Sillago ciliata Cuvier, 1829

Fig. 101

SILL Sill 14

Sillago ciliata Cuvier in Cuvier and Valenciennes, 1829:415 (Southern Seas).

Synonyms: ***Sillago diadoi*** Thiollière, 1857:151 (Woodlark Island, Papua). ***Sillago insularis*** Castelnau, 1873:232 (Noumea, New Caledonia). ***Sillago terra-reginae*** Castelnau, 1878:232 (Moreton Bay, Queensland). ***Sillago bassensis*** (non ***Sillago bassensis*** Cuvier): Castelnau, 1879:381; Macleay, 1881:567; Kent, 1893:291; Tosh, 1902:175-184 (behaviour, eggs, postlarvae, growth). ***Sillago ciliata diadoi:*** Whitley, 1932a:344-345. ***Sillago gracilis*** (non ***Sillago gracilis*** Alleyne and Macleay): Whitley, 1932b:284

FAO Names: En - Sand sillago; **Fr** – Pêche-madame sable; **Sp** - Silago arena.

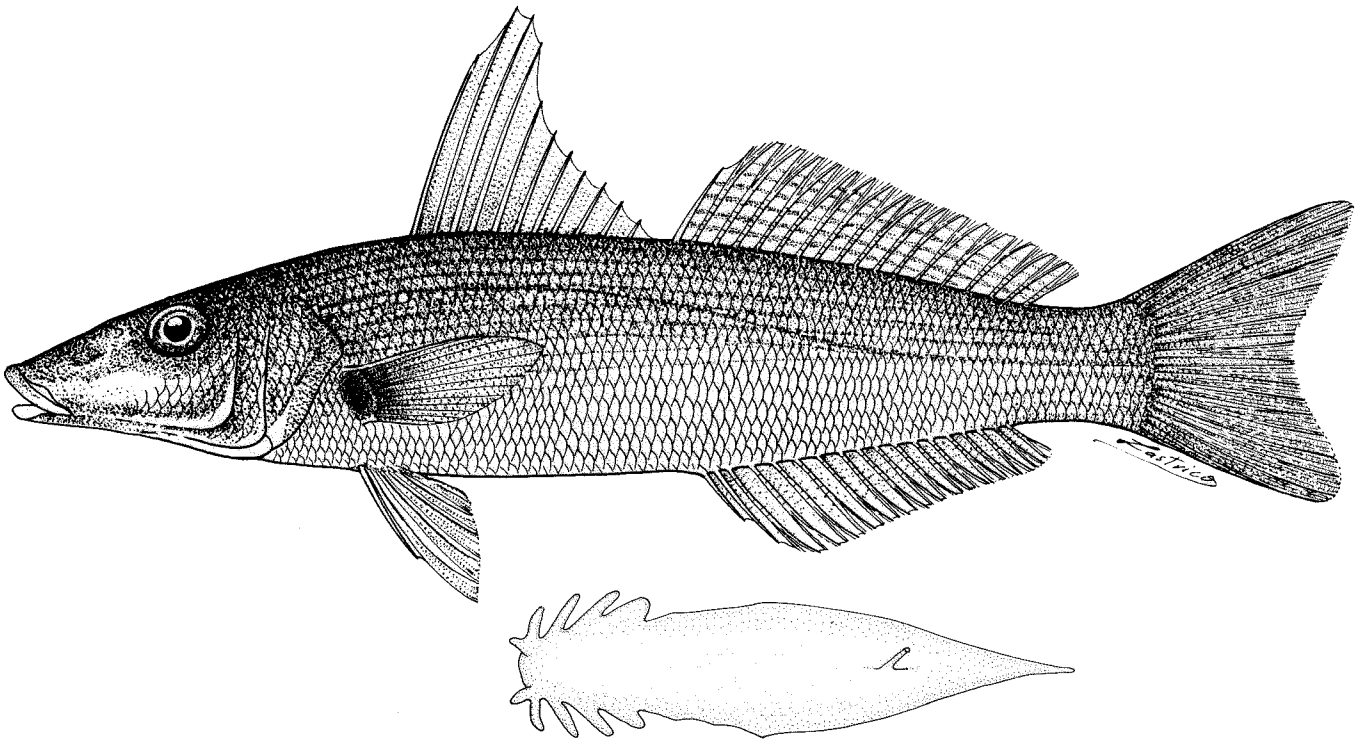

Fig. 101 ***Sillago ciliata***
(adapted from Grant, 1972)

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 15 to 17 soft rays; Lateral-line scales 60 to 69. Vertebrae: 14 or 15 abdominal + 5 to 8 modified + 11 to 14 caudal, total of 32 to 34. Anterior part of the swimbladder with rudimentary tubules projecting anteriorly and a series laterally that diminish in size and become sawtooth-like posteriorly; the shape of the swimbladder is not distinguishable from ***Sillago analis.*** **Colour:** A dark spot at the base of the pectoral fin; coloration of adult specimens uniform without darker bars or blotches.

Geographical Distribution: East coast of Australia from Cape York, Queensland (rare), southward along the coast and the Great Barrier Reef to eastern Victoria, and the east coast of Tasmania. Lord Howe Island, New Caledonia, and Woodlark Island, Papua New Guinea (Fig. 102). Bleeker's (1845, 1849) records from Batavia and Java were in error (Weber and de Beaufort, 1931:178).

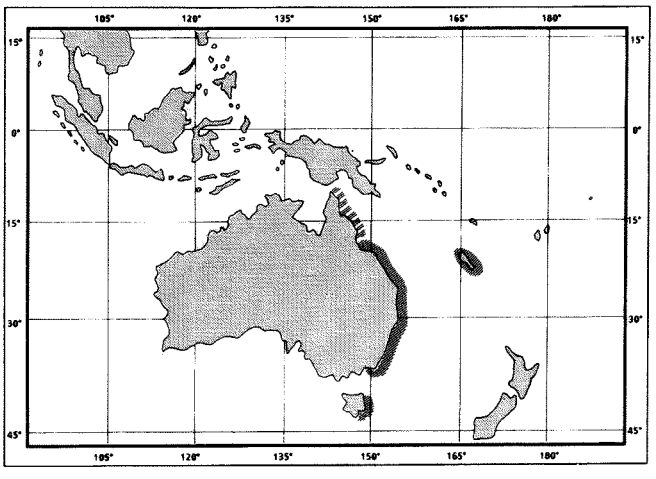

Fig. 102

Habitat and Biology: ***Sillago ciliata*** is an onshore species occurring on coastal beaches, sandbars and surf zones as well as open bays, estuaries and coastal lakes; occasional specimens have been taken in offshore waters to 40 m during winter. Sand whiting enter estuaries and penetrate far upstream to the tidal limits of rivers and creeks where juveniles and adolescent fish may be abundant. The adults congregate around the mouths of estuaries, bars, and spits, in depths down to 5 m. Tosh (1902) described the egg and larval development and gives the spawning period as September to February. Burchmore et al. (1988) reported peak reproductive condition in February, with high levels in December. Tosh also describes the habits of this species and mentions "Soon after the beginning of the spawning season young whiting of 10 mm and over can be observed swimming actively in small droves of from 10 to 20 on sand flats and beaches. They move up and down with the tide, swimming in very shallow water. As they grow older they keep further from the shore. The whiting may be said to live almost exclusively on sandy ground. The adults appear to be gregarious only at spawning time." Dredge (1976) found juveniles inhabited shallow areas with some seagrass. Burchmore et al. (1988) proposed that the *Zostera* areas are important habitats for juveniles of this species in Botany Bay. Motion (1985) found that recaptured tagged ***S. ciliata*** were taken within 15 km of their release site during the spawning season. ***S. ciliata*** feeds mostly on polychaetes (61%) and crustaceans (37%) in Botany Bay (Burchmore et al., 1988).

Size: To 51 cm total length.

Interest to Fisheries: A very important commercial species and an esteemed angling fish weighing up to 1.25 kg. In southeast Queensland the fishery operates from August to February when schools form, presumably to spawn, as most fish are in a spawning or near spawning condition (Dredge, 1976; Morton, 1982). Beach seines and tunnel-nets are employed by commercial fishermen. The fish are marketed fresh. Research is underway on aquaculture for this species.

Local Names: AUSTRALIA: Sand whiting, Bluenose whiting, Summer whiting.

Literature: Valenciennes (1839:13, fig. 2); Günther (1860:245, 1880:42, Cape York); Jouan (1861:272, New Caledonia); Gill (1862a:504); Kner (1865:127-128); Steindachner (1866:443-444); Schmeltz (1869:16, 1879:44); Castelnau (1875:16); Alleyne and Macleay (1877:279, Cape York, abundant); Klunzinger (1879:369, description); Macleay (1881:202); Tenison-Woods (1882:65, pl. 24); Ogilby (1886:31); McCoy (1890:229, pl. 182, Victoria, rare); Cohen (1892:17); Kent (1893:292, 370, pl. 45, fig. 2); Waite (1901:47, 1904:206, Lord Howe Is.); Stead (1906a:574-576, distinguished from ***S.flindersi,*** 1908b:63, pl. 33); McCulloch (1911:62, references), 1921:60, sandy bottoms, 1927:50); Cockerell (1915:41-42, scale, 45 cm, 22 years); Fowler (1928a:253, 1933:428-430, 1953:15); Starks (1926:253, osteology, ethmoid region); Weber and de Beaufort (1931:171, 178); Whitley (1932a:344-345, 1955:331, 51 cm, 1964:43); Hardenberg (1941:228, ***S. analis?);*** Cleland (1947:215-228, biology, fishery); Roughley (1951:46-48, pl. 15, biology); Legand (1952, growth, New Caledonia); Munro (1945, larvae, 1958:178, New Guinea, 1967:346, New Guinea); Parrott (1959:201, eggs float); Woodland and Slack-Smith (1963:32, Heron Island); Marshall (1964:170, biology); Grant (1965:84, 1972:243); Lanzing (1967:242, saccus vasculosus); Lanzing and Hynd (1967:177-178, age, OTC); Dredge (1976, biology); Weng (1983, juveniles, 1986, spatial distribution); McKay (1985:15-17, figs); Morton (1985a, reproduction, 1985b: 19-23, tagging); Hutchins and Swainston(1986:col. pl.268); Goodall et al. (1987, gonads); Burchmore et al. (1988, biology); Goodall et al. (1989, spermatozoa).

Remarks: ***Sillago ciliata*** and ***Sillago analis*** are sibling species that can be separated by colour and in most cases, lateral-line scale counts.

Sillago flindersi McKay, 1985 | Fig. 103 | **SILL Sill 15**

Sillago (Parasillago) bassensis flindersi McKay, 1985:29-30, figs 91-L, 14K, 15 (New South Wales).

Synonyms: ***Sillago bassensis:*** Cohen, 1892:17; Stead, 1906a:574-576, 1906b:111, 1908b:65, pl. 35; McCulloch, 1911:61 (part), 1921:61, pl. 21; Fowler, 1933:422-423 (part); Roughley, 1951:48-49 (part, offshore fishery); Parrott, 1959:201; Scott, 1962; 187; Marshall, 1964:170; Whitley, 1964:43; Grant, 1965:87,1972:247; Last et al., 1983:357-358 (Tasmania). ***Sillago maculata*** (non ***Sillago maculata*** Quoy and Gaimard): Castelnau, 1872:94; Waite, 1899:109 (29-151 m, spawning?). ***Sillago ciliata*** (non ***Sillago ciliata*** Cuvier): Johnston, 1883:80,116,1891:25, 33.

FAO Names: En - Flinders' sillago; **Fr** - Pêche-madame peren; **Sp** -Silago de Flinders.

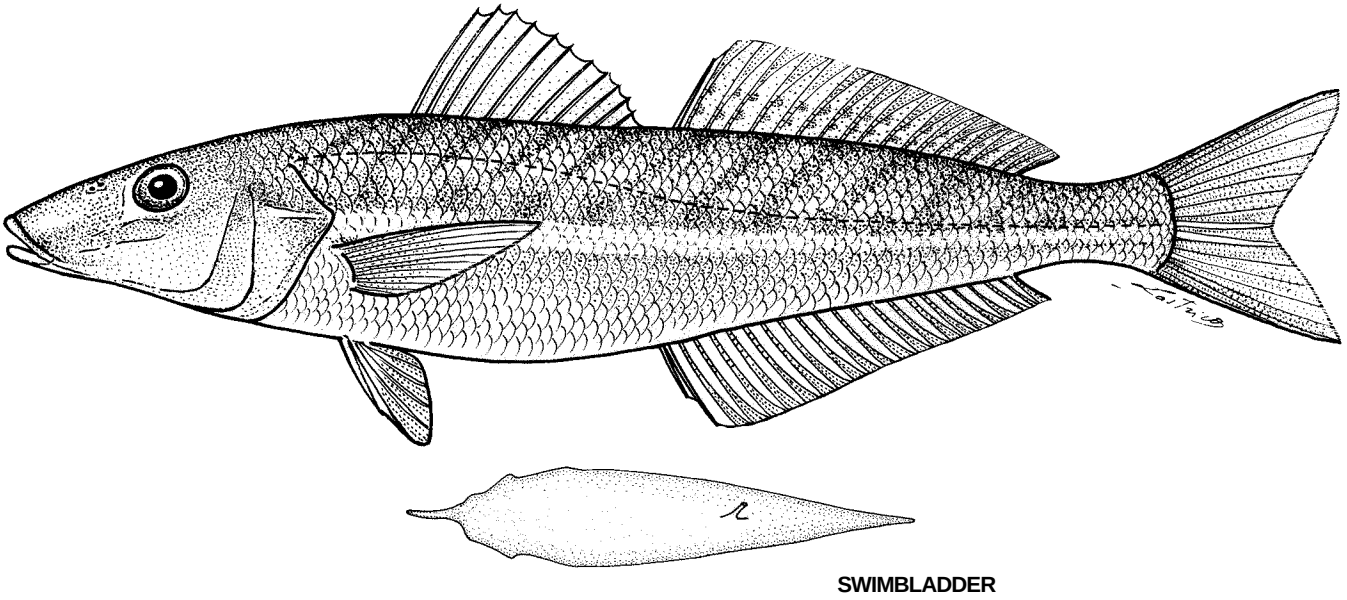

Fig. 103 ***Sillago flindersi***
(adapted from Hutchins and Swainston, 1986)

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 18 to 20 soft rays. Lateral-line scales 65 to 69. Vertebrae: 13 abdominal + 9 to 11 modified + 9 to 11 caudal, total of 32 to 34. **Colour:** No dark spot at the base of the pectoral fin; a series of oblique rusty brown bars on back and upper sides, with a longitudinal row of rusty brown blotches along the midlateral silver stripe; coloration is very similar to ***S. bassensis*** but the oblique bars are wider, more regular and without the appearance effused dots or spots; the midlateral blotches are absent in ***S. bassensis.***

Geographical Distribution: Southern Queensland southward to Anxious Bay, South Australia, and the east coast of Tasmania (Fig. 104).

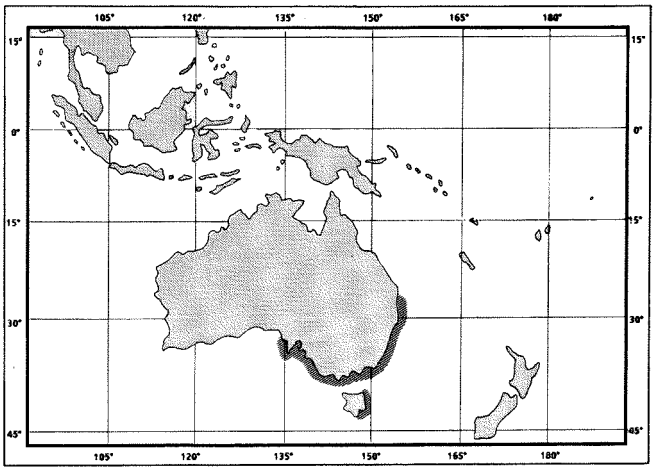

Fig. 104

Habitat and Biology: An offshore species not known in southern Queensland until the development of offshore prawn trawling (Grant, 1965). The adults move offshore and are taken by bottom trawl to depths of 180 m. Juveniles congregate in shallow water where they may be taken by line in large quantities. They are not reported from estuarine waters. Within Botany Bay the juveniles consume mostly copepods and the larger fish (11 to 20 cm) eat mainly *Callianassa* and amphipods. The overall diet is mostly crustaceans (75%), principally amphipods (18%), decapods (18%), mysidaceans (15%) and copepods (13%). Polychaetes make up only 14% of the total diet (Burchmore et al., 1988). This species spawns during October to March in southern New South Wales, but spawns in winter in southeast Queensland and northern New South Wales.

Size: To 33 cm standard length.

Interest to Fisheries: An important export market has developed for this species (Table 3). Danish seine vessels working in eastern Victoria and southeastern Tasmania obtain large catches. This species is an important bycatch of the prawn trawlers operating in northern New South Wales. The grounds off Lakes Entrance, Victoria, and lluka, northern New South Wales have produced the bulk of the catch exported frozen to Japan in recent years. In 1985 to 86 the value of exports exceeded $A 2.5 million (Dixon et al., 1987).

Local Names: AUSTRALIA: Eastern school whiting, Bass Strait whiting, Spotted whiting, Redspot whiting.

Literature: Hutchins and Swainston (1986:col. pl. 265).

Remarks: McKay (1985) described this species as a subspecies of ***S. bassensis*** since, at that time, the two populations were known from allopatric populations. Further collecting in Bass Strait showed the species to overlap in distribution, and electrophoresis conducted by Dixon et al. (1987) confirmed that the two populations were valid species as McKay (1985) had suggested.

Table 3: Australian sillago exports of *S.flindersi* for years 1980-1986.

Year	Tonnes	Value $A
1980-81	777	878,000
1981-82	1,499	1,855,000
1982-83	1,253	1,763,000
1983-84	1,091	1,173,000
1984-85	1,042	1,396,000

Source: Australian Fisheries: Dixon et al. 1987:5.

Sillago indica McKay, Dutt and Sujatha, 1985 Fig. 105 **SILL Sill 16**

Sillago* (*Parasillago*) *indica McKay, Dutt and Sujatha, 1985:38-39, fig. 5E (India).

Synonyms: ***Sillabo parvisquamis*** (non ***Sillabo parvisquamis*** Gill): Dutt and Sujatha, 1980:372-374.

FAO Names: En - Indian sillago; **Fr** - Pêche-madame indien; **Sp** - Silago indio.

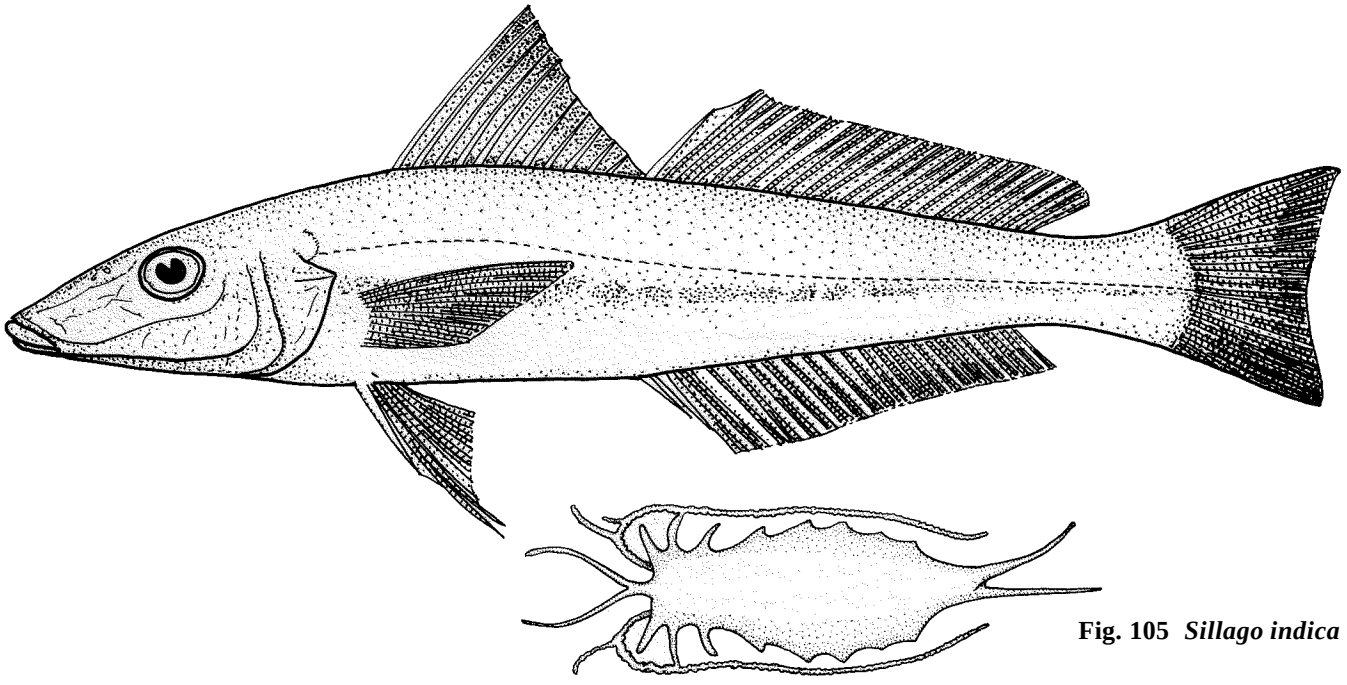

Fig. 105 *Sillago indica*

Diagnostic Features: First dorsal fin with XI spines and second dorsal fin with I spine and 21 or 22 soft rays; anal fin with II spines and 22 or 23 soft rays. Lateral-line scales 68 to 70. Vertebrae: 3 modified, total of 34. Swimbladder with bifurcate anterior extension, anterolateral extensions recurved and extend to ventral duct, posterior extension single. **Colour:** A dark stripe on sides sometimes broken into blotches; body light tan with a dark brown to blackish stripe commencing behind the upper part of the opercle and curving down below the lateral line for approximately two-thirds its length, and then continuing slightly below or on the lateral line to hypural flexure as a more or less broken band or as distinct elongate spots or blotches; head and cheeks with fine black dots; belly and lower sides may be densely dotted, almost blackish; interspinous membranes of first dorsal fin with very numerous black dots; interradial membranes of second dorsal and anal fin dusted with black dots, most concentrated immediately before each ray; caudal dusted with black, lower lobe may be blackish.

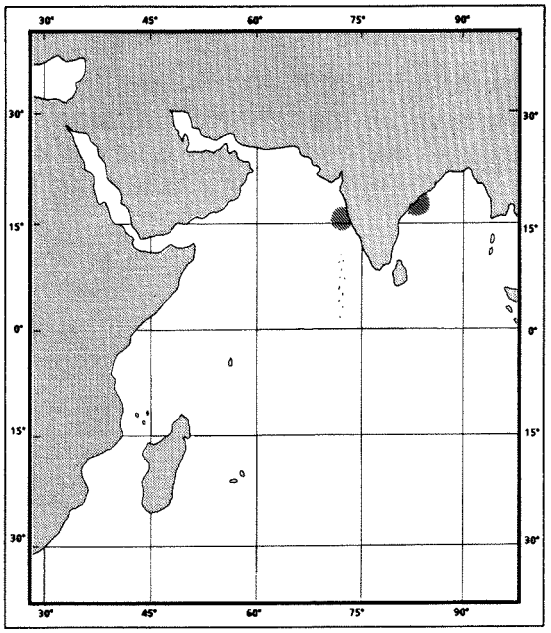

Fig. 106

Geographical Distribution: East and west coasts of India (Fig. 106).

Habitat and Biology: Inshore coastal waters. Inhabits probably depths from 0 to 30 m.

Size: To 17 cm standard length, possibly longer.

Interest to Fisheries: Taken by driftnet, shore seine, cast net and by minitrawlers (Dutt and Sujatha, 1980).

Local Names:

Remarks: Generally confused with other sillaginids in commercial catches.

Sillago ingenuua McKay, 1985 Fig. 107 **SILL Sill 17**

Sillago (Parasillago) ingenuua McKay, 1985:44, fig. 8C, 14P (Thailand and Torres Straits, Queensland).

Synonyms: ***Sillago argentifasciata*** (non ***Sillago argentifasciata*** Martin and Montalban): Shao and Chang, 1978:9, 1979:695-705; Dutt and Sujatha, 1980:371-375.

FAO Names: En - Bay sillago; **Fr** - Pêche-madame halanda; **Sp** - Silago de bahia.

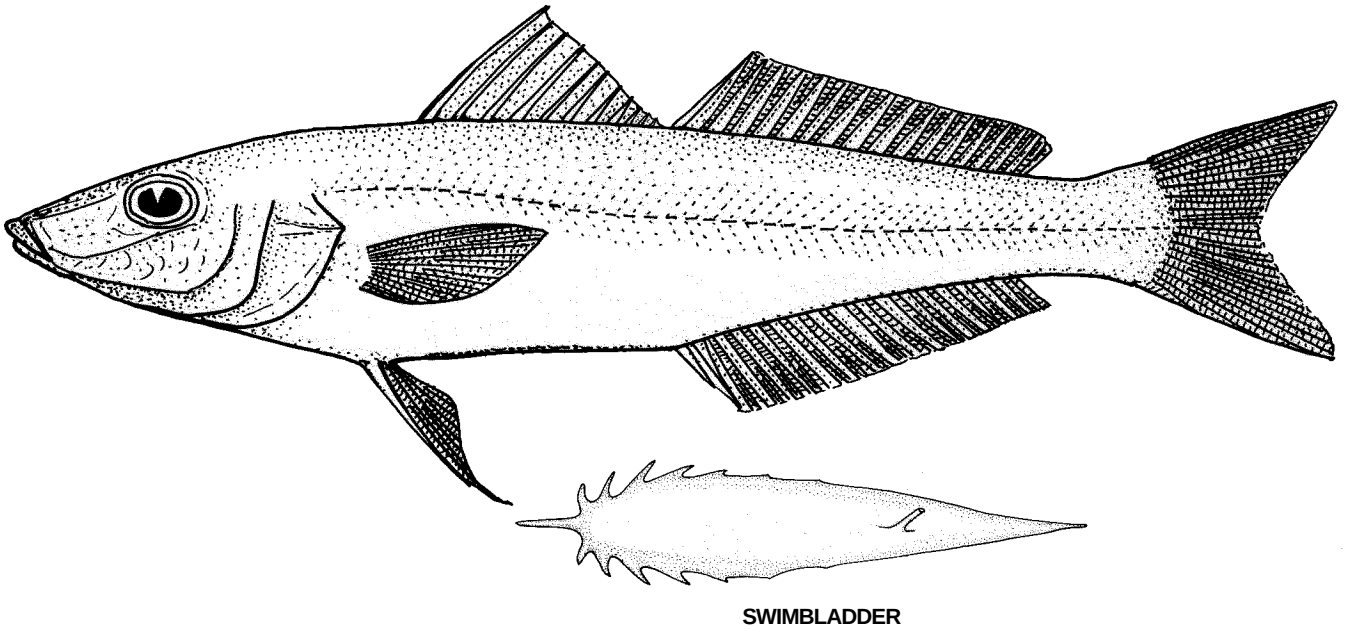

Fig. 107 ***Sillago ingenuua***

Diagnostic Features: First dorsal fin with XI spines (last spine very short) and second dorsal fin with I spine and 17 soft rays; anal fin with II spines and 17 soft rays. Lateral-line scales 66 to 70; cheek scales ctenoid. Vertebrae: 13 abdominal + 9 to 11 modified + 9 to 11 caudal, total of 33. Swimbladder with a short median anterior extension and about 5 small, pointed anterolateral projections (Fig. 103). **Colour:** No black spot on pectoral base; no wide distinct silvery lateral band; peritoneum of ***S. ingenuua*** is black-brown.

Geographical Distribution: Known from the Gulf of Thailand, Taiwan, northern Australia from Shark Bay around the northern coast to Adolphus Passage, northeastern Queensland and India (Fig. 108).

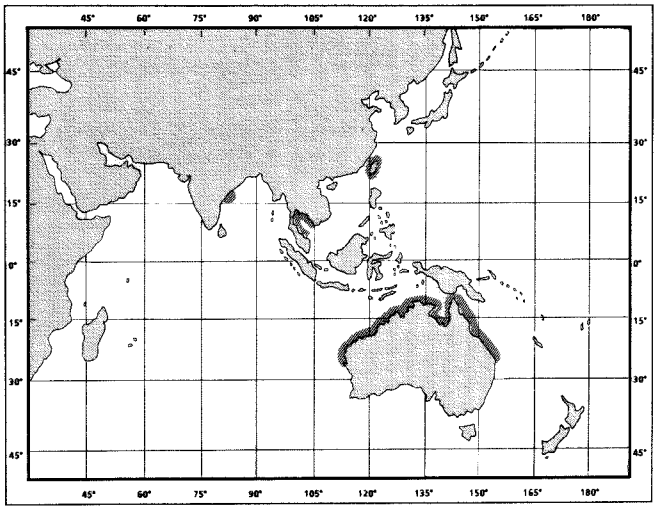

Fig. 108

Habitat and Biology: Inshore coastal waters. Known from depths between 20 and 50 m.

Size: To 20 cm standard length.

Interest to Fisheries: Marketed fresh throughout its range. This species has been taken by trawlers operating on the northwest shelf of Western Australia and occurs southward to Shark Bay. This species is very commonly trawled near Torres Straits.

Local Names: AUSTRALIA: Bay whiting.

Literature: Gloerfelt-Tarp and Kailola (1984:150 ***Sillago*** sp. 3); Shao et al. (1986:147-148).

Remarks: Possibly more widely distributed than indicated above.

Sillago intermedius Wongratana, 1977

Fig. 109

SILL Sill 18

Sillago intermedius Wongratana, 1977:257-262 (East coast, Gulf of Thailand).

Synonyms: ***Sillago maculata*** (non ***Sillago maculata*** Quoy and Gaimard): Dutt and Sujatha, 1980:372-4.

FAO Names: En - Intermediate sillago; **Fr** - Pêche-madame murda; **Sp** - Silago intermedio.

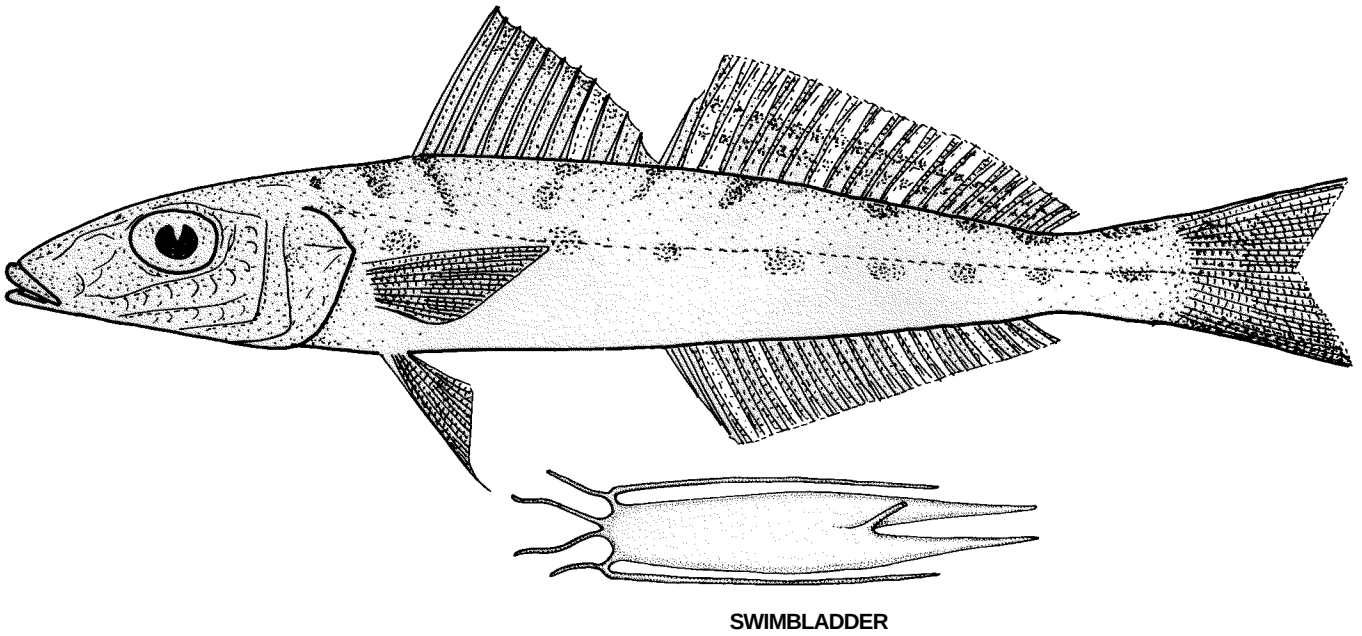

Fig. 109 ***Sillago intermedius***
(adapted from Wongratana, 1977)

Diagnostic Features: First dorsal fin with XI spines and second dorsal fin with I spine and 21 or 22 soft rays; anal fin with II spines and 21 or 22 soft rays. Lateral-line scales 67 to 70. Vertebrae: 14 abdominal+ 5 modified + 15 caudal, total of 34. Two posterior extensions to the swimbladder; anterior margin with two divergent blind tubes that extend to the basioccipital above the auditory capsule; an anterolateral extension on each side, each sending a blind tubule anteriorly and then curving posteriorly along the abdominal wall as a simple tube to terminate just posterior to the duct-like process. **Colour:** Sides of body just below lateral line with a longitudinal row of dusky black spots, and a series of saddle-like dusky black blotches.

Geographical Distribution: Thailand and India (Fig. 110).

Habitat and Biology: An inshore species on open silty bottom, at 0 to 10 m depths.

Size: To 20 cm standard length.

Interest to Fisheries: Taken locally and marketed fresh.

Local Names:

Remarks: ***Sillago intermedius*** is similar to ***S. sihama*** but may be distinguished by the coloration and the simple lateral tubular extensions of the swimbladder.

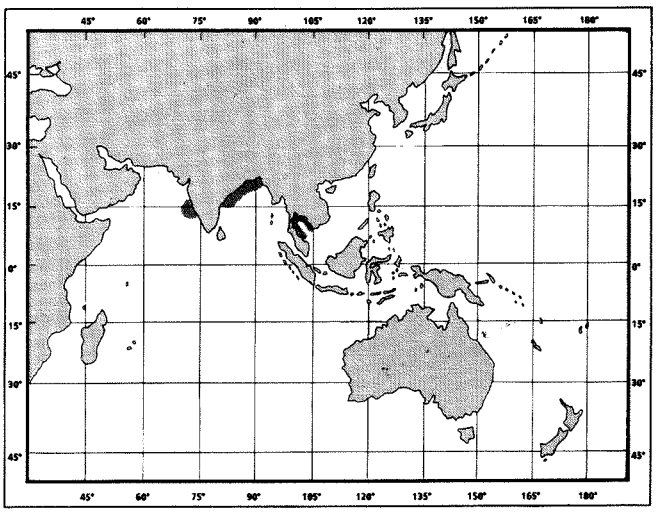

Fig. 110

Sillago japonica Temminck and Schlegel, 1843 Fig. 111 **SILL Sill 19**

Sillago japonica Temminck and Schlegel, 1843:23, 24, pl. 10, fig. 1 (Japan).

Synonyms: ***Sillago sihama*** (non ***Sillago sihama*** Forsskål): Steindachner and Döderlein, 1885:192; Nogusa, 1951:153-155, 1960:26; Ueno and Fujita, 1954:118-120, fig. 1; Okada, 1955:256; Hotta, 1961:62, pl. 33, fig. 99; Takahashi, 1962:24, pl. 57; Kawanabe et al., 1968:54; Kakuda, 1970 (ecology and fishery); Kawamura et al., 1975:797 (burrowing behaviour); Hiramoto, 1976 (artificial spawning).

FAO Names: En - Japanese sillago; **Fr** - Pêche-madame japonais; **Sp** - Silago japones.

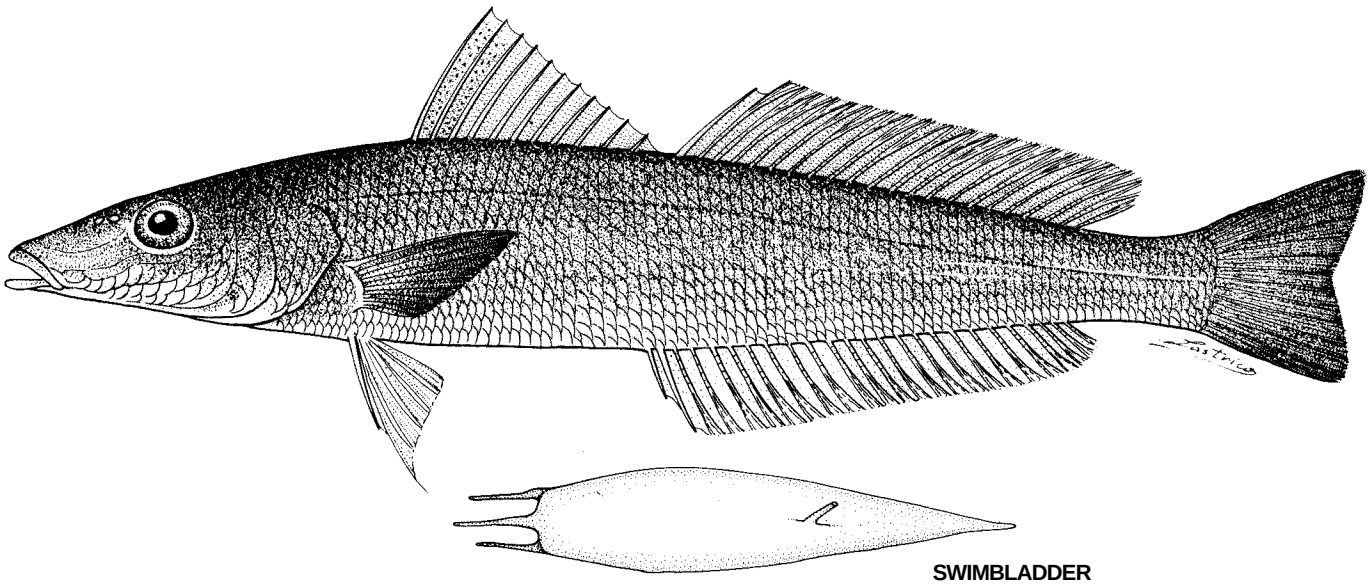

Fig. 111 ***Sillago japonica***
(adapted from Bleeker, 1877)

Diagnostic Features: First dorsal fin with XI spines and second dorsal fin with I spine and 21 to 23 soft rays; anal fin with II spines and 22 to 24 soft rays. Lateral-line scales 70 to 73. Vertebrae: 14 abdominal + 8 or 9 modified (overlapping posterior extension of swimbladder) + 12 or 13 caudal, total of 35. Swimbladder with anterior projecting extensions and a single posterior extension. **Colour:** Body greenish grey above, the dorsal part of the head being the darker, and whitish below; first and second dorsal fin mostly hyaline, the membrane between the first and second and the second and third dorsal-fin spines having minute dark brown dots; margins of dorsal fins with a few dark brown spots; anal and ventral fins hyaline; pectoral fins hyaline with the upper margin and base dark greenish; caudal whitish with dark margins.

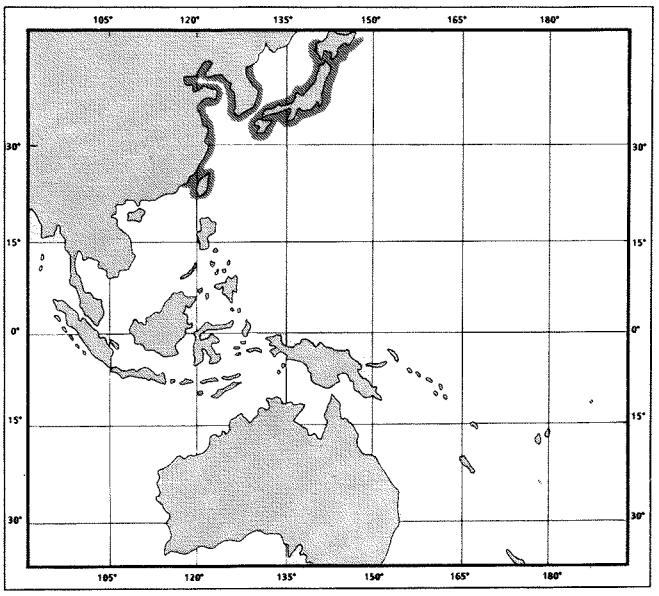

Fig. 112

Geographical Distribution: Japan, Korea, China and Taiwan. Possibly to the Philippines (Masuda et al., 1984) (Fig. 112).

Habitat and Biology: The common whiting of Japan, occurring in bays on shallow sandy flats, in depths between 0 and 30 m.

Size: To 22 cm standard length.

Interest to Fisheries: An important inshore foodfish greatly esteemed for its delicate flavour. Now a subject of aquaculture.

Local Names: JAPAN: Shiro-gisu; TAIWAN: Chin-Sa-Suo.

Literature: Richardson (1846:223, Canton, China); Bleeker (1853:28, 1858:11, 1859:163, description, 1865:56, China, 1875:69-71, 1877, pl. 389, fig. 6, 1879:9); Günther (1860:244-245, 1880:66); Gill (1861:503-504); Steindachner and Döderlein (1885:192); Jordan and Snyder (1901:109, description, Yokohama, 1902:487); Smith and Pope (1906:478, Kochi); Jordan et al. (1913:187); Fowler and Bean (1922:69, description, Takao); Jordan and Hubbs (1925:248, Japan, localities); Reeves 1927:10); Mori (1928:6, Fusan, Korea); Fowler (1930b:654,1931b:302, Hong Kong, 1949:51, China, Korea, Taiwan, localities); Weber and de Beaufort (1931:170, 173-174, description); Herre (1945:118,1953:478 many localities); Boeseman (1947:38); Tomiyama and Abe (1958:1171-1176, pl. 229, fig. 581, description, distribution); Munro (1958:178, New Guinea, misidentified?, 1967:347); Hotta (1961:62); Whitehead and Joysey (1967:139); Masuda et al. (1975, pl. 54C, as ***S. sihama);*** Shao and Chang (1978:9, pl. 1, fig. 5 and pl. 2, fig. 5); Chen and Yu (1982, culture); Tsukashima et al. (1983, fry rearing); Kurahawa and Suzuki (1983, larval feeding); Masuda et al. (1984, pl. 134A, p. 151); Sano and Mochizuki (1984:145-146, fig. 1D, revision); McKay (1985:42-43, figs); Oozeki and Hirano (1985, temperature and development of eggs); Yu and Tung (1983, growth and culture, 1985, culture); Kashiwagi et al. (1987, egg size and hatching); Hirai, 1988, egg micropyle); Kobayashi et al. (1988, culture).

Remarks: This species was commonly misidentified as ***Sillago sihama.***

Sillago lutea McKay, 1985 | Fig. 113 | **SILL Sill 20**

Sillago (Parasillago) lutea McKay, 1985:40-42, figs 10D, 13H-1,18 (Australia, India and Sri Lanka).

Synonyms: ***Sillago macrolepis*** (non ***Sillago macrolepis*** Sleeker): Dutt and Sujatha, 1980:372-374.

FAO Names: En - Mud sillago; **Fr** - Pêche-madame de vase; **Sp** - Silago de fango.

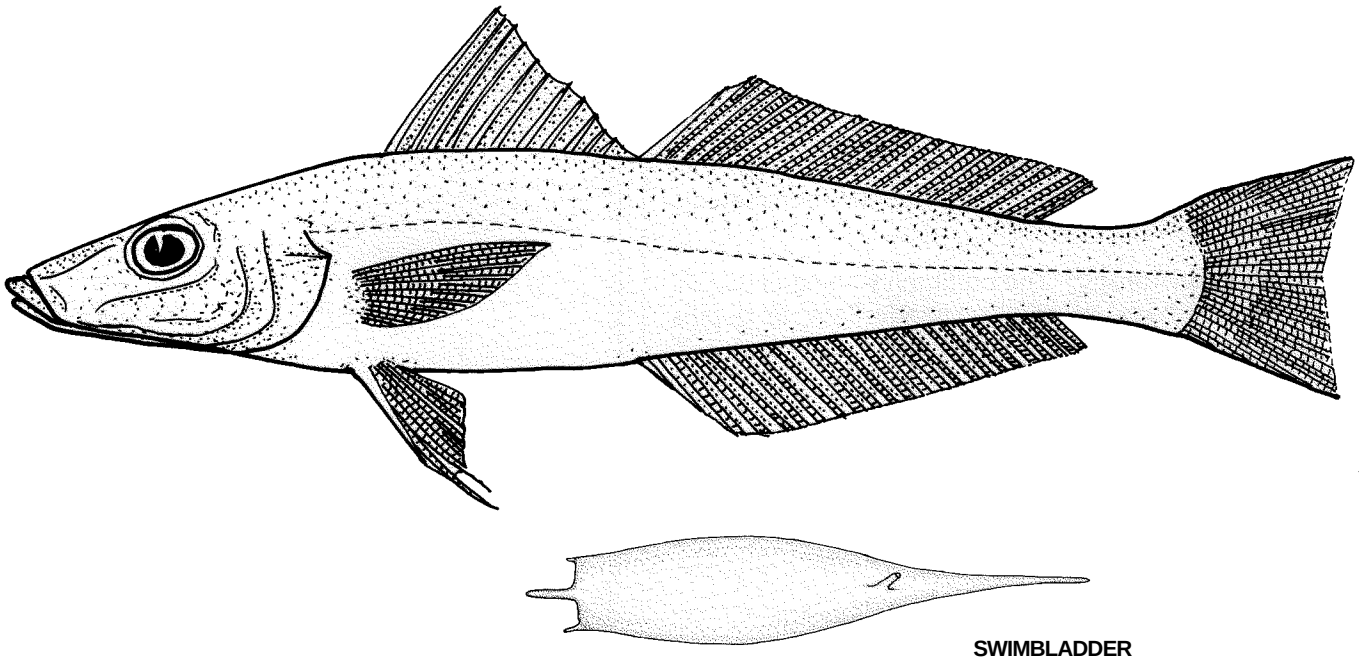

Fig. 113 ***Sillago lutea***

Diagnostic Features: First dorsal fin with XI spines and second dorsal fin with I spine and 20 to 22 soft rays; anal fin with II spines and 21 to 23 soft rays. Lateral-line scales 67 to 72. Vertebrae: 13 or 14 (normally 13) abdominal + 4 to 11 modified + 10 to 17 caudal, total of 33 to 35. Swimbladder with a median anterior extension and with or without rudimentary anteriorly directed anterolateral projections; posterior extension single. **Colour:** Body light sandy brown above, pale brown to whitish below, with an ill defined silvery mid-lateral band; margins of scales may be slightly darker giving a vague meshwork pattern to the body above the lateral line; fins hyaline, the first dorsal-fin membrane tipped with a fine dusting of black; no dark spot at the base of the pectoral fin.

Geographical Distribution: Exmouth Gulf, Western Australia, northward and eastward to Gulf of Carpentaria, India and Sri Lanka (Fig. 114).

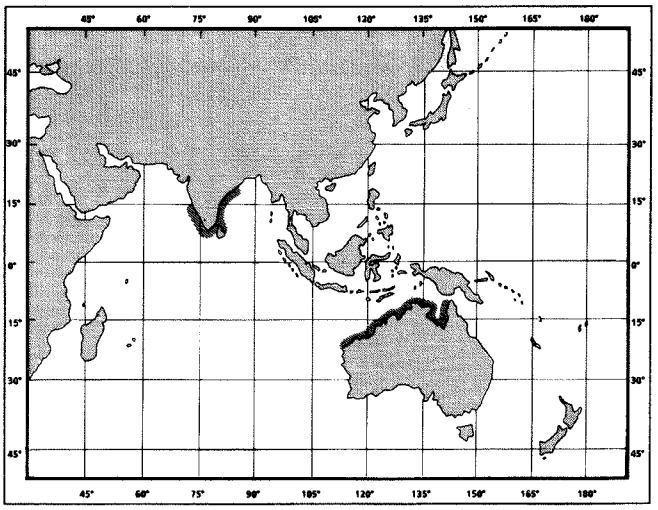

Fig. 114

Habitat and Biology: This species is commonly associated with the banana prawn *Penaeus merguiensis* de Man in northern Australia, and occurs most abundantly on muddy or very silty substrates. Usually found at depths of 0 to 60 m. It attains sexual maturity at 100 mm standard length (ripe females 104 to 120 mm).

Size: To 16 cm standard length.

Interest to Fisheries: A small species taken by trawl net. Of minor interest but small catches are taken by trawlers in the Gulf of Carpentaria to Exmouth Gulf. Large catches are taken by prawn trawlers but as the species grows to only 16 cm, the catch is of no commercial importance at present. This species could form the basis of a small bycatch fishery, to be exported ungutted.