

Size: To 35 cm standard length.

Interest to Fisheries: A small fishery exists along the coast of the Bay of Bengal primarily near or on river deltas. Commercially important fish captured by nets and longlines in the Hooghly and Ganges delta. Marketed fresh.

Local Names: INDIA: Gangetic whiting.

Literature: Fowler (1933:432-433, description); Palekar and Bal (1955:128, anatomy); Misra (1962:231-232, distribution); Dutt and Sujatha (1980:371-374).

Sillago Cuvier, 1817

SILL Sill

Sillago Cuvier, 1817, type by subsequent designation, Gill, 1861:503. Type species, *Sillago sihama* (Forsskål, 1775).

Diagnostic Features: Swimbladder present, often complex, with a blind tube (duct-like process) from the ventral surface to just before the anus usually present.

Biology, Habitat and Distribution: See family.

Subgenera and Species of *Sillago*: McKay (1985) divided the genus *Sillago* into 3 subgenera.

The monotypic subgenus *Sillaginopodys* is characterised by the reduced pelvic-fin spine situated at the base of a thickened club-shaped outer ray (Fig. 50); swimbladder reduced, without duct-like process and no haemal funnel.

Sillago (Sillaginopodys) chondropus Bleeker, 1849.

The subgenus *Sillago* contains 4 species and is characterized by a double post-coelomic extension penetrating the tail region (Fig. 51).

Sillago (Sillago) intermedius Wongratana, 1977

Sillago (Sillago) megacephalus Lin, 1933

Sillago (Sillago) parvisquamis Gill, 1861

Sillago (Sillago) sihama (Forsskål, 1775)

The subgenus *Parasillago* contains 24 species and is distinguished by the single post-coelomic extension of the swimbladder (Fig. 52).

Sillago (Parasillago) aeolus Jordan and Evermann, 1902

Sillago (Parasillago) analis Whitley, 1943

Sillago (Parasillago) arabica McKay and McCarthy, 1989

Sillago (Parasillago) argentifasciata Martin and Montalban, 1935

Sillago (Parasillago) asiatica McKay, 1983

Sillago (Parasillago) attenuata McKay, 1985

Sillago (Parasillago) bassensis Cuvier, 1829

Sillago (Parasillago) boutani Pellegrin, 1905

Sillago (Parasillago) burrus Richardson, 1842

Sillago (Parasillago) ciliata Cuvier, 1829

Sillago (Parasillago) flindersi McKay, 1985

Sillago (Parasillago) indica McKay, Dutt and Sujatha, 1985

Sillago (Parasillago) ingenuua McKay, 1985

Sillago (Parasillago) japonica Temminck and Schlegel, 1843

Sillago (Parasillago) lutea McKay, 1985

Sillago (Parasillago) macrolepis Bleeker, 1859

Sillago (Parasillago) maculata Quoy and Gaimard, 1824

Sillago (Parasillago) microps McKay, 1985

Sillago (Parasillago) nierstraszi Hardenberg, 1941

Sillago (Parasillago) robusta Stead, 1908

Sillago (Parasillago) schomburgkii Peters, 1865

Sillago (Parasillago) soringa Dutt and Sujatha, 1983

Sillago (Parasillago) vincenti McKay, 1980

Sillago (Parasillago) vittata McKay, 1985

Key to Species of *Sillago*

- 1 a. Pelvic-fin spine very small and situated at the base of a thickened club-shaped outer pelvic-fin ray; swimbladder reduced, no duct-like process; no modified caudal vertebrae present (subgenus *Sillaginopodys*) (Figs 49, 50) *S. chondropus*
- 1 b. No club-shaped outer pelvic-fin ray -> 2

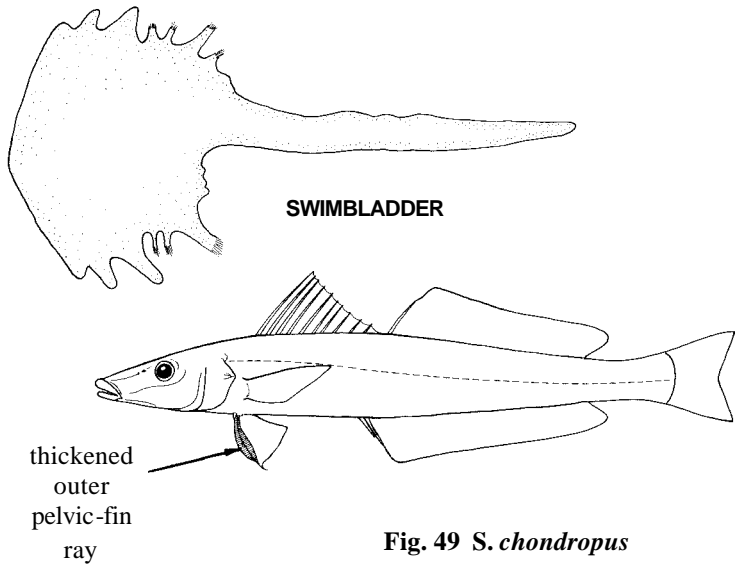


Fig. 49 *S. chondropus*

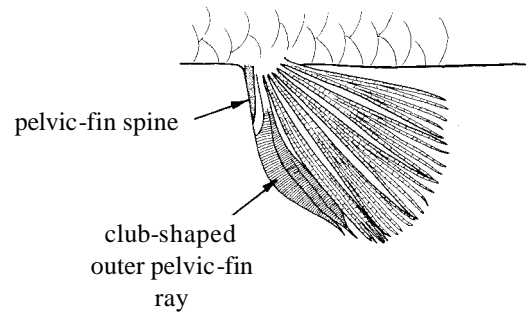


Fig. 50 Pelvic-fin

- 2a. Swimbladder divided posteriorly into 2 tapering extensions projecting below vertebral column into tail musculature (Fig. 51) (*subgenus Sillago*) -> 3
- 2b. Swimbladder with a single posterior extension below vertebral column and entering the tail section (Fig. 52) (*subgenus Parasillago*) -> 6

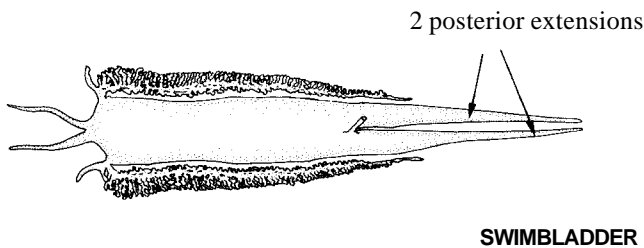


Fig. 51 Subgenus *Sillago*

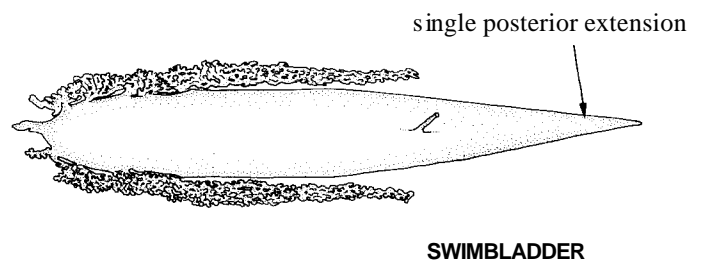


Fig. 52 Subgenus *Parasillago*

- 3a. Dorsal-fin spines XII or XIII; 79 to 84 lateral-line scales; 39 or 40 vertebrae (Fig. 53) *S. parvisquamis*
- 3b. Dorsal-fin spines XI; 66 to 72 lateral-line scales; 33 or 34 vertebrae -> 4

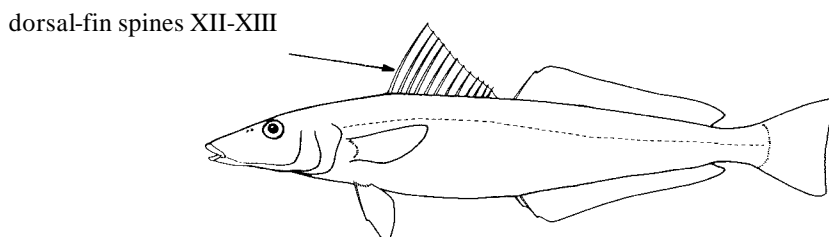


Fig. 53 *S. parvisquamis*

- 4a. Body with a longitudinal row of dark spots below the lateral line and a series of dark saddle-like blotches on back (Fig. 54) *S. intermedius*
- 4b. Body uniform in coloration -> 5

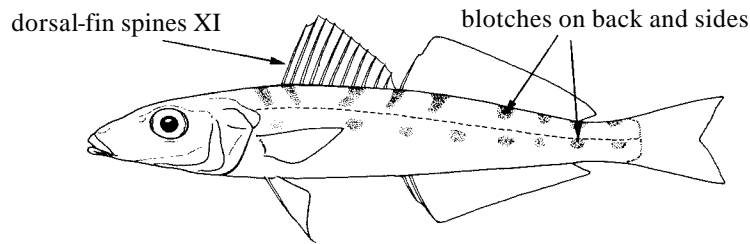


Fig. 54 *S. intermedius*

- 5a. Head length 24 to 30% of standard length; vertebrae 33 (Fig. 55) *S. sihama*
- 5b. Head length 33% of standard length; vertebral number unknown (a doubtful species) *S. megagephalus*

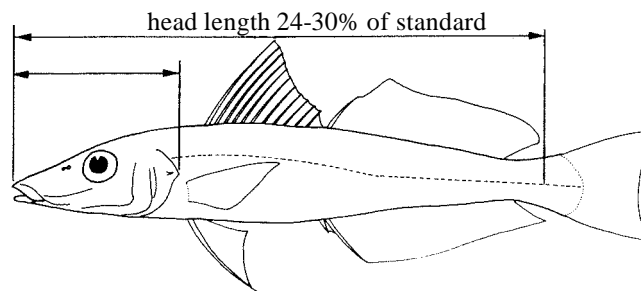


Fig. 55 *S. sihama*

- 6a. A dark brown, dusky or blue-black spot or blotch on or just preceding the base of the pectoral fin (Fig. 56) -> 7
- 6b. No dark blotch at base of pectoral fin although a bright yellow or orange spot may be present (Fig. 57) -> 11

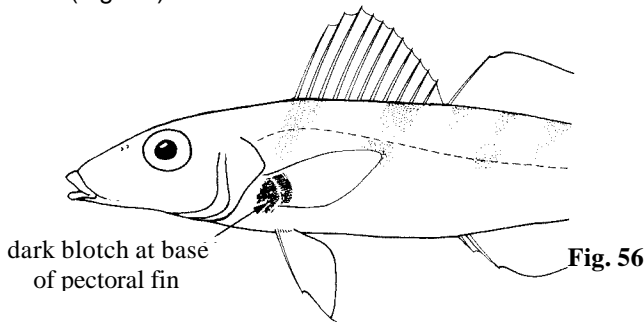


Fig. 56

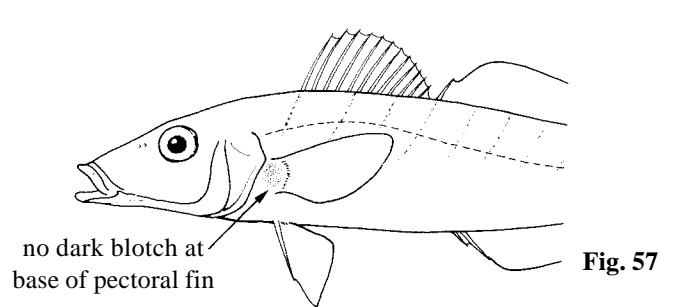


Fig. 57

- 7a. Body colour uniform in adults (juveniles to 90 mm have darker blotches along the sides and back) with the snout bluish in some large specimens; dorsal fin with XI spines in first fin, and I spine and 16 to 18 soft rays in the second fin; anal fin with II spines and 15 to 17 soft rays; lateral-line scales 60 to 69; vertebrae 14 or 15 + 5 to 8 + 11 to 14, total 32 to 34; swimbladder with rudimentary tubules projecting anteriorly and a series of sawtooth-like pockets laterally (Fig. 58) (eastern Australia) *S. ciliata*
- 7b. Body with dark blotches or rusty brown bars -> 8

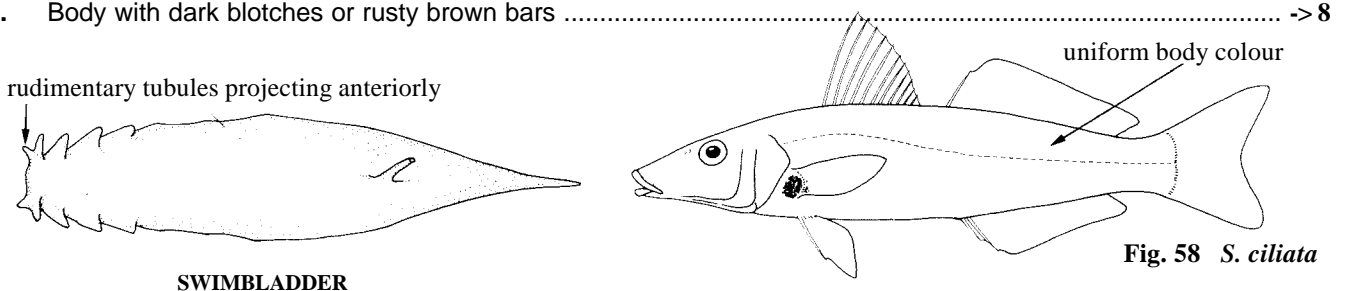
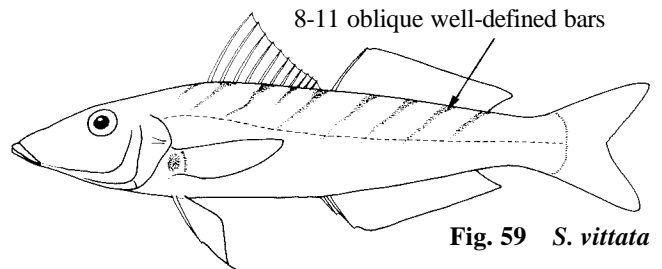
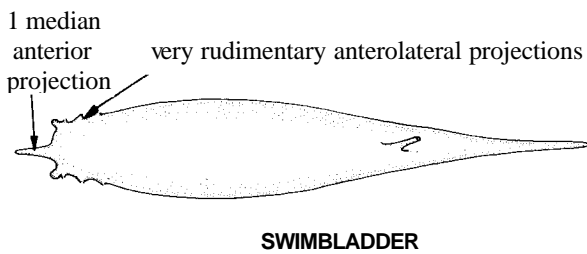
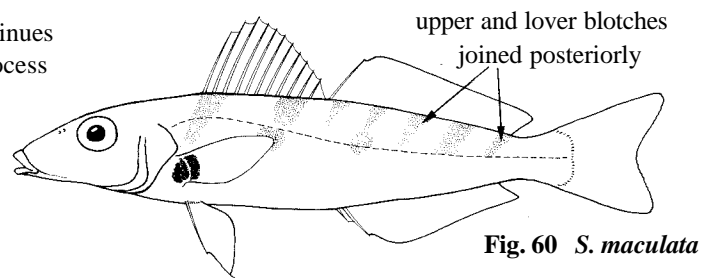
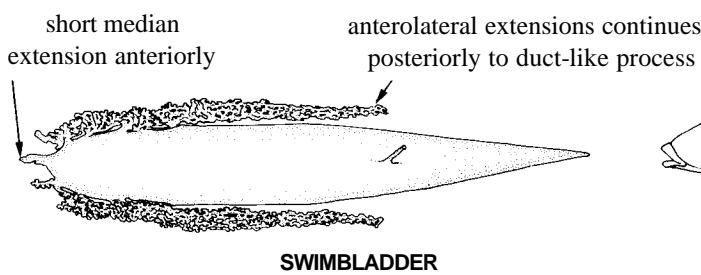


Fig. 58 *S. ciliata*

- 8a. Body with 8 to 11 oblique well-defined rusty-brown bars dorsally; first dorsal fin with XI spines, and second dorsal fin with I spine and 17 to 19 soft rays; anal fin with II spines and 16 to 18 soft rays; lateral-line scales 65 to 70; vertebrae 13 or 14 + 8 to 12 + 7 to 10, total 32 to 34; swimbladder with a median anterior projection and very rudimentary anterolateral projections (Fig. 59) (western Australia) *S. vittata*
- 8b. Body without well-defined rusty-brown bars -> 9



- 9a. Upper and lower dark blotches on sides joined at least posteriorly; first dorsal fin with XI spines, and second dorsal fin with I spine and 19 to 21 soft rays; anal fin with II spines and 19 or 20 soft rays; lateral-line scales 71 to 75; vertebrae 34 to 36; swimbladder with a short median extension anteriorly and a complex anterolateral extension that continues posteriorly to the duct-like process (Fig. 60) (eastern Australia) *S. maculata*
- 9b. Upper and lower dark blotches separate; swimbladder without complex anterolateral extensions extending well posteriorly to end of abdomen -> 10



- 10a. Swimbladder with four rudimentary anterolateral extensions that are normally convoluted; usually 19 or 20 anal-fin rays; usually 35 vertebrae (Fig. 61) (northern coast of Australia, southern New Guinea and Indonesia) *S. burrus*
- 10b. Swimbladder with three rudimentary anterolateral extensions that may be simple or convoluted; usually 18 anal-fin rays; vertebrae 34 (Fig. 62) (western Pacific except Australia and southern New Guinea) *S. aeolus*

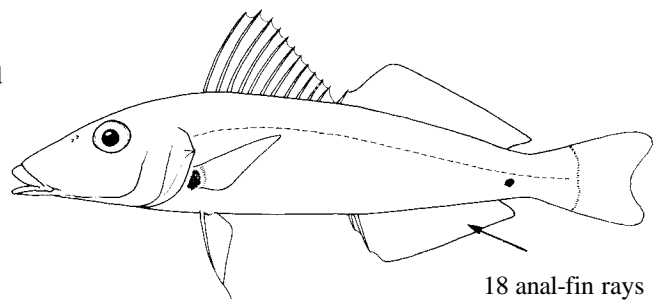
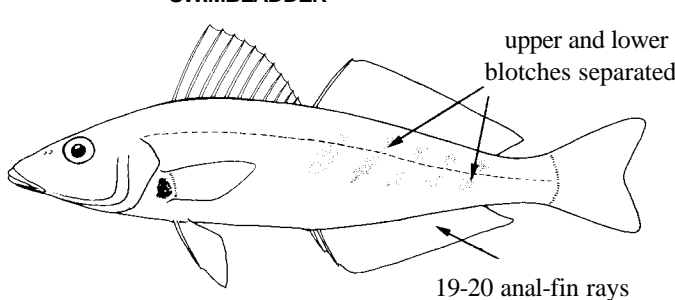
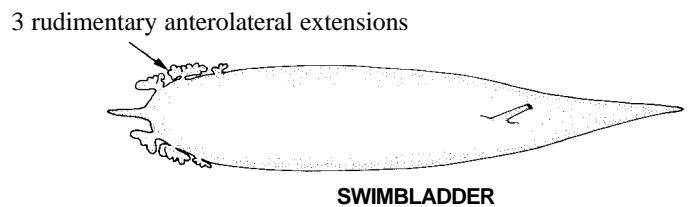
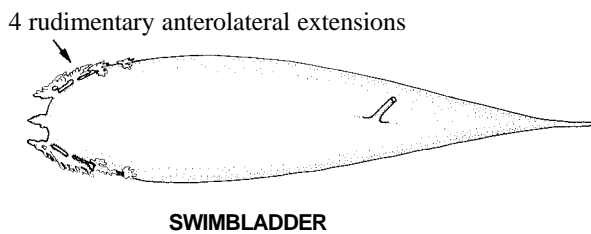
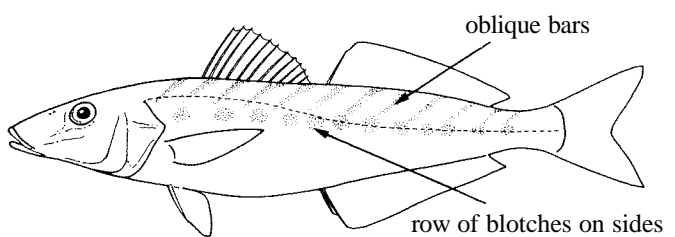
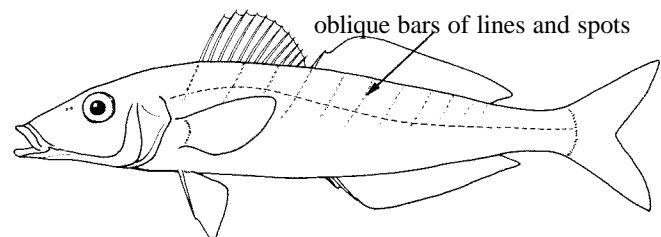


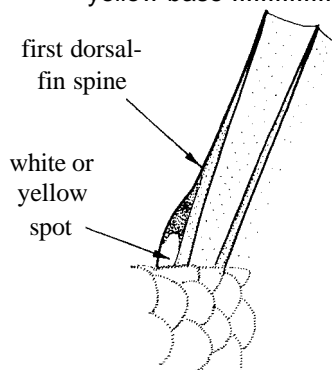
Fig. 61 *S. burrus*

Fig. 62 *S. aeolus*

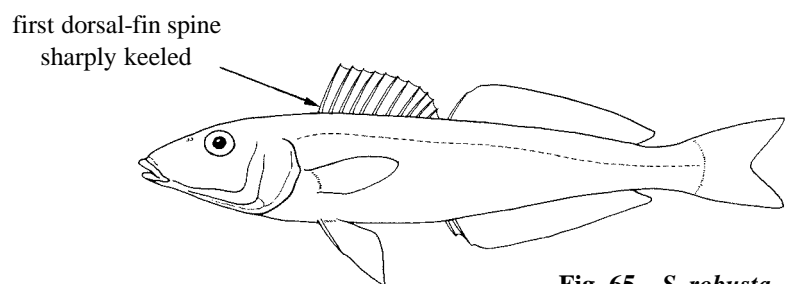
- 11a.** Body with oblique narrow rusty brown bars that may be partly broken into lines of more or less contiguous rusty brown or orange-brown spots (Figs 63, 64) -> 12
- 11 b.** Body without oblique rusty brown bars; some faint dark blotches or small spots may be present in juveniles less than 100 mm standard length -> 13
- 12a.** A longitudinal row of brown or rusty brown blotches along middle of side on or below lateral line; body pale, not silvery; upper oblique bars not formed of lines of contiguous rusty brown spots; midlateral silvery stripe generally indistinct; vertebrae 13 + 9 to 11 + 9 to 11 (Fig. 63) (southeastern Australia) *S. flindersi*
- 12b.** No longitudinal row of brown or rusty brown blotches on or below lateral line; belly silvery; upper oblique bars usually formed of lines of contiguous rusty brown to orange-brown spots; midlateral silvery stripe conspicuous; vertebrae 12 to 14 + 12 to 14 + 7 to 9 (Fig. 64) (western Australia, southern Australia and western Victoria) *S. bassensis*

Fig. 63 *S. flindersi*Fig. 64 *S. bassensis*

- 13a.** Base of first dorsal-fin spine of adults with a sharply keeled anterior edge bearing on the lower part a white or pale yellow spot with a black or black-brown spot above; first dorsal fin with XI spines, and second dorsal fin with I spine and 16 to 18 soft rays; anal fin with II spines and 16 to 19 soft rays; lateral-line scales 64 to 70; vertebrae 13 + 8 to 12 + 8 to 12, total 33 (Fig. 65) (southern Australia) *S. robusta*
- 13b.** Base of first dorsal-fin spine not keeled and without a black spot or blotch above a white or yellow base -> 4



DORSAL-FIN SPINES

Fig. 65 *S. robusta*

- 14a.** Total vertebrae 37 to 40; lateral-line scales usually more than 73 (except some *S. schomburgkii*) -> 15
- 14b.** Total vertebrae 32 to 36; lateral-line scales usually less than 73 (except *S. japonica* and some *S. indica*) -> 18

- 15a. Anal-fin rays 21 to 24 -> 16
- 15b. Anal-fin rays 17 to 20 -> 17

- 16a. Dorsal-fin rays 21; snout 39 to 40% of head length; abdominal vertebrae 13 or 14; modified vertebrae 3 or 4 (Fig. 66) (Gulf of Tongking and China) *S. boutani*
- 16b. Dorsal-fin rays 22 to 24; snout 31 to 38% of head length; abdominal vertebrae 15 or 16; modified vertebrae 0 or 1 (Fig. 67) (Arabian Gulf) *S. arabica*

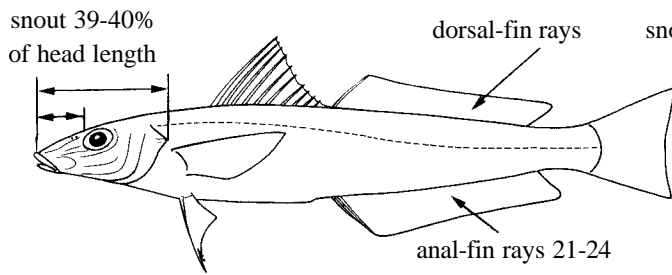


Fig. 66 *S. boutani*

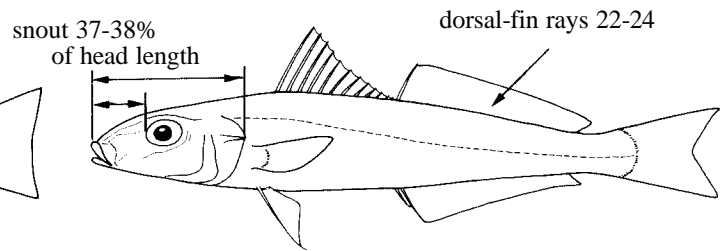
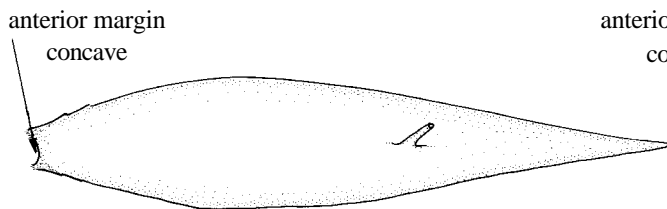
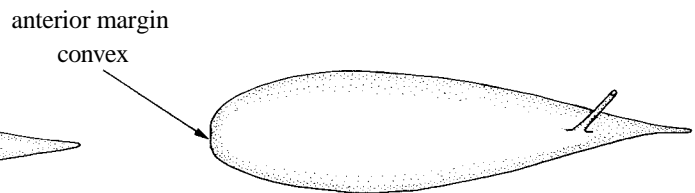


Fig. 67 *S. arabica*

- 17a. Anterior margin of swimbladder concave; first dorsal fin with X to XII (mostly XI) spines, and second dorsal fin with I spine and 19 to 22 soft rays; lateral-line scales 66 to 76; vertebrae 16 or 17 + 8 to 11 + 10 to 13, total 37 (Fig. 68) (western Australia and South Australia) *S. schomburgkii*
- 17b. Anterior margin of swimbladder convex; first dorsal fin with XII to XIII (mostly XII) spines, and second dorsal fin with I spine and 19 to 21 soft rays; lateral-line scales 73 to 77; vertebrae 15 + 2 + 20, total counts range from 37 to 39; body with faint to distinct dark blotches in 3 series laterally (Fig. 69) (Arabian Gulf) *S. attenuata*



SWIMBLADDER



SWIMBLADDER

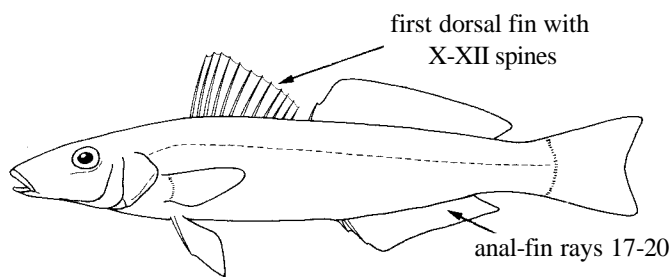


Fig. 68 *S. schomburgkii*

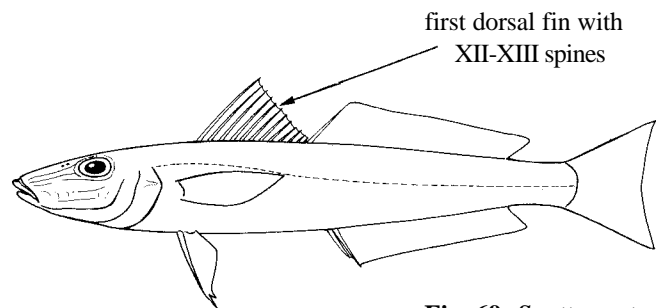
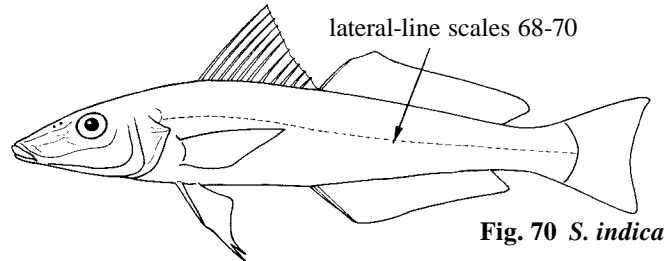
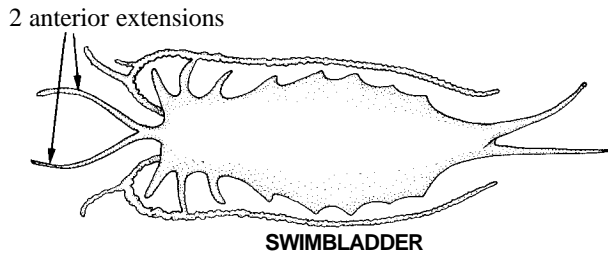


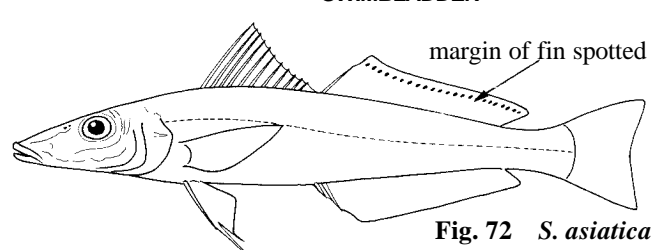
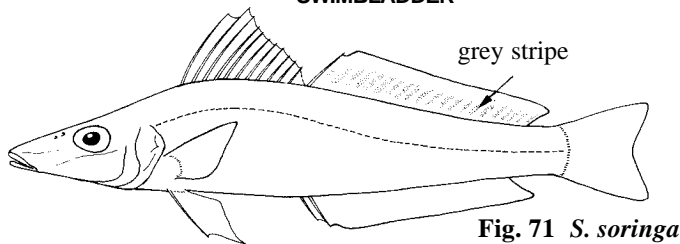
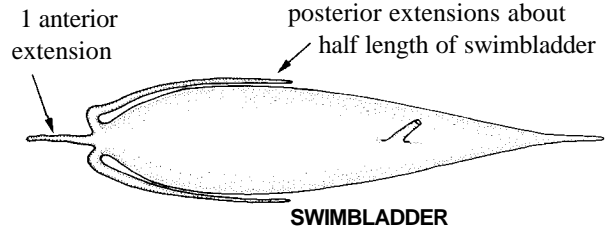
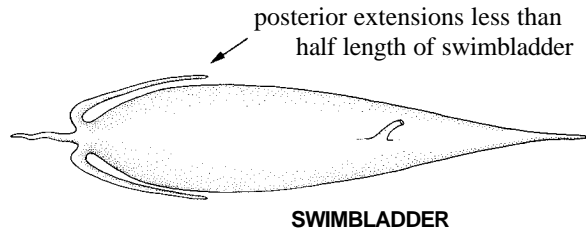
Fig. 69 *S. attenuata*

- 18a. Swimbladder with anterolateral extensions recurved posteriorly (Fig. 70) -> 19
- 18b. Swimbladder without posteriorly recurved anterolateral extensions (Fig. 75) -> 21

- 19a. Swimbladder with 2 anterior extensions in addition to the anterolateral extensions extending posteriorly (Fig. 70); lateral-line scales 68 to 70 (India) *S. indica*
- 19b. Swimbladder with a single anterior extension in addition to the posteriorly directed anterolateral extensions (Fig. 72) -> 20



- 20a. Membrane of second dorsal fin with a more or less continuous grey stripe formed of minute black dots running parallel to and closer to anterior edge of each ray; extensions of swimbladder extend to less than half length of swimbladder (Fig. 71) (India) *S. soringa*
- 20b. Membrane of second dorsal fin without a more or less continuous grey stripe but with margin of fin finely spotted with brown or black; extensions of swimbladder extend posteriorly to almost half length of swimbladder (Fig. 72) (Thailand and Taiwan) *S. asiatica*



- 21 a. Lateral-line scales 61 or less (Fig. 73) -> 22
- 21 b. Lateral-line scales 64 or more -> 23

- 22a. Anal-fin rays 14 to 17 (Fig. 73) (southern New Guinea and northern Australia) *S. analis*; *S. nierstraszi*
- 22b. Anal-fin rays 19 to 21 (Fig. 74) (Indonesia to Philippines, excluding Australia) *S. macrolepis*

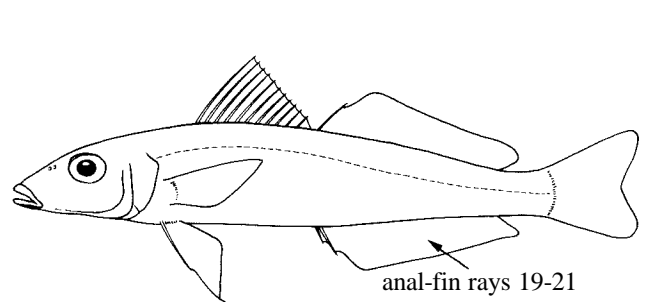
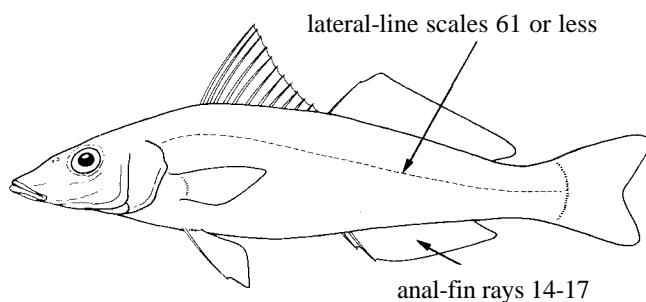
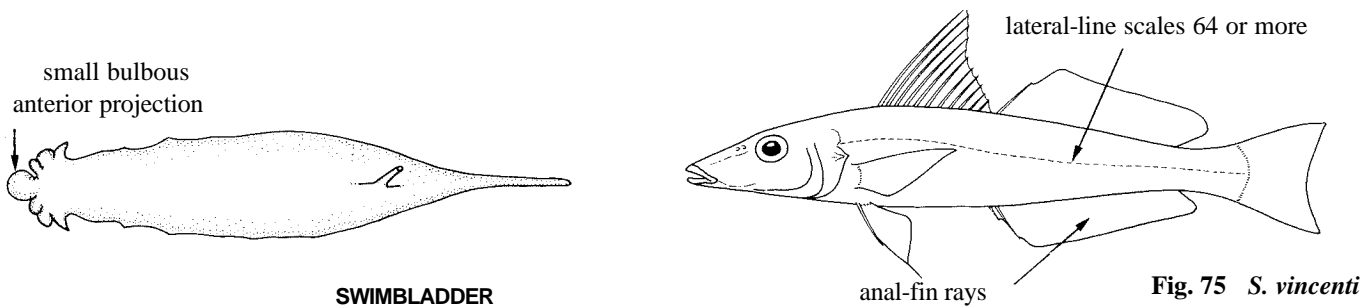


Fig. 73 *S. analis*

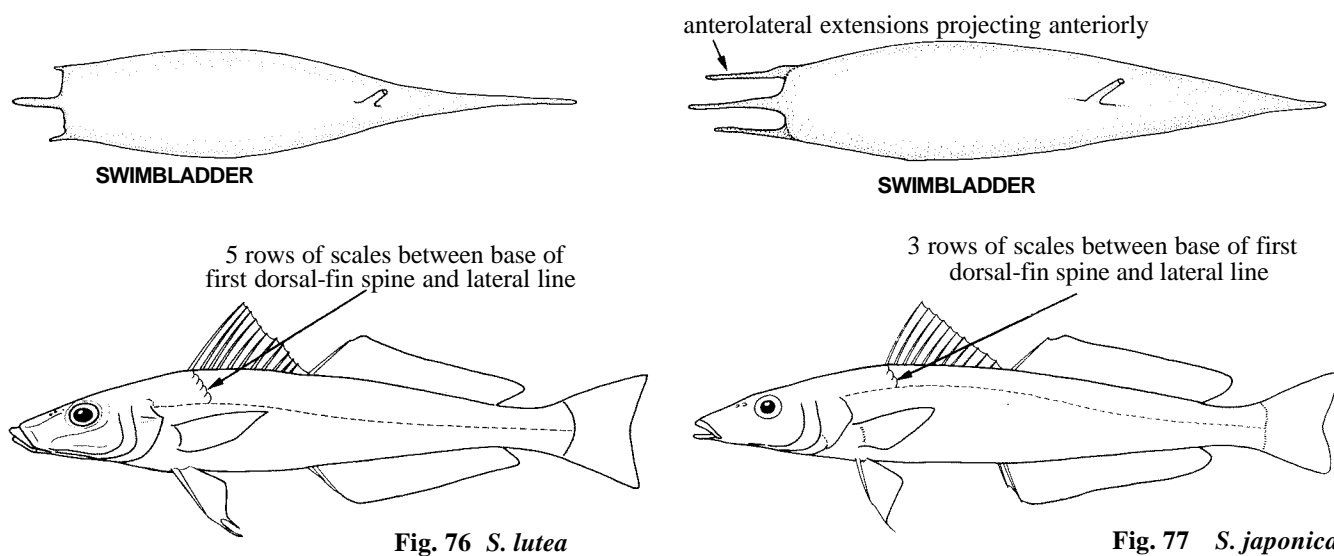
Fig. 74 *S. macrolepis*

- 23a. Anal-fin rays 21 to 24 -> 24
- 23b. Anal-fin rays 17 to 19 -> 26

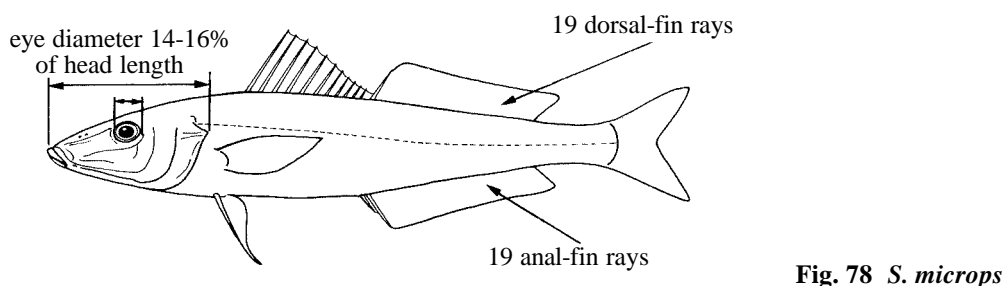
- 24a. Swimbladder with a small bulbous anterior projection and without anterolateral extensions projecting anteriorly (Fig. 75) (southwestern India)..... *S. vincenti*
- 24b. Swimbladder with a pointed median anterior extension and anterolateral extensions projecting anteriorly (Fin; 76, 77) -> 25



- 25a. Scales between lateral line and base of first dorsal-fin spine 5; usually 13 abdominal vertebrae; small species (Fig. 76) (northern Australia to India and Sri Lanka) *S. lutea*
- 25b. Scales between lateral line and base of first dorsal-fin spine 3; usually 14 abdominal vertebrae; moderate species (Fig. 77) (Japan, Korea, China and Taiwan) *S. japonica*



- 26a. Dorsal-fin rays 19; anal-fin rays 19; cheek scales cycloid; vertebrae 13 + 5 + 16, total 34; eye diameter 14 to 16% of head length (Fig. 78) (Taiwan) *S. microps*
- 26b. Dorsal-fin rays 17 or 18; anal-fin rays 17; eye more than 19% of head length -> 27



- 27a.** Dorsal-fin rays 17; cheek scales ctenoid; vertebrae 13 + 9 to 11 + 9 to 11, total 33; eye diameter 19 to 23% of head length; no wide brilliant silvery stripe on side (Fig. 79) (Thailand, India and northern Australia) *S. ingenuua*
- 27b.** Dorsal-fin rays 17 or 18; cheek scales with upper row cycloid and lower 2 rows ctenoid; eye diameter 28 to 29% of head length; a wide brilliant silvery stripe on side (Fig. 80) (Lumbucan Island, Philippines) *S. argentifasciata*

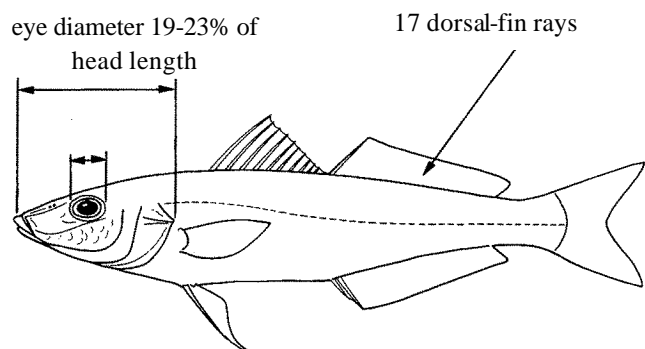


Fig. 79 *S. ingenuua*

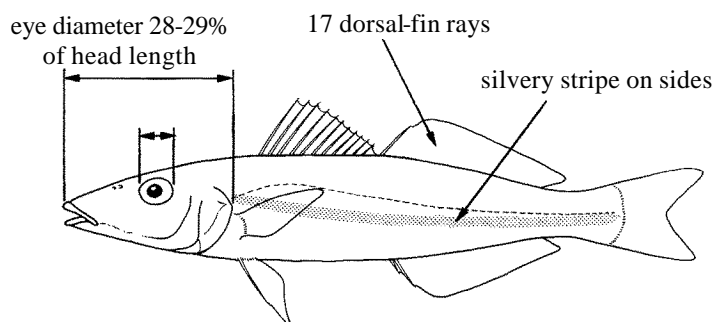


Fig. 80 *S. argentifasciata*

Sillago aeolus Jordan and Evermann, 1902

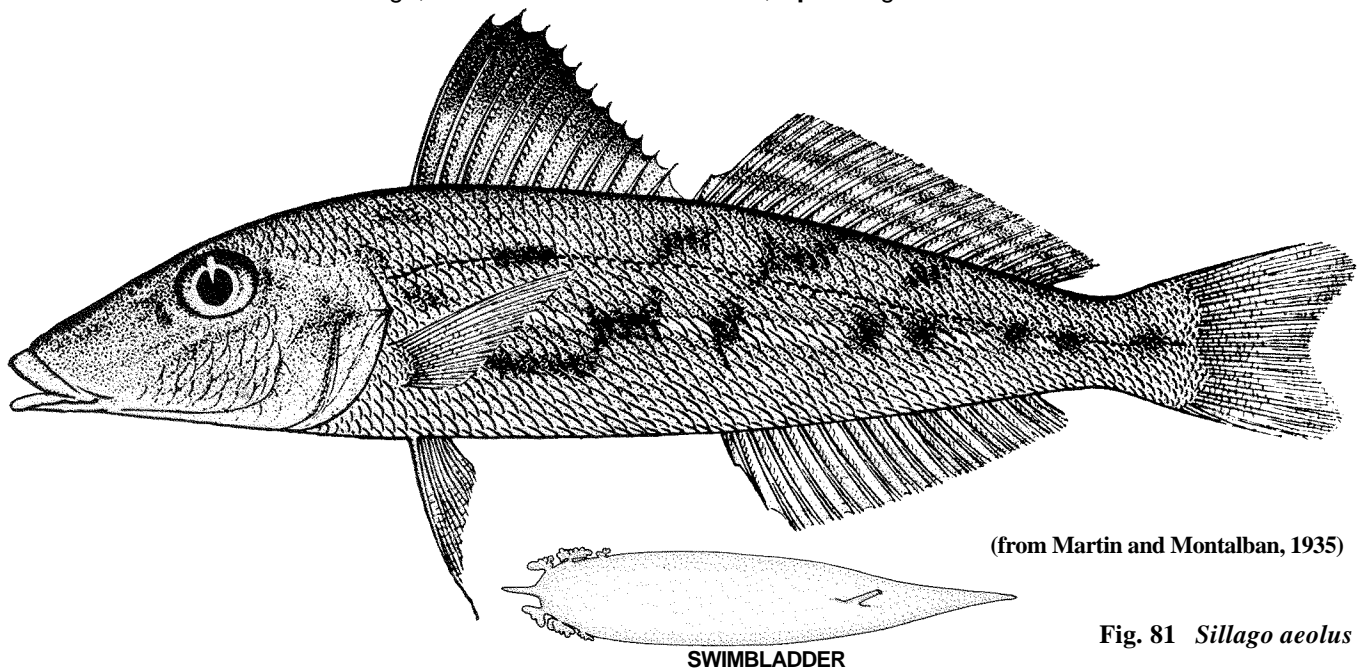
Fig. 81

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Sillago aeolus Jordan and Evermann, 1902:360, fig. 24 (Keerun, Formosa).

Synonyms: *Sillago macrolepis* (non *Sillago macrolepis* Sleeker): Evermann and Seale, 1907:187. *Sillago maculata* (non *Sillago maculata* Quoy and Gaimard): Sleeker, 1858:161 (Indonesian localities), 1874:71 (part); Kner, 1865:127; Pellegrin, 1905:83; Seale, 1914:69 (Hong Kong); Weber and de Beaufort, 1931:174 (part); Fowler, 1933:423-425 (part, localities), 1935:150, 1937:238, 1949:52; Martin and Montalban, 1935:224-225, pl. 1, fig. 2; Smith, 1949:204 (South Africa); Suvatti, 1950:394 (Bangkok, Rayong); Herre, 1953:478-479 (part, many localities); Palekar and Bal, 1955:128 (part); Munro, 1955:122 (Ceylon), 1958:178; Scott, 1959:56 (Malaysia); Shao and Chang, 1978:5, 1979:695-705; Dutt and Sujatha, 1980:372; McKay, 1980:383-384; Masuda et al., 1984:151, pl. 134-B; Sano and Mochizuki, 1984:137-141, fig. 1 A. *Sillago (Parasillago) maculata aeolus*: McKay, 1985:27-28; Shao et al., 1986:147.

FAO Names: En - Oriental sillago; Fr - Pêche-madame oriental; Sp - Silago oriental.

Fig. 81 *Sillago aeolus*

Diagnostic Features: First dorsal fin with XI spines and second dorsal fin with I spine and 18 to 20 soft rays; anal fin with II spines and 17 to 19 (usually 18) soft rays. Lateral-line scales 67 to 72. Vertebrae: 13 or 14 abdominal + 4 to 7 modified + 14 to 16 caudal, 34 total. Swimbladder with three rudimentary anterolateral extensions instead of four; differs from *Sillago maculata* in lacking well developed anterolateral extensions reaching to level of vent. **Colour:** Very similar to *Sillago burrus* but has the most posterior mid-lateral dark brown blotch elongate and reaching caudal flexure.

Geographical Distribution: Singapore, Thailand, China, Hong Kong, Taiwan, Philippines and southern Japan. Possibly distributed throughout the Indo-West Pacific from Delagoa Bay, southern Africa to Okinawajima, Japan, but not recorded from Australia or southern New Guinea (Fig. 82).

Habitat and Biology: Little known. Occurs in a depth range from 0 to 60 m. Maxwell (1921) records juveniles burrowing in the sand.

Size: To 30 cm standard length.

Interest to Fisheries: Small local fisheries exist throughout the range of this species, particularly where bottom trawls are employed. The flesh is prone to spoil rapidly and the Oriental sillago is not considered as highly as the inshore sillaginids.

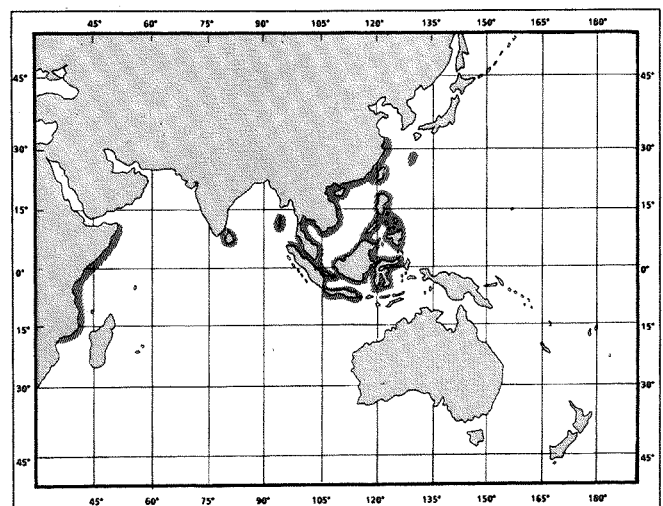


Fig. 82

Local Names: AUSTRALIA: Oriental trumpeter whiting; JAPAN: Hoshi-gisu; MALAYSIA: Ebi, Bulus-bulus, Bêbulus, Kedondong; PHILIPPINES: Oso-so, Asuhos; SOUTH AFRICA: Gevlekte sillago; TANZANIA: Mtambaanchi, Tambanji, Sondo.

Literature: Jordan and Richardson (1909:192, fig. 18); McKay (1985).

Remarks: *Sillago aeolus* has not been found in association with *S. burrus* or *S. maculata*. Specimens of this well patterned complex are required from Indonesia where 2 species may be sympatric.

Sillago analis Whitley, 1943

Fig. 83

SILL Sill 6

Sillago analis Whitley, 1943:184 (Shark's Bay, Western Australia).

Synonyms: *Sillago ciliata* (non *Sillago ciliata* Cuvier): Paradice and Whitley, 1927:89; Taylor, 1964:174 (description).

FAO Names: En - Golden lined sillago; Fr - Pêche-madame doré; Sp - Silago aureolineado.

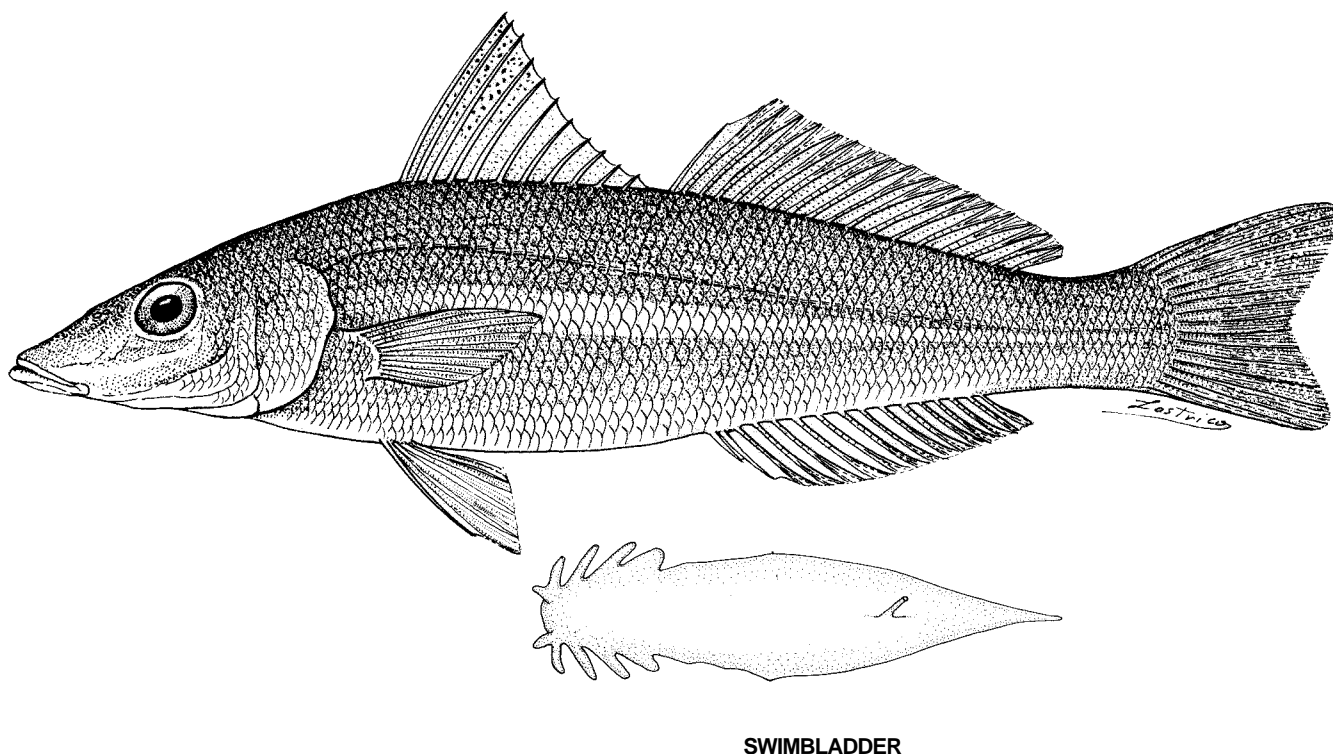


Fig. 83 *Sillago analis*
(after Grant, 1972)

Diagnostic Features: First dorsal fin with XI spines and second dorsal fin with I spine and 16 to 18 soft rays; anal fin with II spines and 14 to 17 soft rays. Lateral-line scales 54 to 61. Vertebrae: 13 or 14 abdominal + 4 to 8 modified + 11 to 15 caudal, 33 or 34 total. The shape of the swimbladder is very similar to *S. ciliata*. **Colour:** No dark spot at base of pectoral fin; Body light silvery, slightly darker to dusky above; a dull golden silver to golden yellow stripe below lateral line; pelvic and anal fins pale yellow to bright yellow; pectoral fin with a darker dusting of fine black-brown spots.

Geographical Distribution: Shark Bay, Western Australia, Northern Territory, Queensland south to Moreton Bay, and southern coast of New Guinea (Fig. 84).

Habitat and Biology: Usually found between 0 and 10 m depths. Spawning takes place from September to January. Lenanton (1969a; 1969b) described the Shark Bay, Western Australian fishery and records that the juveniles of this species, together with those of *S. schomburgku*, "remain in the warmer waters of the shallow mangrove creek shorelines and protected inlets. On reaching maturity *Sillago analis* prefer the muddy, tidal streams but *Sillago schomburgku* are located on the more open, sandy banks." Brewer and Warburton (1992) found that the preferred prey of *S. analis* are crustaceans. It also grubs in the silty-sand substrates for worms and has been observed to "plough" up the bottom with the snout.

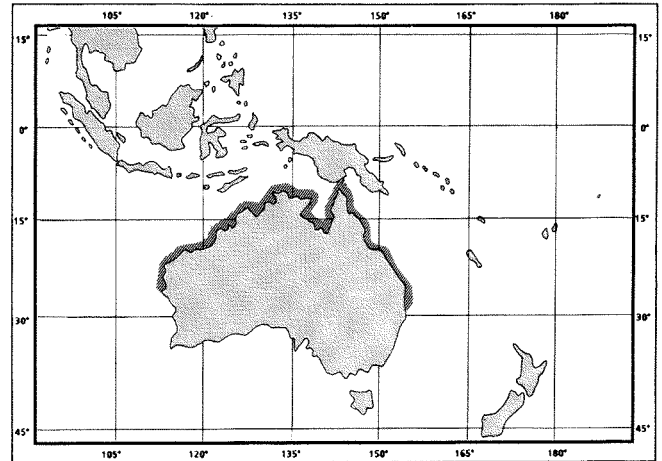


Fig. 84

Size: To 45 cm standard length.

Interest to Fisheries: An important fishery based on this species and others has developed in Shark Bay and to a lesser extent in Queensland. The juveniles enter mangrove creeks and may be future candidates for estuarine aquaculture.

Local Names: AUSTRALIA: golden lined whiting, Tin Can Bay whiting (Queensland), Rough-scale whiting (Western Australia).

Literature: Whitley (1948:19, Western Australia, 1954:27, Melville Island, 1964:43); Haysom (1957:141 recorded Queensland); Grant (1965:85, Tin Can Bay, 1972:244, biology); Weng (1983, 1986); McKay (1985:18-19, figs 3B, 9A-D); Brewer and Warburton (1988:215-217, dietary variation); Allen and Swainston (1988: col. pl. 354).

Remarks: *Sillago nierstraszi* is almost certainly a senior synonym of *S. analis*. The holotype of *S. nierstraszi* was unavailable for study by McKay (1985). Further collecting in southern New Guinea is necessary to resolve the identity of *S. nierstraszi*.

Sillago arabica McKay and McCarthy, 1989

Fig. 85

SILL Sill 7

Sillago arabica McKay and McCarthy, 1989:551-552, figs 1, 2A, 3A-C (Arabian Gulf).

Synonyms: None.

FAO Names: En - Arabian sillago; Fr - Pêche-madame arabe; Sp - Silago arabe.

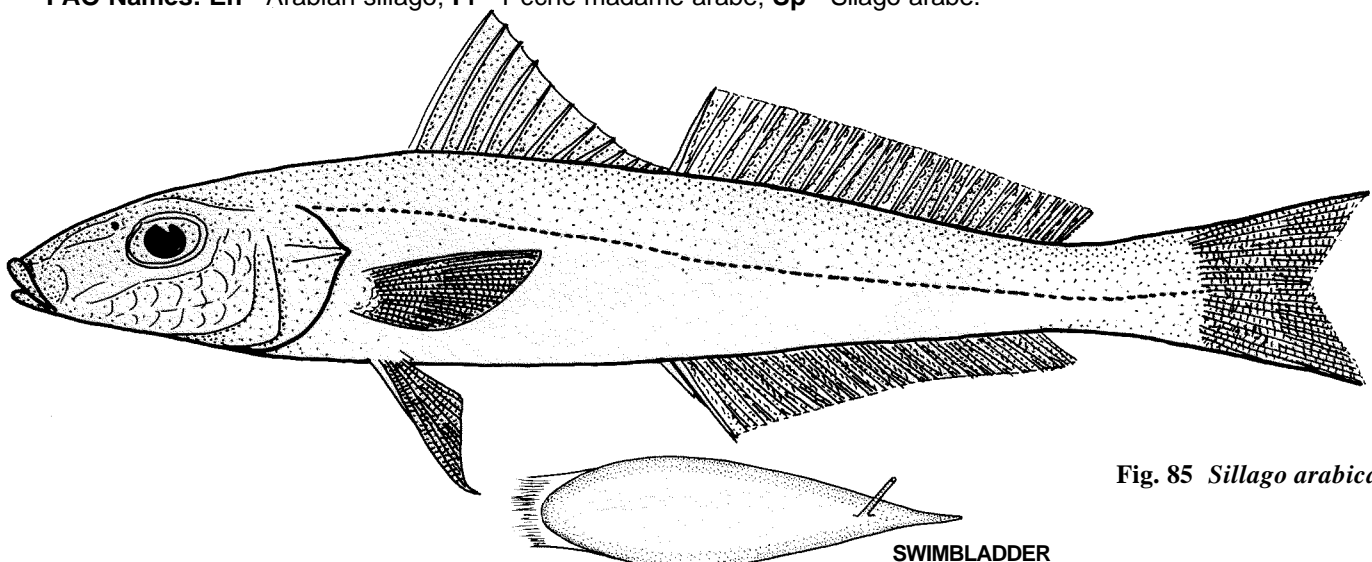


Fig. 85 *Sillago arabica*