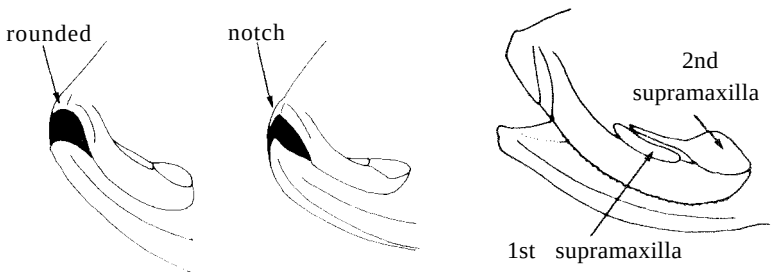
2.2.2 SUBFAMILY CLUPEINAE

FAO Names : En - Herrings, Sardines, Sprats.

Diagnostic Features : Small or moderate-sized herring-like fishes with a normal pelvic scute (i.e. with ascending arms) and scutes present before and behind the pelvic fins. Upper jaw rounded and not notched when seen from the front; two supramaxilla present, a usually elongate anterior and a paddle-shaped posterior; mouth terminal, lower jaw sometimes projecting slightly, teeth small, conical. Dorsal fin at about midpoint of body, short (13 to 21 finrays); anal fin short (12 to 23 finrays), its origin usually well behind the last dorsal finray; pelvic finrays 7 to 10 (mostly 7 or 8).



a. Clupeinae **b.** Alosinae

Biology, Habitat and Distribution : The Clupeinae are mainly marine coastal and schooling fishes, but some enter brackishwater and a few are confined to fresh- or brackishwater (Rhinosardinia, Platanichthys). They occur in the Indo-Pacific region, on both sides of the Atlantic and in the eastern Pacific. Most of the species are found in tropical or subtropical waters, but genera such as Clupea, Sprattus, Sardina and Sardinops occur in cool waters and high latitudes, extending the range of this subfamily to about 70°N and 55°S. These cool-water genera contribute to some of the most important of all clupeoid fisheries, but considerable tropical and subtropical catches come from species of Sardinella, Harengula, Herklotsichthys, etc.

There are 15 genera (4 worldwide, 6 New World, 3 Indo-Pacific, 2 European) and 72 species, thus the largest of the 5 subfamilies of Clupeidae.

Key to the Genera of Clupeinae :

1a. No bony capsule (bulla) in pterotic bone: pelvic finrays i 6 to i 7; temperate waters only

2a. Last two anal rays normal, not enlarged; lower gillrakers 30 to 41; Europe, South America, Australasia ..... **Sprattus**

2b. Last two anal finrays enlarged (Fig. 1); lower gillrakers 39 to 67; Europe only .... **Clupeonella**

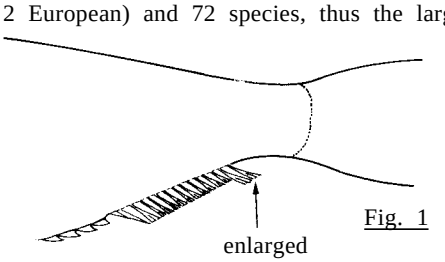
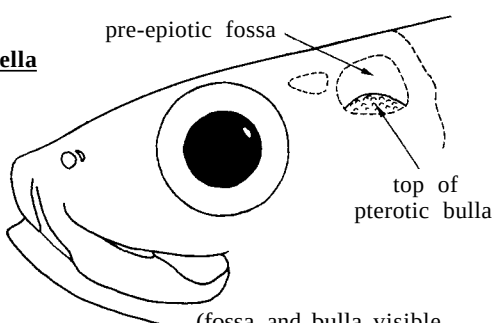


Fig. 1

1b. Bony capsule (bulla) present in pterotic bone (Fig. 2)

3a. Operculum with bony radiating striae (Fig. 3); last two anal finrays elongated; gillrakers absent on hind face of third epibranchial; fleshy 'rakers' on upper edge of ceratohyal (Fig. 4)



(fossa and bulla visible when muscles removed) Fig. 2

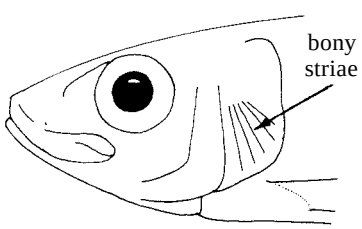
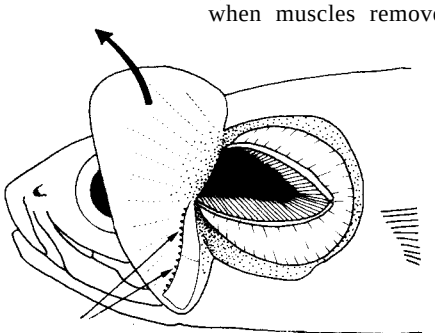


Fig.3

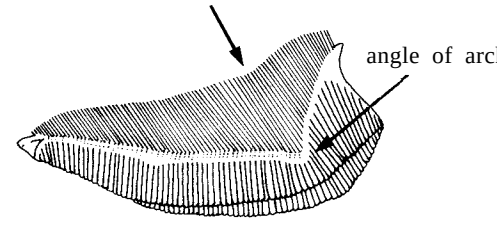


'rakers' on upper edge of ceratohyal

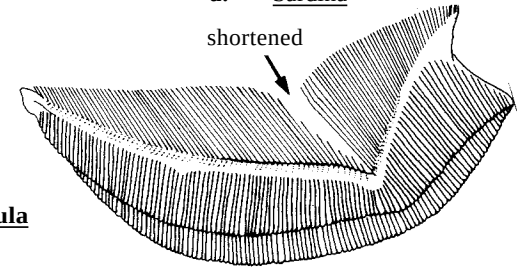
Fig. 4

4a. Scales on flank of uneven size; lower gillrakers not shortened at angle of first gill arch (Fig. 5a); maxilla not reaching to eye centre; eastern Atlantic, Mediterranean only ..... **Sardina**

4b. Scales of equal size along flanks; lower gillrakers shortened at angle (Fig. 5b); maxilla reaching or almost reaching to eye centre; eastern N, S Pacific, southern Africa, Australia, New Zealand ..... **Sardinops**



a. Sardina



b. Sardinops Fig. 5

3b. Operculum smooth; gillrakers usually present on hind face of third epibranchial (Fig. 6); upper edge of ceratohyal smooth

5a. Hind border of gill opening with two distinct fleshy outgrowths (Fig. 7)

6a. Toothed hypo-maxillary bone between ore-maxilla tio and bulge of maxilla (Fig. 8); western Atlantic ..... **Harengula**

6b. No hypo-maxillary bone

7a. Last dorsal finray a long filament; western Atlantic, eastern Pacific ..... **Opisthonema**

7b. Last dorsal finray normal; Indo-Pacific

8a. Fronto-parietal striae on top of head few, about 3 to 7 (Fig. 9a); lower part of second (posterior) supra-maxilla larger than upper (Fig. l0a); last two anal finrays not enlarged ..... **Herklotsichthys**

8b. Fronto-parietal striae on top of head numerous, 7 to 14 (Fig. 9b); second supra-maxilla larger than upper 10b); last two anal finrays enlarged

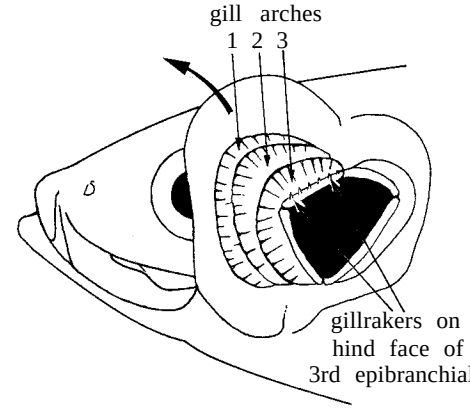


Fig. 6

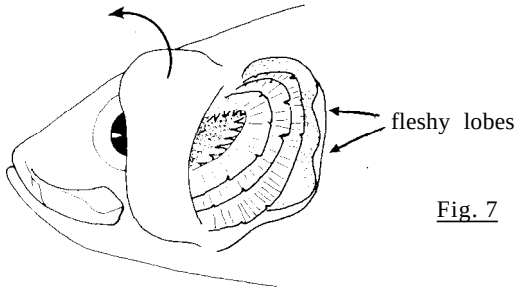
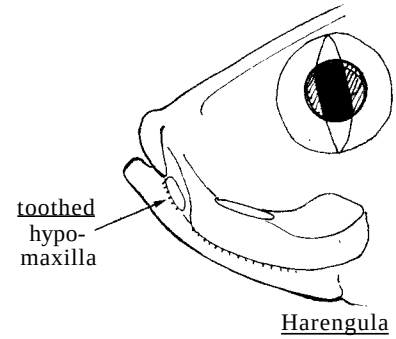
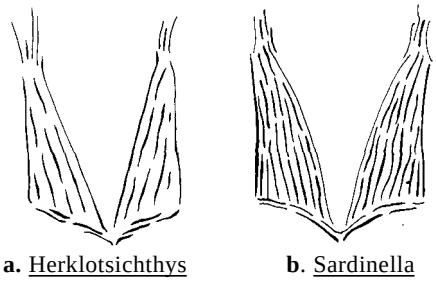


Fig. 7

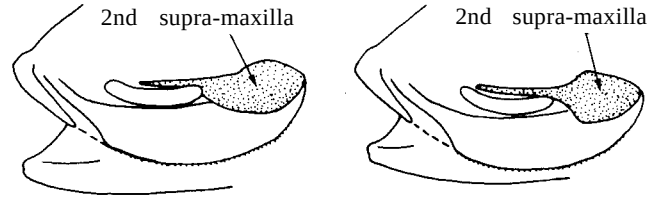


Harengula Fig. 8



a. Herklotsichthys **b**. Sardinella

fronto-parietal striae Fig. 9



a. Herklotsichtys **b.** Sardinella Fig. 10

9a. Lower gillrakers 26 to 43; a median series of pre-dorsal scales (Fig. lla) . . . . . **Amblygaster**

9b. Lower gillrakers rarely less than 40 (mostly 45 to 90, but over 200 in some species); pre-dorsal scales usually paired (Fig. l1b). . . . . **Sardinella**

5b. Hind border of gill opening evenly rounded, without fleshy outgrowths

10a. Pelvic finrays i 8 (rarely i 7 or i 9); belly not sharply keeled; pelvic insertion behind dorsal fin origin; North Atlantic, North Pacific . . . . . **Clupea**

l0b. Pelvic finrays i 6 to i 7

l1a. Indo-Pacific; pelvic finrays i 6; second supra-maxilla rectangular (Fig. 12) . . . . . **Escualosa**

l1b. New World only

12a. Pelvic finrays i 6

13a. Silver stripe along flanks; posterior frontal fontanelles retained in adults (Fig. 13) . . . . . **Platanichthys**

13b. Flanks silver, no stripe; posterior frontal fontanelles occluded in adults . . . . . **Ramnogaster**

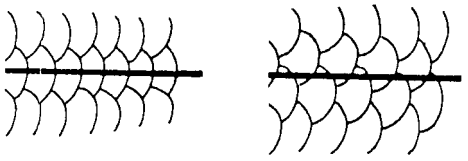
12b. Pelvic finrays i 7

14a. Sharp backward pointing spine near front of maxilla (Fig. 14) . . . . . **Rhinosardinia**

14b. No sharp spine on maxilla

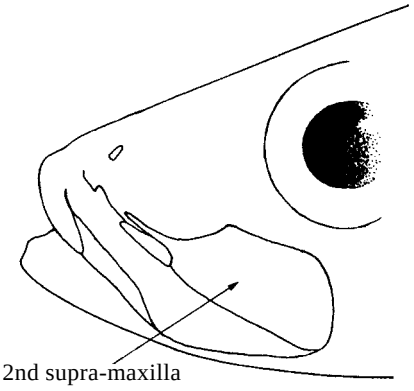
15a. Silver stripe along flanks; eastern central Pacific, Caribbean and so to Brazil . . . . . **Lile**

15b. Flanks silver, no stripe; southern tip of South America. . . . . **Strangomera**

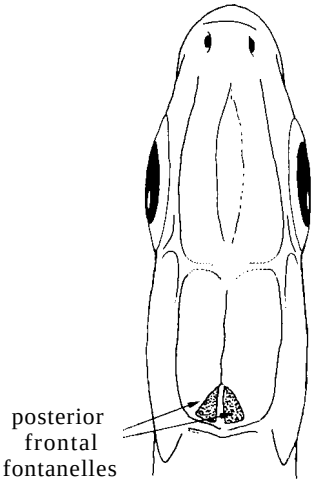


a. Amblygaster **b.** Sardinella

pre-dorsal scales Fig. 11

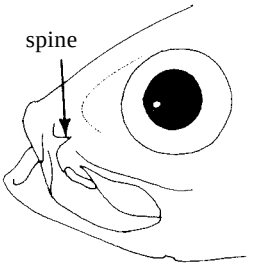


Escualosa Fig. 12



top of head

Platanichthys Fig. 13

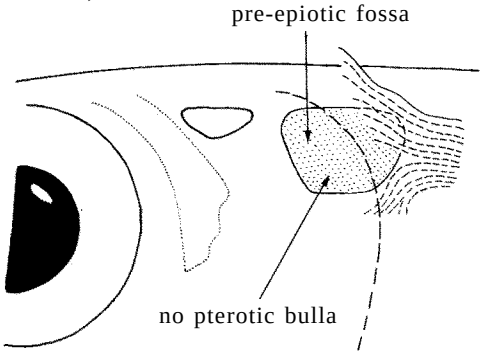


Rhinosardinia Fig. 14

Sprattus Girgensohn, 1846

CLUP Spratt

Sprattus Girgensohn, 1846, Mém.savants étrangers Acad.Sci.Pétersb., 5:534 (type: Sprattus haleciformis Girgensohn, 1846). Spratella Valenciennes, 1847, Hist.nat.poiss., 20:356 (type: Spratella pumila Valenciennes, 1846). Meletta Valenciennes, 1847, Hist.nat.poiss., 20:366 (type: Meletta vulgaris Valenciennes, 1847). Maugeclupea Whitley, 1932, Rec.Austr.Mus., l8:332 (type: Clupea bassensis McCulloch,1911). Antu de Buen, 1958, Rev.Biol.mar.Valparaiso, 8:87 (type: Clupea fuegensis Jenyns, 1846).



Diagnostic Features : Absence of a pterotic bulla (bony dome on floor of pre-epiotic fossa) distinguishes Sprattus from all other clupeine genera except Clupeonella (which has the pelvic fin origin distinctly behind the dorsal fin origin and has the last two anal finrays enlarged). From other Clupeinae that occur sympatrically, Sprattus differs in having only i 6 or 7 pelvic finrays (usually i 8 in Clupea), sharply keeled scutes (rather rounded in Strangomera) and no radiating bony striae on the operculum (Sardinia, Sardinops). Apart from the absence of a pterotic bulla, however, Sprattus hardly differs from the South American Ramnogaster (Uruguay to Tierra del Fuego).

Biology, Habitat and Distribution : Marine pelagic and schooling fishes, especially of coastal waters, often close inshore; sometimes tolerating very low salinities; distribution essentially antitropical, occurring in the Northern Hemisphere (Europe) and the Southern Hemisphere (southern parts of South America and Australia, also in New Zealand).

Interest to Fisheries : Important fisheries in the North Sea, off Norway and in the Baltic (S. sprattus), but perhaps underexploited in the Southern Hemisphere.

Species : A single representative in the Northern Hemisphere (S. sprattus) and 4 in the Southern Hemisphere, the 2 New Zealand species only recently distinguished (Whitehead, Smith & Robertson, 1985):

S. antipodum (Hector, 1872), New Zealand
S. fuegensis (Jenyns, 1842), Southern South America
S. muelleri (Klunzinger, 1880), New Zealand
S. novaehollandiae (Valenciennes, 1847), Southern Australia
S. sprattus (Linnaeus, ,1758) Northeast Atlantic, Mediterranean.

Remarks : Absence of a pterotic bulla can only be determined by dissection. Removal of the muscles near the corner of the operculum reveals a cavity, the pre-epiotic fossa. If the pterotic bulla is present, it appears as a rough-surfaced dome on the floor of the fossa.

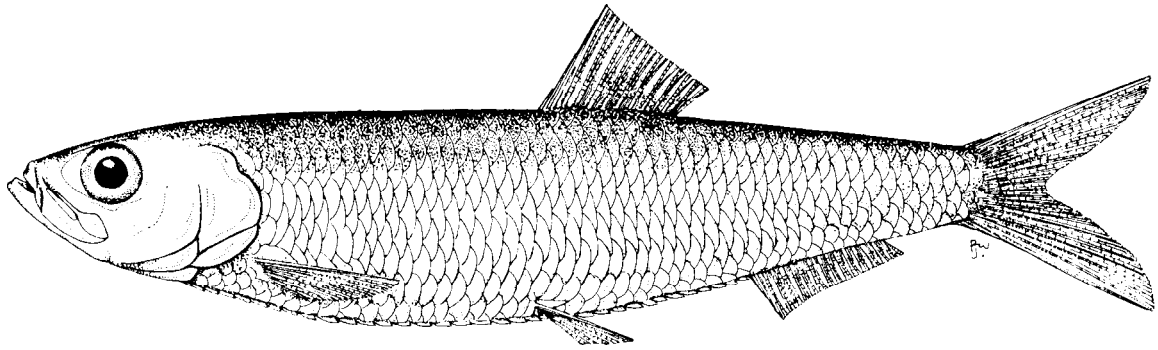
Sprattus antipodum (Hector, 1872)

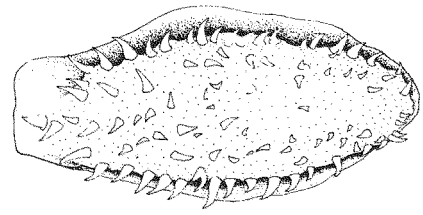
CLUP Spratt 4

Clupea sprattus var. antipodum Hector,1872, Notes edib.fish. in Hutton, Cat.Fish.N.Z., Colon.Mus. & Geol. Surv.Dept., Publ. 18:133 (Foveaux Strait, New Zealand).

Synonyms : Clupea sprattus var. antipodarum:Colenso, 1879:572 (unjustified emendation); Clupea antipoda Hutton, 1904:51; Clupea holodon Regan, 1916:5 (Stewart 1.); Clupea antipodum:Regan, 1917:227; Sprattus antipodum - Whitehead, Smith & Robertson, in press (key, diagnosis, biology, synopsis); name applied to S. muelleri in most literature.

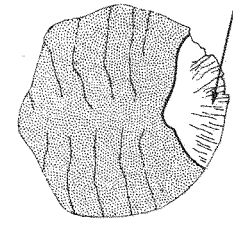
FAO Names : En - New Zealand blueback sprat.





toothplate on tongue

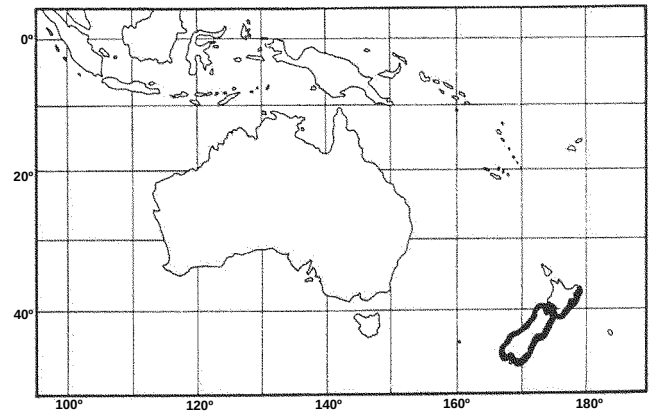
fine striae



scale

Diagnostic Features : Body slender, its depth 16 to 26% of standard length (mean 22%); gill cover without bony radiating striae; toothplate on tongue broad, almost oval, width about 3 times in length, lateral teeth strong: scales with fine radiating or horizontal striae on exposed posterior part; vertebrae 48 to 51; back steel blue when fresh.

Geographical Distribution : New Zealand coasts (east coast of the North Island, Cook Strait, apparently all coasts of the South Island south to Stewart Island and Foveaux Strait).



Habitat and Biology : Marine pelagic and schooling fishes of coastal waters; biology probably similar to that of S. muelleri, from which it has not usually been distinguished in earlier studies.

Size : To 12 cm standard length, usually 8 to 10 cm.

Interest to Fisheries : No separate statistics, but perhaps of local interest.

Local Names : -

Literature : Whitehead, Smith & Robertson (in press - synopsis).

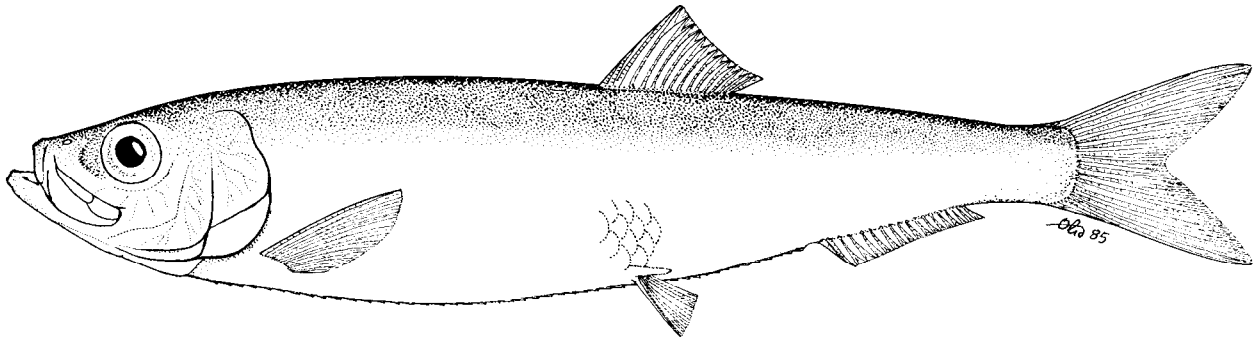
Sprattus fuegensis (Jenyns, 1842)

CLUP Spratt 2

Clupea fuegensis Jenyns, 1842, Zool.voy.Beagle, fishes:133 (Tierra de1 Fuego).

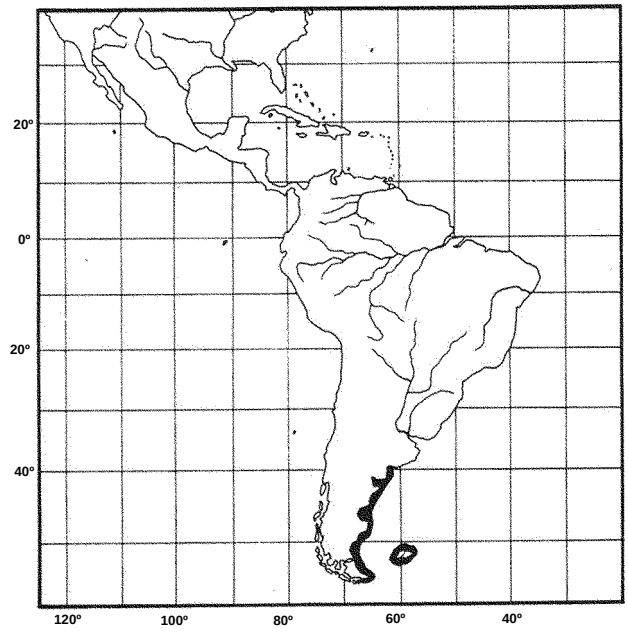
Synonyms : Clupea fuegensis:Regan, 1916:4; Norman, 1937:37, fig. 14 (Tierra de1 Fuego, Falklands/ Malvinas); Fowler, 1945:1, fig (all records); Svetovidov, 1952:117; Idem, 1963:122; Clupea (Antu) fuegensis:de Buen, 1958:88; Sprattus fuegensis - Whitehead, 1964:326 (key).

FAO Names : En - Chilean sprat.



Diagnostic Features : Lower jaw slightly projecting, gill cover without bony radiating striae, teeth rarely present on vomer, or only 1 or 2; belly with strong keel of scutes; pelvic finrays i 7, insertion of fin under or just behind dorsal fin origin, last two anal finrays not enlarged. No dark spots on flanks.

Geographical Distribution : Western South Atlantic (from about 40°S to Tierra del Fuego, also Falklands/Malvinas); records from the Pacific coast (e.g. to Valparaiso, Chile, by Mann, 1954:130) may refer to Strangomera.



Habitat and Biology : Marine pelagic and schooling fishes of coastal waters. More data needed.

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

Interest to Fisheries : Of perhaps considerable importance, but separate statistics not yet reported.

Local Names : CHILE: Pechu chalwa, Sardina quichay.

Literature : De Buen (1958 - synonymy only).

Remarks : Perhaps confused in the field with the possibly sympatric Strangomera bentincki, from which it can be distinguished by its more sharply keeled belly and fewer lower gillrakers (less than 50, cf. more than 60) which do not overlap the upper gillrakers.

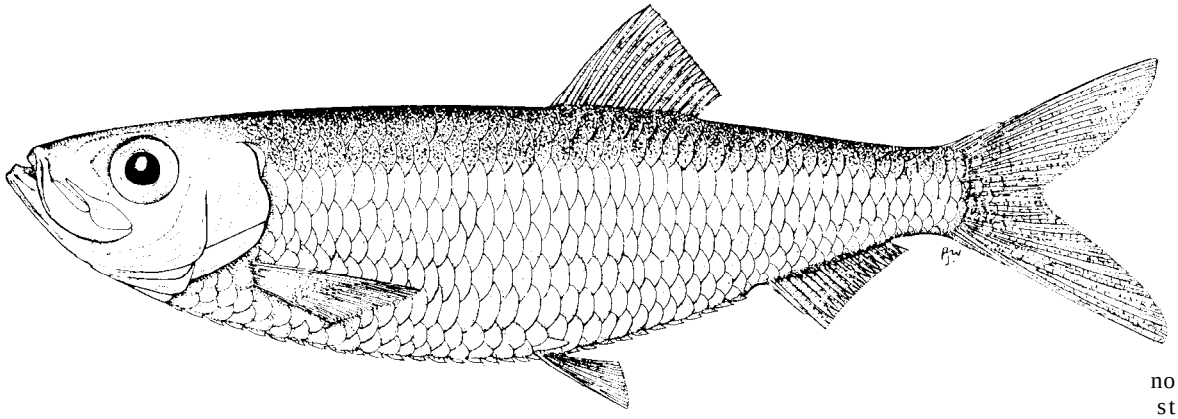
Sprattus muelleri (Klunzinger, 1880)

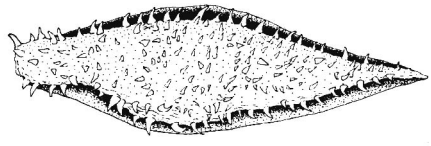
CLUP Spratt 5

Clupea muelleri Klunzinger, 1880, Sitzber.Akad.Wiss.Wien, 80(1):416 (New Zealand, Ferdinand von Müller collection.

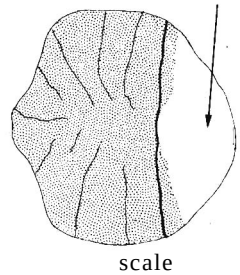
Synonyms : Clupea muelleri:Regan, 1916:228; Sprattus muelleri:Whitehead, Smith & Robertson, in press (key, diagnosis, biology, synopsis); given as S. antipodum in most literature after Regan.

FAO Names : En - New Zealand sprat.





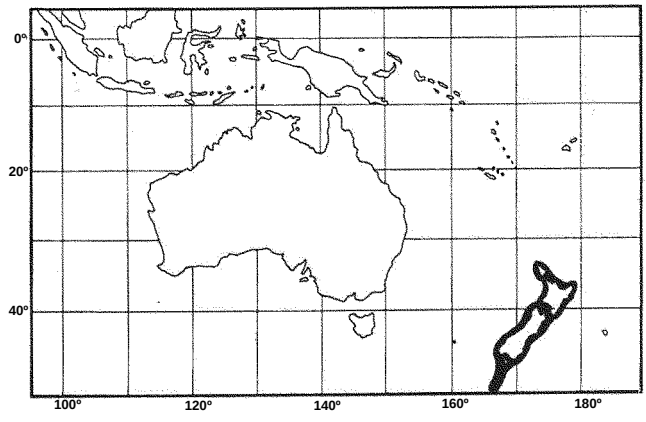
toothplate on tongue



scale

Diagnostic Features : Body moderately deep, its depth from 24 to 31% of standard length (mean 26%); gill cover without bony radiating striae; toothplate on tongue narrow, pointed at each end, its width about 4 or 5 times in length, lateral teeth moderate; scales without fine striae on exposed posterior part; vertebrae 43 to 47; back green/grey when fresh.

Geographical Distribution : New Zealand (eastern and western coasts of the North and the South Islands, possibly south to Foveaux Strait and even to Aukland Island, nearly 51°S).



Habitat and Biology : Marine, pelagic and schooling fishes of coastal waters, from beaches down to 110 m or more. An apparently long spawning season (July to January) around the South Island, but not a fractional spawner; eggs present in mid-summer near Clutha River mouth (but samples may also have included S. antipodum). More data needed.

Size : To about 13 cm standard length, usually to 10 cm.

Interest to Fisheries : No separate statistics, but perhaps of local interest.

Local Names : -

Literature : Smith & Robertson (1981 - summary of breeding data); Whitehead, Smith & Robertson (in press - synopsis).

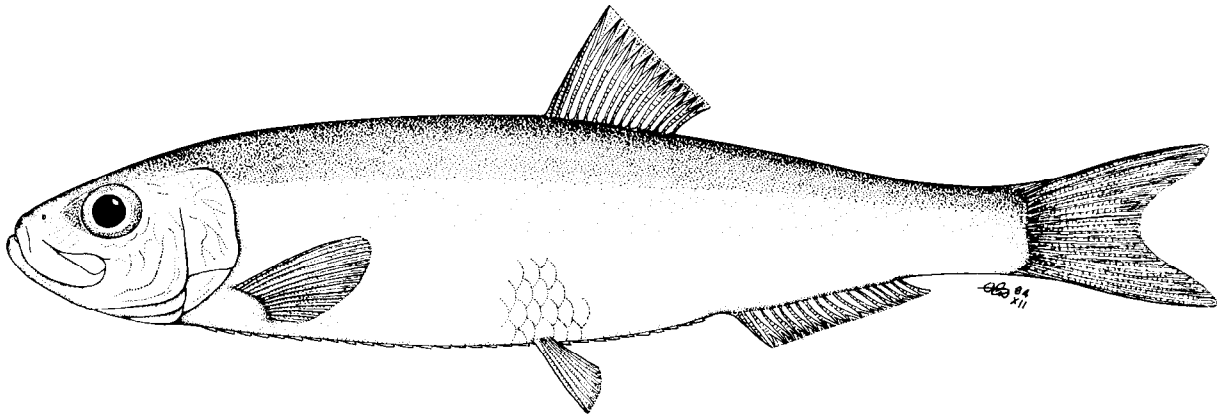
Sprattus novaehollandiae (Valenciennes, 1847)

CLUP Spratt 3

Meletta novae-hollandiae Valenciennes, 1847, Hist.nat.poiss, 20:376 (Port Jackson, Australia).

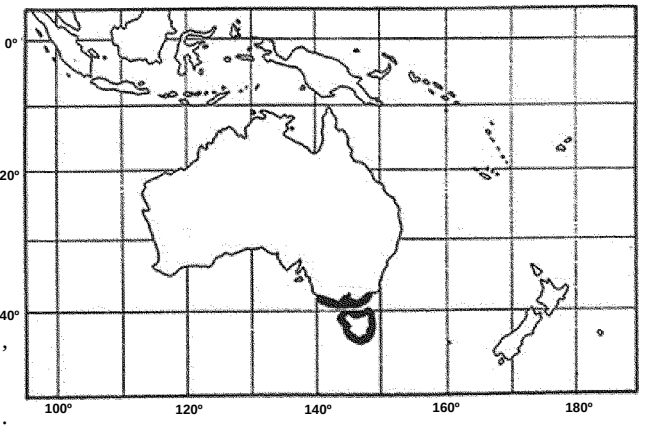
Synonyms : Clupea (Pomolobus) bassensis McCulloch, 1911, Zool.Res.Endeavour, 1:16, pl. 4, fig. 2 (Bass Strait and Tasmania); Clupea bassensis:Regan,1916:5; Munro, 193824, sp. 166; Sprattus bassensis Svetovidov, 1952:106; Idem, 1963:106 in Ennglish); Sprattus novaehollandiae - Whitehead, 196721 (type); Idem,1964:327 (key, synonymy).

FAO Names : En - Australian sprat.



Diagnostic Features : Lower jaw slightly projecting, gill cover without bony radiating striae, teeth absent on vomer; belly not sharply keeled, scutes rounded; pelvic finrays i 7, insertion of fin a little before dorsal fin origin, last two anal finrays not enlarged. Overlaps ranges of Sardinops (series of spots along flank, bony striae on gill cover) and Hyperlophus (scutes present on back before dorsal fin).

Geographical Distribution : Tasmania, Bass Strait, southeastern Australia north to Sydney.



Habitat and Biology : Marine pelagic and schooling fishes of coastal waters, appearing off Tasmanian shores in large schools (especially in August-November) and often entering estuaries (e.g. of Tamar and Derwent rivers; said to ascend the former as far as Launceston in March fide Blackburn, 1941). More data needed.

Size : To about 14 cm standard length.

Interest to Fisheries : No separate statistics, but schools seasonally large.

Local Names : AUSTRALIA: Sprat (Tasmania).

Literature : Blackburn (1941 - as Clupea bassensis, taxonomy, biology summarized briefly).

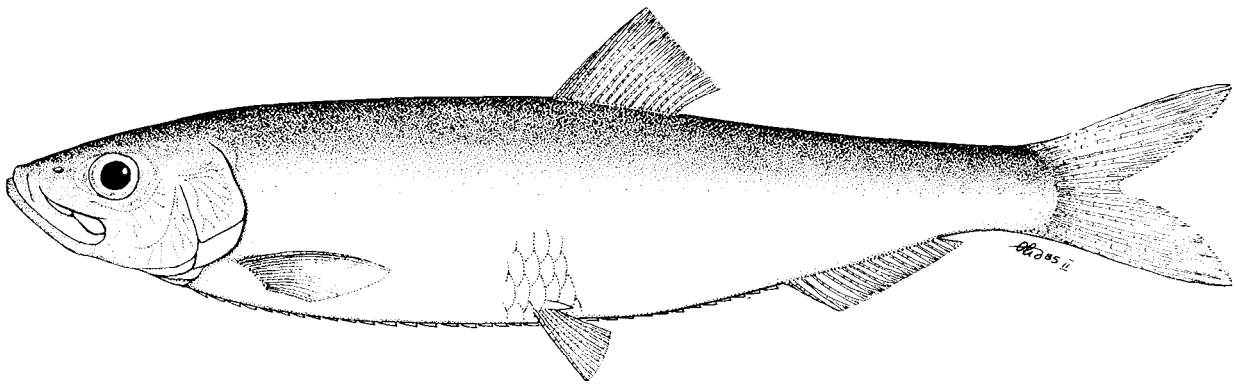
Sprattus sprattus (Linnaeus, 1758)

CLUP Spratt 1

Clupea sprattus Linnaeus, 1758, Syst.nat., 10th ed.:318 (Europe).

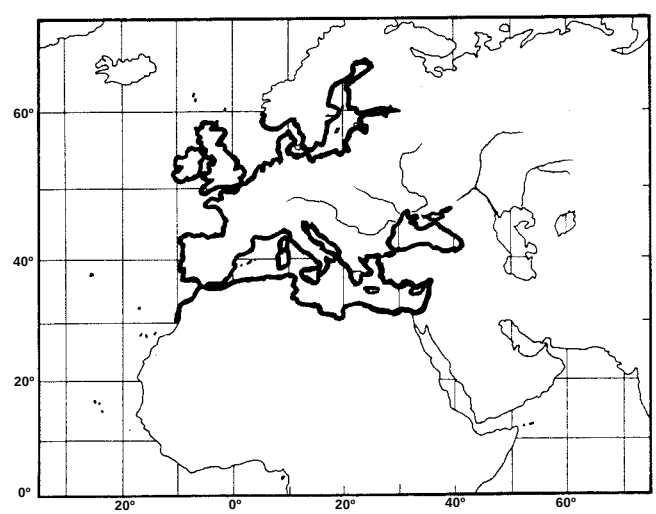
Synonyms : Clupanodon phalerica Risso, 1827:425; Clupea latulus Cuvier, 1829:318; Clupea papalina Bonaparte, 1845:34; Clupea schoneveldii Kroyer, 1846:193; Spratella pumila Valenciennes, 1847:357; Meletta vulgaris Valencianes, 1847:366; Clupea sprattus balticus G. Schneider, 1904:66; Clupea sulinae Antipa, 1906:38; Spratella serdnica Nikolsky, 1923:2; Sprattus sprattus - Svetovidov, 1952:107, pl. 1, fig. 3; Idem, 1963:lll (in English); Demir, 1965:unp. (synopsis); CLOFNAM, 1973:104 (full synonymy); FNAM, 1984:224, fig. (synopsis).

FAO Names : En - European sprat.



Diagnostic Features : Lower jaw slightly projecting, gill cover without bony radiating striae, teeth rarely present on vomer; belly with a strong keel of scutes; pelvic finrays i 6 (rarely i 7), insertion of fin under or before the dorsal fin origin, last two anal finrays not enlarged. No dark spots on flanks. See CLUP Spratt 1, Fishing Area 37.

Geographical Distribution : Northeast Atlantic (from North Sea and Baltic south to Morocco; also Mediterranean, Adriatic, Black Sea).



Habitat and Biology : Marine pelagic and usually inshore schooling fishes, sometimes entering estuaries (especially the juveniles) and tolerating salinities as low as 4‰; strong migrations between winter feeding and summer spawning grounds. Feeds on planktonic crustaceans. Some spawning almost throughout the year, near to the coast or up to 100 km out to sea, mainly in spring and summer, the young drifting inshore. Move to the surface at night.

Size : To 16 cm, usually to 12 cm standard length.

Interest to Fisheries : Of importance in North Sea, Baltic and off Norwegian coasts, with a total of 327 420 tons in 1983; more than two thirds of this was fished by Denmark and Norway. Mediterranean and Black Sea catches in 1983 were 43 193 tons, mostly by Yugoslavia and Bulgaria. Caught in trawls or driftnets, or driven up Norwegian fjords by nets and penned until needed by the canning factories (sold as 'brislings'); juveniles sold as 'white bait' (often mixed with juvenile herrings).

Local Names : Many variants on the names Sprott or Sprat, Espadin, Papalina and Brisling (see Bini, 1970:56).

Literature : Svetovidov (1952, 1963 - Russia); Demir (1965 - biology, synopsis); Banarescu (1968 - Black Sea); Wheeler (1969 - UK); Bini (1970 - Mediterranean); FNAM (1984 - synopsis).

Remarks : Small differences, mainly in numbers of post-pelvic scutes, have been used to define three subspecies:

(a) S. sprattus sprattus: average post-pelvic scutes more than 11.5; Atlantic and North Sea coasts.
(b) S. sprattus phalericus: average post-pelvic scutes not more than 11.3; Mediterranean, Adriatic, Black Sea
(c) S. sprattus balticus: average post-pelvic scutes less than 11.5; Baltic Sea.