

**Clupea** Linnaeus, 1758

CLUP Clup

Clupea Linnaeus, 1758, Syst.nat., 10th ed.:317 (type: Clupea harengus Linnaeus). Rogenia Valenciennes, 1847, Hist.nat.poiss., 20:340 (type: Rogenia alba Yarrell = C. harengus).

**Diagnostic Features** : Moderately slender fishes, with the belly fairly rounded and the scutes not forming a strong keel; mainly characterized by lacking various specialized features of other genera. Operculum smooth and without bony radiating striae (cf. Sardinops, which has spots along the flanks). Hind border of gill opening smooth and without a pair of fleshy outgrowths (cf. Sardinella). Pelvic finrays i 8 (i 7 in Sprattus and Clupeonella, which lack a bony capsule (bulla) in the pterotic bone; i 8 in Alosa, but a distinct median notch in upper jaw; i 8 in some species of Sardinella, but strong fronto-parietal striae on top of head, also gill opening different and last two anal finrays enlarged); pelvic fin insertion behind dorsal fin origin (below or in front in Sprattus). No dark spots along flanks, at dorsal fin origin, on gill cover or tips of caudal fin.

**Biology, Habitat and Distribution** : Marine, pelagic and schooling, down to about 200 m, mainly offshore (but some populations entering or even confined to brackishwater in bays or saline lakes); juveniles in shallow water. Eggs demersal, adhesive on the sea bed or on marine vegetation. Confined to cooler or cold waters of the Northern Hemisphere.

**Interest to Fisheries** : One of the prime northern genera, with a long history of exploitation and, in recent years, over-exploitation in both Atlantic and Pacific waters. The total catch of Clupea in 1983 was 1418 078 tons (but up to twice that catch in earlier years before imposition of restrictions, e.g. 2 520 800 tons in 1973).

**Species** : Authors have mostly followed Svetovidov (1952:120, 1963:126), who advocated recognition of two subspecies of Clupea harengus, an Atlantic (and Baltic) and a Pacific (and White Sea eastward), the latter with fewer vertebrae. The Atlantic and Pacific herrings, as Svetovidov also noted, have rather different spawning patterns; in addition, the Pacific herring is said to have a thinner egg membrane. No detailed analysis has been made of this problem since Svetovidov's studies. Were it not for the presence of Pacific-type herrings in the White Sea and eastwards, and an overlap with Atlantic-type herrings in the White Sea, it would be much simpler to recognize a distinct Pacific species widely separated geographically from an Atlantic species. However, the White Sea and associated forms apparently remain genetically distinct and could be regarded as a relict from the time when a Pacific species inhabited all the Arctic waters of the Soviet Union. For this reason it is preferred here to follow American authors and to recognize two species:

C. harengus Linnaeus, 1758, North Atlantic to White Sea, Baltic

C. pallasii Valenciennes, 1847, North Pacific, White Sea and eastward.

**Remarks** : Differences between the two species can be summarized as follows:

- (a) C. harengus: vertebrae 51 to 60 (usually 55 to 57); spawning throughout year (spring, summer, autumn and winter herrings); spawn usually some distance from shore, at 25 to 200 m; spawn usually at relatively high temperatures (10 to 15°C); spawn at high salinities; egg masses dense, deposited on sea bed.
- (b) C. pallasii: vertebrae 49 to 57 (usually 52 to 55); spawning in spring (i.e. spring herrings only); spawn in coastal waters, often close to shore, at 0 to 20 m (usually less than 15 m); spawn at relatively low temperatures (0 to 10°C); spawn at low salinities (10 to 21‰ optimum) egg masses more sparse, in one or two layers only, deposited on marine vegetation.

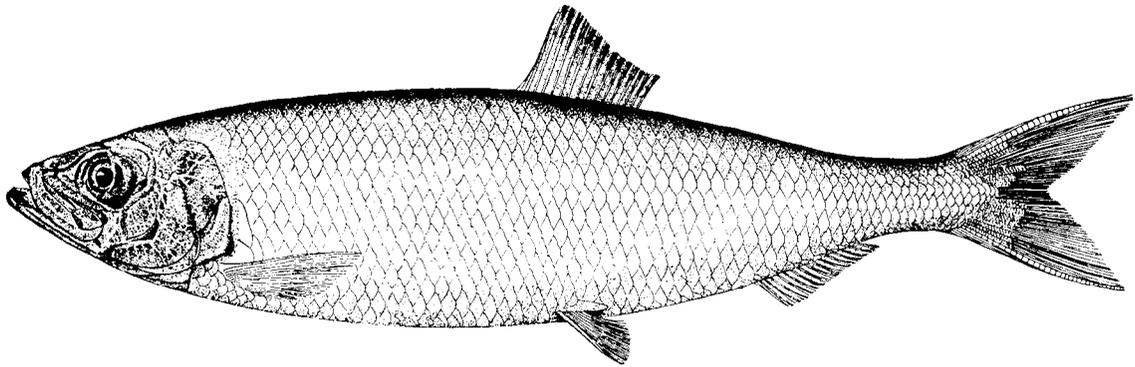
**Clupea harengus** Linnaeus, 1758

CLUP Clup 1

Clupea harengus Linnaeus, 1758, Syst.nat., 10th ed.:317 (northern Europe).

**Synonyms** : Clupea harengus B membras Linnaeus, 1761:128 (Baltic); Cyprinus esca Walbaum, 1792:36 (on Pennant, 1769); Clupea elongata LeSueur, 1818:234 (Massachusetts); Clupea alba Yarrell, 1829:137, 465, pl. 5, fig. 2 (Thames estuary); Clupea leachii Yarrell, 1832:277, pl. 12 (Thames, Medway estuaries); Clupea minima Storer, 1839:113 (New Hampshire); Clupea harengus - Svetovidov, 1952:117, pl. 2, figs 1, 2, pl. 3 fig. 2 (eastern Atlantic, Baltic); Idem, 1963:123, same plates; FWNA, 1964:275, fig. 66 (western Atlantic); Andriyashev, 1964:73 (northern seas of USSR); Liem & Scott, 1966:94 (western Atlantic); Whitehead, 1967:17 (Rogenia alba of Valenciennes); CLOFNAM, 1973:99 (eastern Atlantic, full synonymy); FNAM, 1984:219 (eastern Atlantic, synopsis).

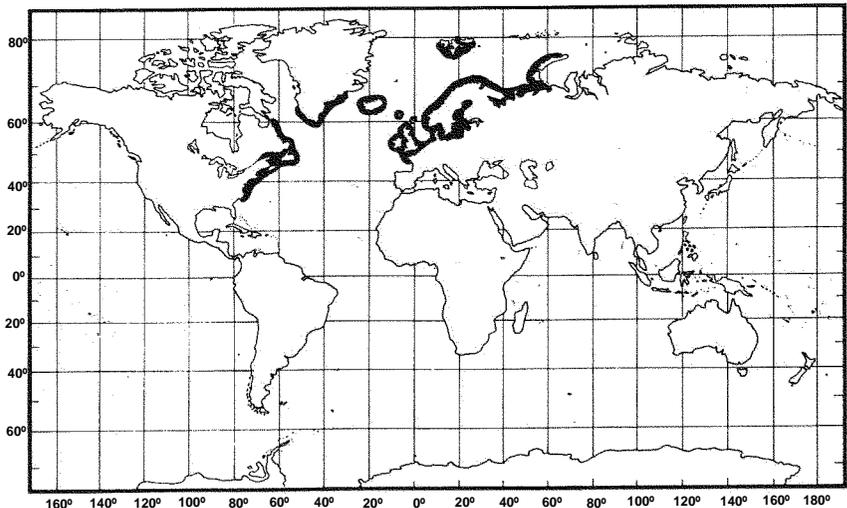
**FAO Names** : En - Atlantic herring.



**Diagnostic Features :** Body elongate and fairly slender, belly rather rounded, scutes without prominent keel. No median notch in upper jaw (cf. *Alosa*). Gill cover (operculum) without radiating bony striae (cf. *Sardinops*, which has dark spots along the flank). Hind border of gill opening evenly rounded (with two fleshy outgrowths in *Sardinella*). Pelvic fin insertion behind vertical from dorsal fin origin (below or in front in *Sprattus*); pelvic finrays i 8 (rarely i 7 or i 9) (only *Alosa* and some species of *Sardinella* have this count; all other clupeids have i 6 or i 7). No distinctive dark spots on body or fins. Overlaps *C. pallasii* in White Sea, but distinguished by more vertebrae and post-pelvic scutes (usually 55 to 57 and 12 to 16; cf. usually 52 to 55 and 10 to 14).

**Geographical Distribution :**

Eastern Atlantic (northern Bay of Biscay northward to Iceland and southern Greenland, eastward to Spitzbergen and Novaya Zemlya, also Baltic); western Atlantic (southwestern Greenland, Labrador, southward to South Carolina).



**Habitat and Biology :** Coastal, pelagic down to 200 m, schooling, with complex feeding and spawning migrations, whose times and extent correlate with the various more or less distinct races which can be recognized on morphological grounds (mainly numbers of vertebrae, finrays, scales and gillrakers). Feeds on small planktonic copepods in the first year, and thereafter mainly copepods (especially *Calanus finmarchicus* and *Temora longicornis*), but also hyperid amphipods, euphausiids, mysid shrimps, small fishes, arrow-worms, ctenophores and pteropods). At least one population is spawning in any one month of the year, each race having a different spawning time and place (spring, summer, autumn and winter herrings; in 0 to 5 m off Greenland down to 200 m in autumn (bank) herrings of the North Sea; eggs laid on the sea bed, on rock, stones, gravel, sand or beds of algae or phanerogams (see also data under genus). Note: it is impossible to summarize briefly the wide range of spawning strategies of Atlantic herring; the best reviews are those of Svetovidov (1952, 1963) for the eastern Atlantic and FWNA (1964) for the western Atlantic.

**Size :** To 40 cm standard length, usually 20 to 25 cm.

**Interest to Fisheries :** Although stocks have been badly over-fished and depleted in recent years, *Clupea harengus* still ranks as the third most heavily exploited clupeid fish. The total catch in 1983 was 1 141 736 tons, of which 976 041 tons came from the eastern North Atlantic, and 23 253 tons from the western North Atlantic.

**Local Names :** Numerous local names have been given, not only to the species, but to all the various forms (subspecies, races, etc., of authors).

**Literature :** More has been published on *Clupea harengus* than on any other fish. This literature is summarized by Svetovidov (1952, 1963) and FWNA (1964, with some additional references in CLOFNAM (1973), a succinct account for Canadian Atlantic coasts by Liem & Scott (1966), and a similar account for the northern seas of the USSR by Andriyashev (1964); many further and more recent papers are given by Blaxter & Hunter (1982). As many as a hundred or more papers appear annually on all aspects of herring biology and fisheries.

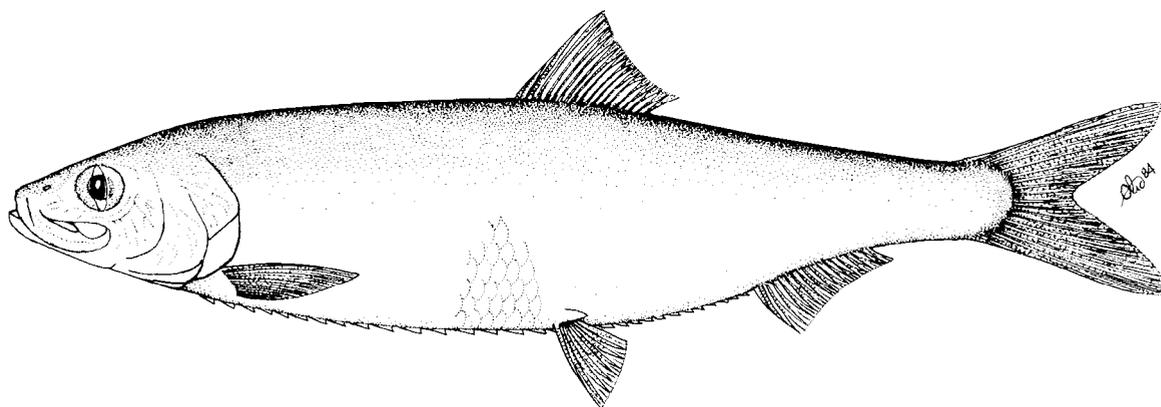
**Clupea pallasii** Valenciennes, 1847

CLUP Clup 2

Clupea pallasii Valenciennes, 1847, Hist.nat.poiss., 20:253 (Pallas specimen, Kamchatka).

**Synonyms** : ? Clupea lineolata Valenciennes, 1847:256 (Pallas specimen, no locality); Clupea mirabilis Girard, 1854:138 (San Francisco); Clupea inermis Basilevsky, 1855:242 (China); Spratelloides bryoporus Cope, 1873:25 (Alaska); Clupea harengus pallasii:Svetovidov,1952:145, pls 3, fig. 2 and 4, figs 1, 2 (western Pacific); Idem, 1963:155, same plates; Andriyashev, 1964:77 (northern seas of USSR); Shmidt, 1965:19 (Sea of Okhotsk); Hart, 1973:96, fig. (Canada, Pacific coasts, synopsis); Clupea pallasii:Clemens & Wilby, 1967:99, fig. 34 (Canada, Pacific coasts; misspelt); Whitehead & Bauchot, in press pallasii and lineolata types).

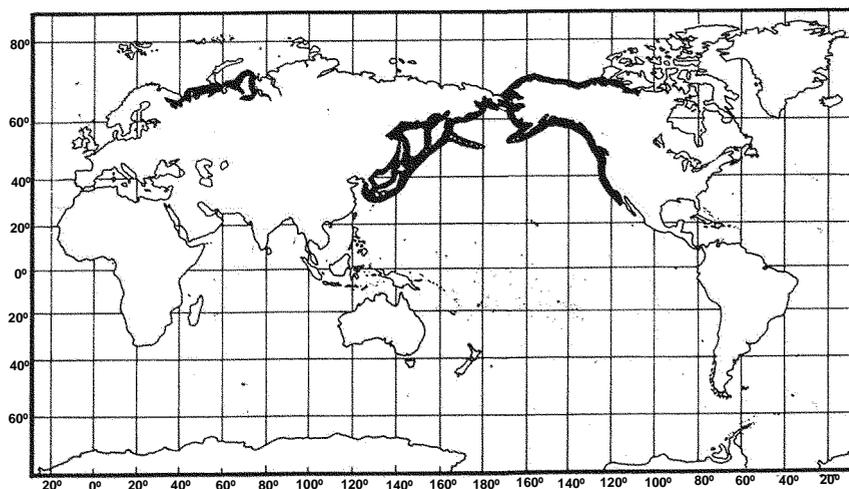
**FAO Names** : En - Pacific herring.



**Diagnostic Features** : Body elongate and fairly slender, belly rather rounded, scutes without prominent keel. No median notch in upper jaw (cf. the introduced Alosa sapidissima of the eastern Pacific). Gill cover (operculum) without radiating bony striae (cf. Sardinops, which has dark spots along the flank). Pelvic finrays 8 (as in Sardinella lemuru of southern Japan, which has strong fronto-parietal striae on top of head and a pair of fleshy outgrowths on the hind border of the gill opening). No distinctive dark spots on body or fins. Overlaps C. harengus in White Sea, but distinguished by fewer vertebrae and post-pelvic scutes (usually 52 to 55 and 10 to 14; cf. usually 55 to 57 and 12 to 16).

**Geographical Distribution** :

Arctic Sea (White Sea eastward to Ob inlet); western Pacific (from Anadyr Bay, eastern coasts of Kamchatka, possibly the Aleutian Islands southward to Japan and western coasts of Korea); eastern Pacific (Kent Peninsula at 107°W and Beaufort Sea southward to northern Baja California and San Diego).



**Habitat and Biology** : Coastal, pelagic, schooling, migrating inshore to breed, but without any strong north-south migrations, the population being localized. Apparently landlocked populations (races) exist in the lakes of South Sakhalin, eastern Hokkaido and eastern Honshu. Feeds on euphausiids, also copepods, mysids, amphipods and zoea of crabs. Breeds from December to July, depending on the latitude, coming into shallow water and depositing eggs on marine vegetation (mainly eelgrass and seaweeds) or solid materials (see also data under genus). Spawning fishes will enter estuaries.

**Size** : To 33 cm, usually to 25 cm standard length.

**Interest to Fisheries :** Of prime importance on both sides of the Pacific, but stocks depleted by over-fishing in recent years. The total catch in 1983 was 276 342 tons, of which 179 721 tons came from the western North Pacific (mainly USSR, China and Japan) and 88 643 tons from the eastern North Pacific (Canada and USA).

**Local Names :-**

**Literature :** Summarized for western Pacific by Svetovidov (1952, 1963) and for the Canadian Pacific by Hart (1973 - excellent synopsis of biology and fishery, with over sixty selected references). See also Ye (1980, 1983) and Ye, Tang & Qin (1981) on the Yellow Sea form and its fishery.

**Escualosa** Whitley, 1940

CLUP Esc

Leptogaster Bleeker, 1872, Atlas Ichthyol. Ind. Néerland., 6: pl. 262, fig. 2 (type: Clupea (Leptogaster) argyrotaenia - nomen oblitum fide Whitehead et al., 1966:70). Kowala (not of Valenciennes: Regan, 1922, Ann. Mag. nat. Hist., (9)10:587 (type: Kowala thoracata Valenciennes, designated by Regan, but overlooking earlier designation of K. albella by Gill - see Sardinella synonymy). Escualosa Whitley, 1940, Aust. Zool., 9(4):402 (type: Clupea macrolepis Steindachner = K. thoracata Valenciennes).

**Diagnostic Features :** Small clupeid fishes, strongly compressed, the belly keeled. Resembling juvenile Sardinella, Amblygaster and Herklotsichthys, but hind margin of gill opening evenly rounded (cf. with two fleshy outgrowths; also, tip of maxilla and second supra-maxilla enlarged, the latter more or less rectangular. Pelvic finrays i 6. Anal fin short (iii to iv 14 to 18 finrays; cf. iii to iv 31 to 49 in the pristigasterids Ilisha and Pellona). A bright silver stripe along flank.

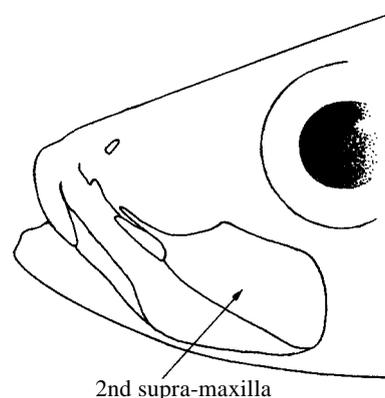
**Biology, Habitat and Distribution :** Coastal, pelagic, schooling, mainly shallow waters; juveniles found in lower parts of rivers.

**Interest to Fisheries :** Contributes to clupeoid catches, especially on the western coast of India.

**Species :** Following the revision by Wongratana (1981), two species are now recognized:

E. elongata Wongratana, 1983, Gulf of Thailand

E. thoracata (Valenciennes, 1847), northern Indian Ocean, western Pacific.



2nd supra-maxilla

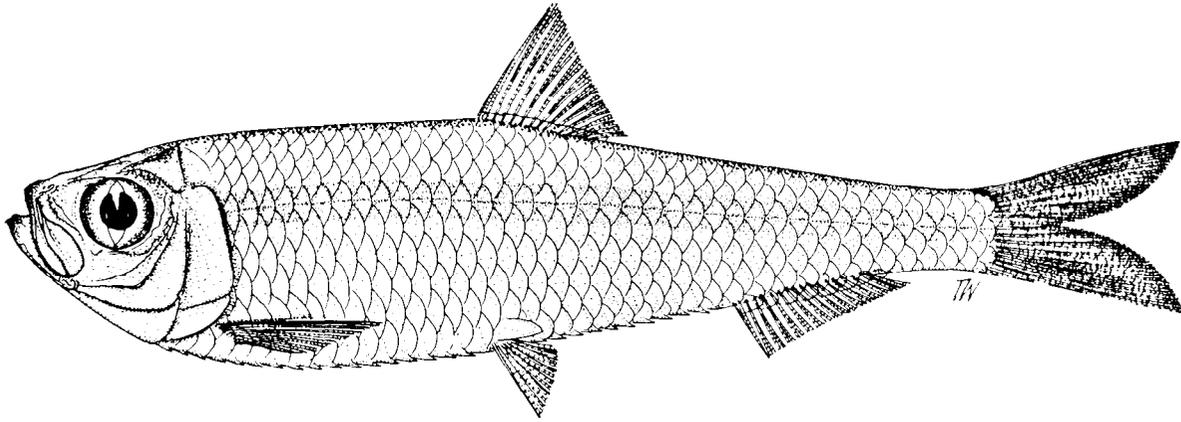
**Escualosa elongata** Wongratana, 1983

CLUP Esc 2

Escualosa elongata Wongratana, 1983, Jap. J. Ichthyol., 29(4):392, fig. 8 (east coast of Gulf of Thailand).

**Synonyms :** None.

**FAO Names :** En - Slender white sardine.



**Diagnostic Features :** Body slender, its depth 25% of standard length, belly strongly keeled. Separated from similar fishes in the area by the characters given under *K. thoracata*, from which it differs by its more slender body (cf. 27 to 37% of standard length) and narrower silver stripe along the flank (about half eye diameter: cf. about equal to eye diameter).

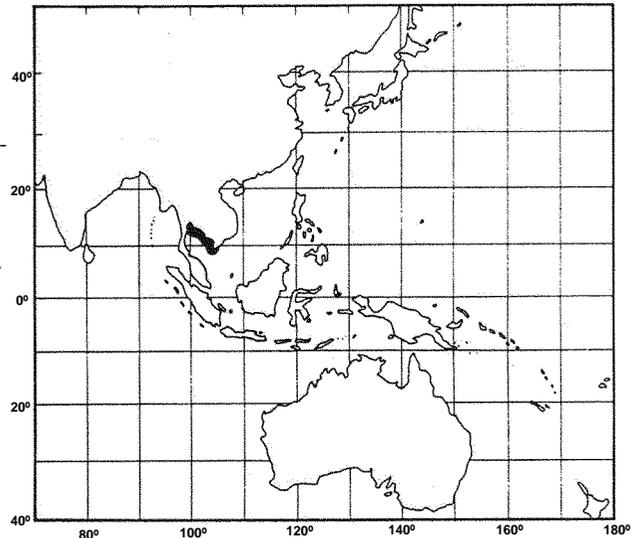
**Geographical Distribution :** Known only from 2 specimens—from the east coast of the Gulf of Thailand (but discovered at the Sunday Market in Bangkok). More specimens needed.

**Habitat and Biology :** Presumed marine and coastal pelagic. More data needed.

**Size :** To 6.7 cm standard length.

**Interest to Fisheries :** No data, but presumably not abundant.

**Local Names :-**



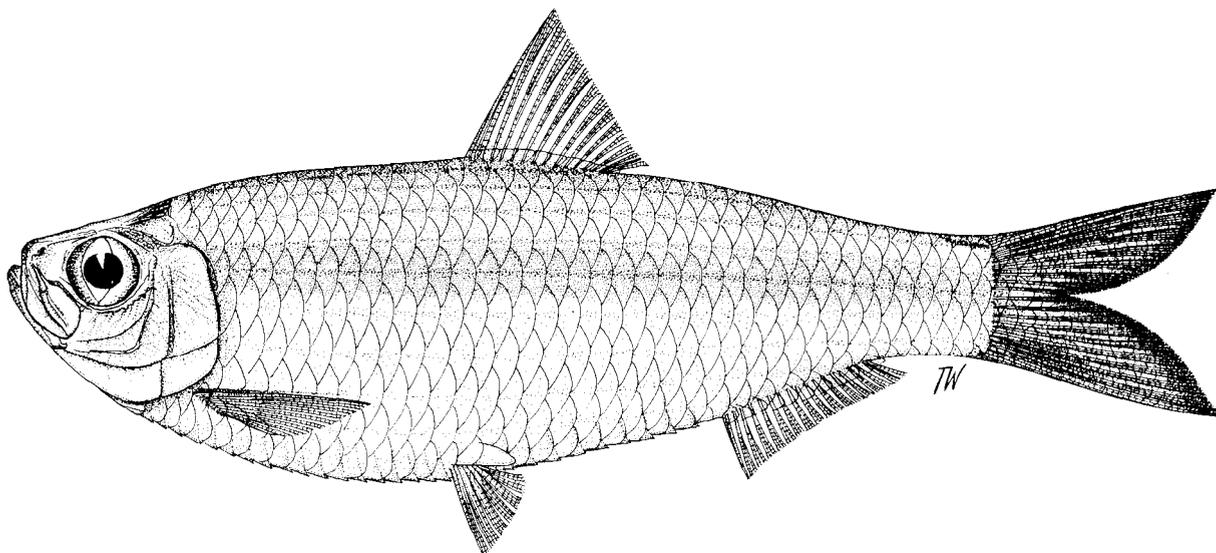
***Escualosa thoracata* (Valenciennes, 1847)**

CLUP Esc 1

*Kowala thoracata* Valenciennes, 1847, *Hist.nat.poiss.*, 20:363 (Pondicherry).

**Synonyms :** ? *Clupea coval* Cuvier, 1829:318 (footnote; on *Kowal* of Russel, 1803 - *nomen dubium* fide Whitehead, 1967:70); *Meletta lile* Valenciennes, 1847:378 (Pondicherry, Coromandel); *Alausa champil* (Cantor, 1850:1284 (Penang)); *Rogenia argijrotaenia* Bleeker, 1852:457 (Muntok, Jakarta); *Clupea (Leptogaster) argyrotaenia*:Bleeker, 1872:pl. 262, fig. 2; *Clupea macrolepis* Steindachner, 1879:13 (Townsville, Queensland ; ? *Clupea huae* Tirant, 1929:29 (Viet Nam *Kowala coval*:Fowler, 1941:638 (Borneo); *Escualosa thoracata* - Whitehead et alii, 1966:71 (*argijrotaenia* types); Whitehead, 1967:70, 71, 72 (*coval*, also *thoracata* and *lile* types); *Idem*, 1973b:189, fig. 20 (Indian Ocean, synopsis); Nair, 1973:74, fig. 18 (India); Wongratana, 1980:154,pls 100, 101 (revision); Whitehead & Bauchot, in press (*coval*, *lile*).

**FAO Names :** En - White sardine.



**Diagnostic Features :** Body fairly deep and compressed, its depth 27 to 30% of standard length, belly strongly keeled. The almost rectangular second supra-maxilla and the bright silver stripe along the flank distinguish it from juveniles of *Sardinella*, *Amblygaster* and *Herklotsichthys* (see also under genus). Resembles some pellenulines with a silver stripe (species of *Clupeoides*, *Cupleichthys*), but they lack a first (anterior) supra-maxilla. Distinguished from *Escualosa elongata* of the Gulf of Thailand by its deeper body (more than 25% of standard length) and broader silver stripe (about equal to eye diameter: cf. about half eye diameter). See CLUP Esc 1, Fishing Area 51.

**Geographical Distribution :** Northern Indian Ocean (Karachi eastward to Rangoon), Indonesia (Java Sea), the Philippines southward to Papua New Guinea, Australia (Queensland at Townsville and Western Australia at Onslow).

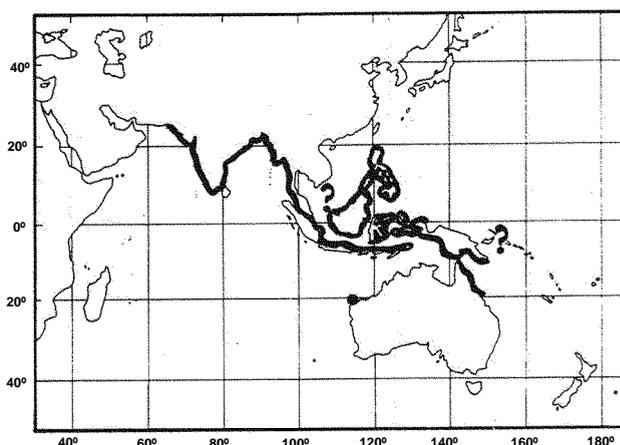
**Habitat and Biology :** Coastal, pelagic, schooling, in shallow waters, the juveniles apparently entering the lower parts of rivers (e.g. Canning River, eastern coast of India), but returning later to the sea. Feeds on both zooplankton (copepods, crab zoea, larvae of bivalves and fish eggs) and phytoplankton. Breeds from October to February (mainly November to January) off western coast of India, usually in relatively shallow inshore waters. The eggs and larvae are well illustrated by Nair (1973).

**Size :** To 10 cm standard length, common at 8 cm.

**Interest to Fisheries :** An important element in clupeoid fisheries off western coasts of India (over 1000 tons in some years *vide* Nair, 1973:table 17). Separate statistics not reported.

**Local Names :** INDIA: Chooda, Velloori (Malayalam), Swadi balanjil (Kannada), Bhitgi (Marathi).

**Literature :** Nair (1973 - excellent synopsis for India, including illustrations of eggs and larvae).

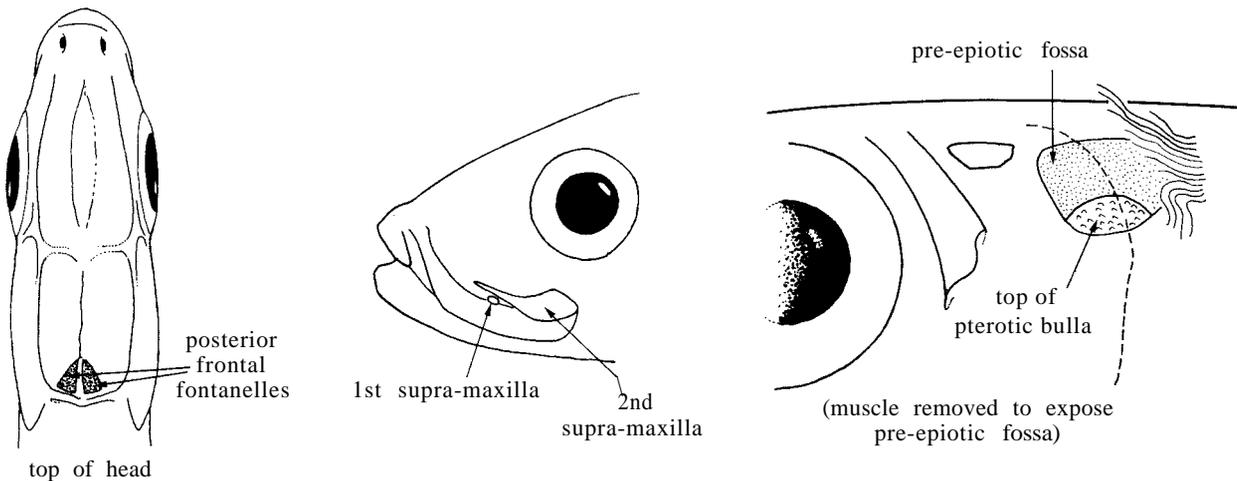


**Platanichthys** Whitehead, 1968

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*Platanichthys* Whitehead, 1968, *J.nat.Hist.*, 2:477 (type: *Lile platana* Regan).

**Diagnostic Features :** Small clupeid fishes of South American fresh- or brackishwaters, the body strongly compressed and the belly sharply keeled. Posterior frontal fontanelles on top of head retained in adults (occluded in *Ramnogaster*). Anterior (first) supra-maxilla very small or absent; no sharp backward-pointing (retrorse) spine near front of maxilla (cf. *Rhinosardinia*). Pelvic finrays i 6 or rarely i 5 (cf. i 7 in *Rhinosardinia*, *Lile*, *Strangomera*). Very closely resembles *Sprattus*, but a bony capsule (bulla) present in pterotic and a very distinct silver lateral stripe down flank (stripe absent in *Sprattus* and *Ramnogaster*).



**Biology, Habitat and Distribution :** Estuaries and lower parts of rivers, presumably schooling; known only from Argentina, Uruguay and Brazil.

**Interest to Fisheries :** Probably of little importance.

**Species :** A single species recognized:

*Platanichthys platana* (Regan, 1917), western South Atlantic.

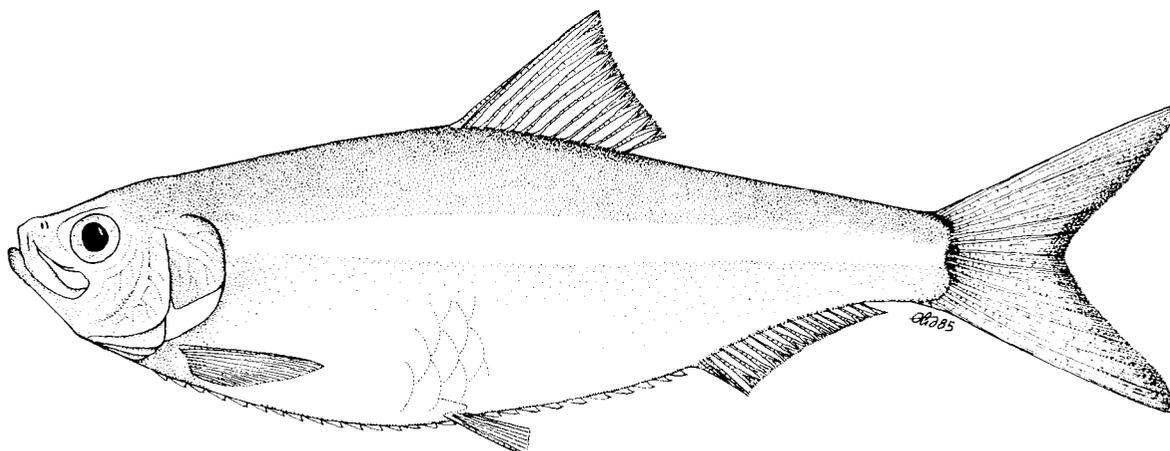
**Platanichthys platana** (Regan, 1917)

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*Lile platana* Regan, 1917, *Ann.Mag.nat.Hist.*, (8)19:394 (La Plata).

**Synonyms :** *Spratella pallida* de Buen, 1952: (Nueva Palmira, mouth of Uruguay River);? *Stolephorus otidus* Ringuélet, 1942:435 (Laguna Chascomús, Argentina); *Clupea melanostoma limnoica* Aramburu, 1961:2 (Laguna Chascomús and others, Argentina); *Platanichthys platana* - Whitehead, 1968:479, fig. 1 (description, relationships); Figueiredo & Menezes, 1978:25, fig. 29 (Brazil)..

**FAO Names :** En - River Plate sprat.



**Diagnostic Features :** Body moderately deep and strongly compressed, its depth about 30% of standard length, belly sharply keeled. Anterior (first) supra-maxilla minute or absent. Closely resembles species of Ramnogaster, which lack a distinct silver stripe along flank and have a well-developed first supra-maxilla. Distinguished from species of Rhinosardinia by the absence of a sharp backward-pointing (retorse) spine near front of maxilla and only i 5 or 6 pelvic finrays (i 7 in Rhinosardinia); from Sprattus fuegensis by the pelvic count (cf. i 7) and presence of silver lateral stripe; and from small Sardinella and Harengula by the absence of two fleshy outgrowths on the hind margin of the gill opening.

**Geographical Distribution :** Western South Atlantic (lagoons, estuaries, lower parts of rivers of Argentina (Rio de la Plata), Uruguay (Uruguay River), northward to just north of Rio de Janeiro, Brazil).

**Habitat and Biology :** Probably confined to fresh- and brackishwaters of lagoons, estuaries and the lower reaches of rivers. More data needed.

**Size :** To 6.7 cm standard length, usually around 5 cm.

**Interest to Fisheries :** Perhaps makes a small contribution locally.

**Local Names :-**

**Literature :** De Buen (1952 - Uruguay, as Sprattella pallida); Whitehead (1964 - description).

