quite low salinities (7 ‰). Feeds chiefly on phytoplankton (mainly diatoms, also dinoflagellates), but also copepods, molluscan and crustacean larvae, prawns, amphipods and polychaetes (Godavari estuary, Babu Rao, 1966). Spawns (at least in Godavari estuary) around February (Babu Rao, *loc. cit.*).

Size : To 24.4 cm standard length, usually about 15 to 18 cm.

Interest to Fisheries : Apparently does not form large schools, but enters artisanal fisheries (e.g. in Godavari estuary, eastern coast of India).

Local Names : KENYA: Makrange, Pawali.

Literature : Whitehead (1973b - refs); Babu Rao (1966 - biol. in Godavari estuary).

