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THE FLAT FISHES OF PORTO NOVO (INDIA)

(PISCES, PLEURONECTIFORMES)

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ABSTRACT

Thirty-two species of flat fishes from Porto Novo (India) are recorded and depicted. Along with meristic and morphometric data, lateral lines, scales, gillrakers, gillraker serrae, and pyloric caecae have been taken into consideration to provide information on the identity of each species. A key for the identification of the flat fishes of Porto Novo is provided.

INTRODUCTION

Thirty-two species of flat fishes have been recorded from Porto Novo waters (India). The material was collected from commercial trawl catches off Porto Novo (Fig. 1), and has been deposited in the Biological Station Reference Museum (BSRM), Annamalai University, India, and in the Institute of Taxonomic Zoology (Zoological Museum), Amsterdam (ZMA), The Netherlands.

Anatomical characters like a gillraker serrae and pyloric caecae have been examined

along with morphometric data, recorded as given in Fig. 2.

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LIST OF SUBORDERS, FAMILIES AND GENERA OF PLEURONECTIFORMES
OCCURRING IN PORTO NOVO WATERS

Suborder	Family	Genus	Number of species
Psettodoidei	Psettodidae	<i>Psettodes</i>	1
Pleuronectoidei	Citharidae	<i>Brachypleura</i>	1
	Paralichthyidae	<i>Pseudorhombus</i>	5
	Bothidae	<i>Grammatobothus</i>	1
		<i>Bothus</i>	1
		<i>Engyproscopon</i>	1
		<i>Crossorhombus</i>	2
		<i>Laeops</i>	2
	Pleuronectidae	<i>Samaris</i>	1
Soleoidei	Soleidae	<i>Heteromycteris</i>	1
		<i>Aesopia</i>	1
		<i>Zebrias</i>	3
		<i>Brachirus</i>	1
		<i>Synaptura</i>	2
		<i>Solea</i>	1
		<i>Pardachirus</i>	1
		<i>Aseraggodes</i>	1
	Cynoglossidae	<i>Paraplagusia</i>	1
		<i>Cynoglossus</i>	5

KEY TO THE FLAT FISHES OF PORTO NOVO WATERS

- | | |
|---|---|
| <p>1. Origin of dorsal fin well behind eye; anterior few rays of dorsal and anal spinous; palatine with teeth..... <i>Psettodes erumei</i></p> <p>-. Origin of dorsal fin above or in front of eye; dorsal and anal fins without spines..... 2</p> <p>2. Preopercular margin distinct, not hidden by skin and scales; palatine without teeth..... 3</p> <p>-. Preopercular margin adnate, hidden by skin and scales..... 5</p> <p>3. Pelvic fins with one spine and 5 soft rays, pelvic fin bases short..... <i>Brachypleura novaezeelandiae</i></p> <p>-. Pelvic fins without spine..... 4</p> <p>4. Eyes and pigmentation on left side of head (sinistral)</p> <p style="padding-left: 20px;">a- Pelvic and pectoral fin rays branched, at least in posterior and inner parts; both pelvic fin bases short and almost symmetrical (Paralichthyidae)..... 6</p> <p style="padding-left: 20px;">b- Pelvic and pectoral fin rays simple, pelvic fin on ocular side slightly or greatly elongate (Bothidae)..... 10</p> | <p>-. Eyes and pigmentation on right side of head (dextral)..... <i>Samaris cristatus</i></p> <p>5. Eyes and pigmentation on right side of head (Soleidae)..... 16</p> <p>-. Eyes and pigmentation on left side of head; dorsal and anal fins confluent with caudal fin, pectoral fins absent (Cynoglossidae).. 26</p> <p>6. Gillrakers palmate, body with three or four conspicuous double ocelli..... <i>Pseudorhombus dupliciocellatus</i></p> <p>-. Gillrakers pointed, body without double ocelli..... 7</p> <p>7. Anterior dorsal rays prolonged; body with three conspicuous ocelli arranged in the form of a triangle..... <i>P. triocellatus</i></p> <p>-. Anterior dorsal rays not prolonged..... 8</p> <p>8. Scales on ocular and blind side ctenoid.... <i>P. malayanus</i></p> <p>-. Scales on ocular side ctenoid, on blind side cycloid..... 9</p> <p>9. Eyed side dark, distinct open-ring-like</p> |
|---|---|

- blotches, scattered over the body.....
.....*P. elevatus*
- . Eyed side with dark and purple spots with ring-like blotches.....*P. arsius*
10. Dentition more or less developed on both sides of jaws..... 11
- . Dentition mainly confined to blind side of jaws..... 15
11. Lateral line present on both sides of body; interorbital space narrow.....
.....*Grammatobothus polyophthalmus*
- . Lateral line absent on blind side; interorbital space broad..... 12
12. Scales rather large and ctenoid on ocular side..... 13
- . Scales very small, cycloid on both sides.....*Bothus myriaster*
13. Two dark brown blotches present on the upper and lower margin of caudal fin.....
.....*Engyprosopon grandisquama*
- . No dark blotches on upper and lower margin of caudal fin..... 14
14. Scales of ocular side strongly ctenoid, upper pectoral ray prolonged in males....
.....*Crossorhombus azureus*
- . Scales of ocular side weakly ctenoid, upper pectoral ray not prolonged in males.....*C. valderostratus*
15. Teeth in villiform bands; maxillary hardly reaching anterior margin of lower eye.....*Laeops guentheri*
- . Teeth uniserial; maxillary reaching anterior margin of lower eye.....
.....*L. nigrescens*
16. Snout not forming distinct hook, dorsal fin not extending to its tip..... 17
- . Snout forming a distinct hook, dorsal fin extending to its tip.....
.....*Heteromycteris oculus*
17. Dorsal and anal fins confluent with caudal fin..... 18
- . Dorsal and anal fins separated from caudal fin..... 24
18. Body and head with vertical dark brown bands, extending to dorsal and anal fins..... 19
- . Body and head without vertical dark brown bands..... 22
19. First ray of dorsal fin prolonged and fleshy.....*Aesopia cornuta*
- . First ray of dorsal fin not prolonged.... 20
20. Scales strongly ctenoid; posterior rays of dorsal and anal fins joined to basal half of caudal fin.....*Zebrias synapturoides*
- . Scales moderately ctenoid..... 21
21. Each eye with a tentacle.....*Z. quagga*
- . Eyes without tentacles.....*Z. altipinnis*
22. Body elongate, pointed towards caudal end; a bony process on snout..... 23
- . Body oval, caudal rounded; no bony process on snout.....*Brachirus orientalis*
23. Right pectoral rather large; ocular side with two rows of distinct white spots along upper and lower margin of body.....
.....*Synaptura albomaculata*
- . Right pectoral small; ocular side without white spots.....*S. commersoniana*
24. Pectoral fins present and well-developed.....
.....*Solea ovata*
- . Pectoral fins absent or rudimentary..... 25
25. Dorsal and anal fins with pores at the base of each ray.....*Pardachirus pavoninus*
- . Dorsal and anal fins without pores at the base of each ray.....
.....*Aseraggodes cyaneus*
26. Two lateral lines on eyed side; lips fringed; rostral hook rather long.....
.....*Paraplagusia bilineata*
- . Two lateral lines on eyed side; lips not fringed; rostral hook moderate..... 27
27. Rictus of mouth reaching middle of the lower eye; 6-7 scales between lateral lines.....*Cynoglossus arel*
- . Rictus of mouth reaching to or beyond posterior margin or lower eye; 10 or more scales between lateral lines..... 28
28. Head and body with irregular and incomplete, dark cross bands..... 29
- . Head and body without such bands..... 30
29. Rictus of mouth nearer to snout than to gill opening; 16-21 scales between lateral lines.....*C. puncticeps*
- . Rictus of mouth mid-way between tip of snout and gill opening; 12-15 scales between lateral lines.....*C. semifasciatus*
30. Eyes very small; rostral hook very short; snout pointed; 16-20 scales between lateral lines.....*C. monopus*
- . Eyes rather large; rostral hook of moderate length; snout rounded; 10-15 scales between lateral lines.....*C. lida*

DESCRIPTION OF SPECIES

Family PSETTODIDAE

Psettodes erumei

(Bloch & Schneider, 1801) (Fig. 3)

Common name.-

Indian Halibut.

Diagnosis.-

Origin of dorsal fin behind eyes, anterior rays of dorsal and anal fins spinous; one of the eyes placed on dorsal surface of head, eyes may be present on right or left side of head; maxillary teeth well-developed and body fatty.

Description.-

Based on 92 specimens ranging from 27-485 mm sl (48 sinistral specimens, 44 dextral specimens). Males: 35, females: 8, immature: 49.

D 42-55, A 31-42, P 14-15 (eyed side), 13-16 (blind side), V 6, C 17-19, Ll 66-78 (eyed side), Gr (teeth-like structures) 18-20 (on first gill arch of eyed side).

In percentage of standard length: head length 26.7-44.5 (M: 31.3), head depth 26.3-38.5 (M: 30.6), body depth 35.3-60.1 (M: 41.5), snout length 7.5-11.8 (M: 9.4), post-orbital length 14.9-22.5 (M: 17.3), eye diameter 3.3-7.7 (M: 5.1).

Lateral line present on both sides, with a slight curve above pectoral fin. Scales ctenoid on both sides and nondeciduous; scales absent on snout, tips of jaws, and on interorbital space. "Gillraker" (teeth-like structures) minute but strong and pointed. Pyloric caecae ten.

Distribution.-

East Africa, coasts of India to Pacific.

Family CITHARIDAE

Brachypleura novaezeelandiae Günther, 1862
(Figs. 4a & b)

Brachypleura xanthosticta Alcock, 1889: 281-282, pl. 17, fig. 3.

Common name.-

Right-hand Flounder, Yellow-dappled Flounder.

Diagnosis.-

B. novaezeelandiae has a large mouth; both pectoral fins developed, large scales on the body.

Description.-

Based on 98 specimens ranging from 50-109 mm sl. Males: 42, females: 53, immature: 3.

D 67-76, A 45-50, P 11-13 (eyed side), 10-13 (blind side), V 6, C 16-19, Ll 29-35, Gr 1-6 + 7-9 (on first gill arch of eyed side).

In percentage of standard length: head length 27.6-31.3 (M: 29.3), head depth 26.9-31.2 (M: 28.6), body depth 33.9-44.9 (M: 39.9), snout length 6.8-9.5 (M: 7.9), post-orbital length 13.1-16.7 (M: 14.8), eye diameter 6.1-8.0 (M: 7.0).

Lateral line present on both sides of body; lateral line of eyed side slightly curved near head region. Scales on eyed side weakly ctenoid, those of blind side cycloid and deciduous. Jaw and snout naked. Gillrakers rather long and blunt at tip; serrae along margin of gillrakers. Pyloric caecae 3.

Distribution.-

From Bay of Bengal through Malay Archipelago and Gulf of Thailand to Philippines and New Zealand.

Family PARALICHTHYIDAE

Pseudorhombus dupliciocellatus Regan, 1905
(Fig. 5)

Platophrys palad Evermann and Seale, 1907: 105, fig. 21.
Pseudorhombus cartwright Ogilby, 1912: 47.

Common name.-

Ocellated Flounder.

Diagnosis.-

A flounder showing four double ocelli with rings, arranged in a rectangular pattern; body elongated.

Description.-

Based on 18 specimens ranging from 109-193 mm sl. Males: 7, females: 11.

D 70-74, A 52-57, P 11-12 (eyed side), 10-11 (blind side), V 6, C 17, Ll 73-76 (eyed side), Gr 5 + 7-9 (on first gill arch of eyed side).

In percentage of standard length: head length 27.4-30.3 (M: 28.5), head depth 23.8-28.4 (M: 26.8), body depth 37.1-43.4 (M: 40.7), snout length 5.2-6.1 (M: 5.7), post-orbital length 15.2-18.3 (M: 16.5), eye diameter 6.1-7.4 (M: 6.7).

One lateral line on each side of body, curved above pectoral fin and branched into two on head. Scales ctenoid on eyed side, cycloid on blind side. Snout, interorbital ridge, and jaws without scales. Gillrakers short, as broad as long, palmate-like, with pointed serrae. Pyloric caecae four.

Distribution.-

From Nicobar Islands through most of Indo-Australian Archipelago, Gulf of Thailand, northward to Japan, southward to northeastern Australia.

Pseudorhombus triocellatus

(Bloch & Schneider, 1801) (Fig. 6)

Common name.-

Three-spotted Flounder.

Diagnosis.-

Pseudorhombus triocellatus differs from other species of *Pseudorhombus* by three single blotches surrounded by a white ring, arranged in a triangular.

Description.-

Based on 128 specimens ranging from 44-114 mm sl. Males: 48, females: 54, immature: 26.

D 65-72, A 46-53, P 11-14 (eyed side), 10-12 (blind side), V 6, C 16-17, Ll 63-70, Gr 5-9 + 18-28 (on first gill arch of eyed side).

In percentage of standard length: head length 26.5-34.1 (M: 29.6), head depth 27.1-38.4 (M: 33.2), body depth 59.6-58.6 (M: 64.7), snout length 6.0-9.1 (M: 7.0), post-orbital length 13.3-18.2 (M: 15.2), eye diameter 6.2-10.0 (M: 7.8).

Lateral line well-developed on both sides, on eyed side curved upward above pectoral fin. Scales of eyed side ctenoid, on blind side cycloid, except anteriorly and near bases of dorsal and anal fins. Snout, interorbital ridge, and jaws naked. Gillrakers slender, rather elongate, and closely set up; minute serrae arranged in a line on outer edge of each gillraker. Pyloric caecae 4.

Distribution.-

From west and east coasts of India to Malay Archipelago.

Pseudorhombus malayanus Bleeker, 1866

(Fig. 7)

Common name.-

Malayan Flounder, Rough-scaled Flounder.

Diagnosis.-

Pseudorhombus arsius is very similar to *P. malayanus*. The latter species is recognized by the presence of ctenoid scales on both sides and a larger body depth, whereas in *P. arsius*, the scales on the blind side are cycloid.

Description.-

Based on 78 specimens ranging from 44-229 mm sl. Males: 41, females: 24, immature: 13.

D 65-76, A 52-60, P 11-14 (eyed side), 11-12 (blind side), V 6, Ll 70-79, Gr 1-4 + 8-13 (on first gill arch of eyed side).

In percentage of standard length: head length 26.5-34.7 (M: 29.4), head depth 26.7-38.0 (M: 30.8), body depth 47.2-56.8 (M: 52.7), snout length 5.1-7.8 (M: 6.2), post-orbital length 15.1-19.2 (M: 17.3), eye diameter 5.1-9.1 (M: 6.1).

One lateral line on each side of body, anterior part curving upward above pectoral fin of eyed side;; accessory branch of lateral line extending towards 9th to 11th ray of dorsal fin.

Scales ctenoid on both sides of body; snout

and interorbital space naked; maxillary scale on eyed side. Gillrakers rather short and pointed, upper margin having serrae with pointed end. Pyloric caecae 4.

Distribution.-

East coast of India through Malay Peninsula and Archipelago, Gulf of Thailand to Philippines. Migrates into estuaries for feeding.

Pseudorhombus elevatus Ogilby, 1912
(Fig. 8)

Pseudorhombus javanicus Bleeker, 1866-1872: 8, pl. 232, Fig. 3.

Common name.-

Deep Flounder.

Diagnosis.-

Pseudorhombus elevatus is distinguished from all other species of *Pseudorhombus* by three distinct blotches along the straight part of the lateral line, and by incomplete ring-like blotches all over the eyed side of the body.

Description.-

Based on 86 specimens ranging from 20-128 mm sl. Males: 34, females: 34, immature: 18.

D 64-74, A 47-58, P 11-12 (eyed side), 10-12 (blind side), V 6, C 17-18. Ll 64-75 (eyed side), Gr 3-7 + 10-18 (on first gill arch of eyed side).

In percentage of standard length: head length 25.4-35.0 (M: 30.5), head depth 22.0-37.8 (M: 31.5), body depth 43.8-54.7 (M: 50.2), snout length 5.5-10.0 (M: 7.1), post-orbital length 13.8-18.8 (M: 16.2), eye diameter 5.0-10.0 (M: 7.5).

One lateral line on each side, those of eyed side with a supratemporal branch, splitted from median level of lateral line near upper part of operculum, reaching base of 10th, 11th, or 12th dorsal fin ray; it curves upward above pectoral fin. Scales ctenoid on eyed side, cycloid on blind side and non-deciduous. Gillrakers rather long, pointed with serrae in two to three rows on outer margin. Pyloric caecae 4.

Distribution.-

Along Asiatic main-land from Persian Gulf

to Gulf of Thailand, and throughout Malay Archipelago to Australia. Migrates to estuaries.

Pseudorhombus arsius (Hamilton, 1822)
(Fig. 9)

Rhombus polyspilus Bleeker, 1853b: 503.
Pseudorhombus russelli Day, 1865: 172.

Common name.-

Large-toothed Flounder.

Diagnosis.-

Pseudorhombus arsius is quite similar to *P. malayanus*, the former having ctenoid scales on the eyed side and cycloid scales on the blind side, whereas the body depth is less than in *P. malayanus*.

Description.-

Based on 41 specimens ranging from 60-226 mm sl. Males: 20, females 19, immature: 2.

D 68-74, A 51-58, P 11-13 (eyed side), 10-12 (blind side), V 6, C 17, Ll 66-80, Gr 1-5 + 9-14 (on first gill arch of eyed side).

In percentage of standard length: head length 26.6-38.9 (M: 29.4), head depth 28.3-41.3 (M: 31.7), body depth 45.3-60.7 (M: 50.4), snout length 5.8-7.7 (M: 6.8), post-orbital length 14.8-17.8 (M: 16.6), eye diameter 4.4-8.3 (M: 6.3).

One lateral line on each side of body, curved above pectoral fin. Tip of first interhaemal spine sometimes projecting. Scales ctenoid on eyed side, cycloid on blind side; scales absent on snout tips and interorbital space. Gillrakers moderate in length and stout, their margins strongly serrated with serrae. Pyloric caecae 4.

Distribution.-

East coast of Africa, along coasts of India, Gulf of Thailand, South Vietnam and Malay Archipelago to Pacific. Migrates to estuaries for feeding.

Family BOTHIDAE

Grammatobothus polyophthalmus
(Bleeker, 1866) (Fig. 10)

Common name.-

Many-eyed Flounder, Three-spot Flounder.

Diagnosis.-

Narrow interorbital space; three large, dark blotches surrounded by white rings arranged in a triangular.

Description.-

Based on five specimens ranging from 84-112 mm sl. Males: 3, females: 2.

D 79-85, A 65-68, P 14-15 (eyed side), 11-13 (blind side), V 6, C 17, Ll 62-68 (eyed side), Gr 2-3 + 7 (on first gill arch of eyed side).

In percentage of standard length: head length 26.8-29.4 (M: 28.3), head depth 29.8-33.7 (M: 31.8), body depth 58.1-61.6 (M: 60.1), snout length 6.0-7.2 (M: 6.5), post-orbital length 12.5-14.3 (M: 13.6), eye diameter 8.1-8.9 (M: 8.6).

Lateral line present on both sides; on eyed side curved above pectoral fin, bifurcated near tip. Small scales, ctenoid on eyed side, cycloid on blind side; snout, jaws and interorbital ridge naked. Gillrakers very small, triangular shaped with serrae on margin. Pyloric caecae 4.

Sexual dimorphism.-

Males of this species show a more steep dorsal profile of head, and have the 2nd ray of pectoral fin of eyed side prolonged.

Distribution.-

From Indian Ocean and shores of Malay Peninsula and Archipelago, including Gulf of Thailand to Australia. Inhabits shallow waters.

Bothus myriaster

(Temminck & Schlegel, 1847) (Fig. 11)

Platophrys ovalis Regan, 1908: 232, pl. 27, fig. 6.

Platophrys circularis Regan, 1908: 233, pl. 26, fig. 3.

Common name.-

Oval Flounder.

Diagnosis.-

Very small cycloid scales on body, except the marginal portions where scales are ctenoid;

small lower jaw, and flat deep body.

Description.-

Based on 19 specimens ranging from 98-128 mm sl. Males: 3, females: 16.

D 88-95, A 65-71, P 8-10 (eyed side), 9-10 (blind side), V 6, C 16-17, Ll 72-108, Gr 0-5 + 6-8 (on first gill arch of eyed side).

In percentage of standard length: head length 26.5-31.6 (M: 29.7), head depth 29.5-35.3 (M: 32.8), body depth 55.6-64.1 (M: 59.7), snout length 7.1-8.3 (M: 7.6), post-orbital length 12.2-15.4 (M: 14.1), eye diameter 8.1-9.4 (M: 8.8), interorbital space 8.3-11.5 (M: 9.3).

Lateral line on eyed side curved near pectoral fin, bifurcated near upper eye; lateral line absent on blind side. Scales very small, adherent, cycloid on both sides, except on margins of eyed side where ctenoid; snout and jaws naked. Gillrakers very small. Pyloric caecae 4.

Sexual dimorphism.-

Remarkable sexual dimorphism exists in many external characters. In males: first 4 to 5 pectoral fin rays on eyed side well prolonged into filamentous structures, almost reaching caudal peduncle. Interorbital space extremely wide. A spine present on snout, another spine on symphysis of lower jaw. Orbits with spiny projections. Each eye with a large membranous flap from posterior part. Blind side with dark spots posteriorly.

Distribution.-

Africa, Southeastern India and Ceylon to Burma and Japan. Inhabits deeper waters.

Engyproscopon grandisquama

(Temminck & Schlegel, 1846) (Fig. 12)

Rhombus poecilurus Bleeker, 1852: 293-294.

Common name.-

Large-scaled Flounder.

Diagnosis.-

Caudal fin with two dark blotches, one above and another below. Scales in lateral line 37 to 45.

Description.-

Based on 87 specimens ranging from 41-83 mm sl. Males: 56, females: 29, immature: 2.

D 77-90, A 58-69, P 9-12 (eyed side), 9-11 (blind side), V 6, C 16-17, Ll 37-45, Gr 0 + 5-8 (on first gill arch of eyed side).

In percentage of standard length: head length 23.4-30.2 (M: 27.5), head depth 27.4-36.9 (M: 33.0), body depth 47.2-56.6 (M: 52.0), snout length 4.8-7.6 (M: 6.0), post-orbital length 12.9-16.2 (M: 14.2), eye diameter 6.5-9.5 (M: 7.9).

Lateral line developed on eyed side, curved above pectoral fin, bifurcated at tip; lateral line absent on blind side. Scales weakly ctenoid on eyed side, cycloid on blind side, deciduous; snout and jaws naked. Gillrakers short with minute hair-like processes. Pyloric caecae 4.

Sexual dimorphism.-

Sexes can be externally differentiated. Males have a wider interorbital space, head steep in the anterior profile, a strong rostral spine, and blind side with dark grey spots in anterior region. The second ray of pectoral fin of eyed side elongated.

Distribution.-

East Africa through Indian Ocean and Malay Archipelago to Australia and Japan.

Crossorhombus azureus
(Alcock, 1889) (Fig. 13)

Common name.-

Blue-spotted Flounder.

Diagnosis.-

Differs from *Crossorhombus valderostratus* in the presence of dark, scattered blotches on the coloured side.

Description.-

Based on 76 specimens ranging from 53-113 mm sl. Males: 39, females: 37.

D 85-93, A 64-72, P 11-13 (eyed side), 9-13 (blind side), V 6, C 15-18, Ll 52-59 (eyed side), Gr 0-6 + 5-8 (on first gill arch of eyed side).

In percentage of standard length: head length, 25.5-29.5 (M: 27.2), head depth 24.1-34.9 (M: 29.9), body depth 47.8-56.8 (M: 53.3), snout length 4.4-6.7 (M: 5.5), post-orbital length 12.0-16.0 (M: 14.2), eye diameter 7.1-10.1 (M: 8.1), interorbital space 6.1-8.7 (M: 6.2) in males, 1.9-5.3 (M: 4.3) in females.

Lateral line developed on eyed side, curved above pectoral fin, branched at tip; lateral line absent on blind side. Scales adherent, strongly ctenoid on eyed side, cycloid on blind side. Gillrakers small with serrae on one margin. Pyloric caecae 4.

Sexual dimorphism.-

Males with a strong spine on snout, a wider interorbital space than in females, orbital spines and some dark bluish spots in front of interorbital space. The second ray of pectoral fin of eyed side elongated.

Distribution.-

Southeastern India, Ceylon, Burma, and Nicobar Islands.

Crossorhombus valderostratus
(Alcock, 1890) (Fig. 14)

Platophrys dimorphus Gilchrist, 1905: 10, pl. 27.

Common name.-

Strong-snout Flounder.

Diagnosis.-

C. valderostratus closely resembles *Engyproson grandisquama*, the latter species showing two dark blotches on the margins of the caudal fin, which are absent in the former species.

Description.-

Based on 60 specimens ranging from 50-90 mm sl. Males: 23, females: 37.

D 84-91, A 62-72, P 11-13 (eyed side), 9-11 (blind side), V 6, C 17, Ll 46-53, Gr 0-4 + 5-9 (on first gill arch of eyed side).

In percentage of standard length: head length 23.1-28.6 (M: 27.0), head depth 26.7-33.3 (M: 29.0), body depth 51.4-58.1 (M: 54.4), snout

length 4.8-6.7 (M: 5.7), post-orbital length 12.5-15.6 (M: 14.1), eye diameter 7.0-9.1 (M: 7.9).

Lateral line developed on eyed side, curved above pectoral fin, bifurcated at tip; lateral line absent on blind side. Scales strongly ctenoid on eyed side, cycloid on blind side, and adherent. Gillrakers small, with minute serrae on outer margin, Pyloric caecae 4.

Sexual dimorphism.-

Males with rather steep dorsal profile of head, a broad interorbital space, and dark bluish spots in front of interorbital space and margin of head. A strong spine on snout, spines on anterior part of orbits. The second ray of pectoral fin on eyed side is elongated.

Distribution.-

Off mouth of Umblanga river, Natal to Delagoa and Indo-Pacific.

Laeops guentheri Alcock, 1890
(Fig. 15)

Common name.-

Flounder.

Diagnosis.-

Teeth in a villiform band; maxillary hardly reaching anterior margin of lower eye.

Description.-

Based on 70 specimens ranging from 39-105 mm sl. Males: 45, females: 18, immature: 7.

D 85-102, A 61-83, P 11-15 (each side), V 6, C 16-17, Ll 95-102, Gr 0 + 4-8 (on first gill arch of eyed side).

In percentage of standard length: head length 19.5-26.7 (M: 24.1), head depth 20.0-28.0 (M: 25.4), body depth 32.5-45.9 (M: 41.1), snout length 3.2-6.7 (M: 5.2), post-orbital length 9.4-14.3 (M: 12.3), eye diameter 4.9-8.5 (M: 6.6).

Lateral line present on eyed side, curved above pectoral fin; lateral line absent on blind side. Scales cycloid on both sides, deciduous. Gillrakers small. Pyloric caecae 3.

Distribution.-

Persian Gulf, east coast of India, Gulf of Martaban and Gulf of Thailand. Inhabits shallow waters.

Laeops nigrescens Lloyd, 1907
(Fig. 16)

Common name.-

Flounder

Diagnosis.-

Differs from *L. guentheri* in the uniserial teeth; maxillary reaching anterior edge of eye.

Description.-

Based on 14 specimens ranging from 62-104 mm sl. Males: 9, females: 4, immature: 1.

D 95-103, A 74-84, P 13-15 (both sides), V 6, C 17, Ll 85-96, Gr 0 + 6-7 (on first gill arch of eyed side).

In percentage of standard length: head length 19.4-22.5 (M: 21.2), head depth 21.4-25.6 (M: 22.8), body depth 36.1-44.4 (M: 38.7), snout length 3.2-4.8 (M: 4.1), post-orbital length 9.9-12.5 (M: 11.3), eye diameter 4.8-7.4 (M: 6.4).

Lateral line developed only on eyed side, curved above pectoral fin. Scales cycloid on both sides of body, deciduous. Gillrakers very small and pointed. Pyloric caecae 2.

Distribution.-

From east coast of India to Gulf of Aden. Inhabits shallow waters.

Family PLEURONECTIDAE

Samaris cristatus Gray, 1831
(Fig. 17)

Common name.-

Gray's Crested Flounder.

Diagnosis.-

Mouth small; anterior 12 to 15 rays of dorsal fin elongated and filamentous; pectoral fin on

blind side absent.

Description.-

Based on 92 specimens ranging from 53-129 mm sl. Males: 45, females: 46, immature: 1.

D 12-15 + 61-71, A 49-60, P 4-5 (eyed side), V 5, C 15-17, Ll 68-78, Gr 4 + 5-7 (on first gill arch of eyed side).

In percentage of standard length: head length 19.8-25.4 (M: 23.1), head depth 23.4-30.0 (M: 26.3), body depth 33.0-41.7 (M: 37.0), snout length 4.0-6.7 (M: 5.2), post-orbital length 9.0-13.9 (M: 11.8), eye diameter 5.2-9.4 (M: 6.7).

Lateral line present on eyed side, anteriorly with some accessory branches; lateral line absent on blind side. Scales of eyed side ctenoid, on blind side feebly ctenoid. Gillrakers small, palmate shaped with very minute serrae. Pyloric caecae absent.

Distribution.-

Distributed in deep waters off Ceylon, east coast of India, Andaman Islands, Seas of China and Gulf of Thailand. Inhabits deeper waters.

Family SOLEIDAE

Heteromycteris oculus (Alcock, 1889)
(Fig. 18)

Common name.-

Beaked Sole.

Diagnosis.-

Differs from other species of the family Soleidae in having a rostral hook. This hook curved around behind the symphysis of the lower jaw, and extends vertically from the front edge of the lower eye; the dorsal fin originates from the tip of this hook.

Description.-

Based on 26 specimens ranging from 50-106 mm sl. Males: 12, females: 7, immature: 7.

D 85-99, A 55-66, P 5, C 19, Ll 86-103.

In percentage of standard length: head length 22.2-26.0 (M: 24.4), head depth 23.8-29.0

(M: 26.3), body depth 33.0-39.8 (M: 36.6), snout length 9.0-14.8 (M: 10.8), post-orbital length 9.0-12.0 (M: 10.5), eye diameter 2.6-4.1 (M: 3.3).

Lateral line present on both sides. Scales highly ctenoid on both sides, those on blind side smaller. Gillrakers and pyloric caecae absent.

Distribution.-

Ceylon, Bay of Bengal to Gulf of Thailand.

Aesopia cornuta Kaup, 1858
(Fig. 19)

Common name.-

Horned Sole.

Diagnosis.-

Although *Aesopia cornuta* resembles the species of *Zebrias* in colouration of the eyed side, it is distinguished by its thick and prolonged first ray of the dorsal fin and by weakly ctenoid scales on both sides of its body.

Description.-

Based on 130 specimens ranging from 51-136 mm sl. Males: 60, females: 55, immature: 15.

D 66-79, A 53-66, V 4, C 15-17, Ll 87-100.

In percentage of standard length: head length 16.9-25.9 (M: 20.2), head depth 21.3-33.3 (M: 25.6), body depth 30.6-39.5 (M: 35.0), snout length 3.4-7.4 (M: 4.9), post-orbital length 10.0-15.7 (M: 11.9), eye diameter 3.0-5.9 (M: 4.2).

Scales feebly ctenoid on both sides; scales of anterior half of blind side produced into barbel-like processes. Gillrakers and pyloric caecae absent.

Distribution.-

From South Africa, Seas of India through Gulf of Thailand to Japan.

Zebrias synapturoides (Jenkins, 1910)
(Fig. 20).

Common name.-

Zebra Sole.

Diagnosis.-

Eyes without tentacles; scales strongly ctenoid

on both sides; dorsal and anal fins confluent with anterior half of caudal fin.

Description.-

Based on 28 specimens ranging from 16-114 mm sl. Males: 11, females: 11, immatures: 6.

D 65-76, A 53-62, P 8-9 (eyed side), V 4-5, C 16-18, Ll 66-73.

In percentage of standard length: head length 18.9-23.2 (M: 20.8), head depth 23.3-31.1 (M: 26.5), body depth 34.4-39.5 (M: 36.7), snout length 3.6-7.0 (M: 5.6), post-orbital length 10.0-13.1 (M: 11.5), eye diameter 2.8-5.6 (M: 4.3).

Lateral line developed on both sides. Scales strongly ctenoid on both sides, each scale with 10 to 12 long spinules in outer series, subsequently 3 to 4 series of small spinules. Gillrakers and pyloric caecae absent.

Distribution.-

From east coast of India and Ganjam coast.

Zebrias quagga (Kaup, 1858)
(Fig. 21)

Common name.-

Zebra Sole.

Diagnosis.-

Zebrias quagga differs from other species of *Zebrias* by the presence of membranous tentacles on the inner margin of its eyes.

Description.-

Based on 70 specimens ranging from 62-145 mm sl. Males: 30, females: 28, immature: 12.

D 58-85, A 47-68, P 4-7 (eyed side), V 4, C 16-18, Ll 91-101.

In percentage of standard length: head length 18.0-26.9 (M: 20.3), head depth 22.2-32.3 (M: 26.0), body depth 34.2-42.1 (M: 37.9), snout length 4.1-7.7 (M: 5.0), post-orbital length 9.2-15.4 (M: 11.1), eye diameter 2.4-6.0 (M: 4.8).

Lateral line present on both sides. Scales ctenoid on both sides of body; scales on anterior part of blind side, head, and snout produced into short papillae. Gillrakers and

pyloric caecae absent.

Distribution.-

Seas of India through Malay Peninsula and Archipelago, including Gulf of Thailand to China.

Zebrias altipinnis (Alcock, 1890)
(Fig. 22)

Common name.-

Zebra Sole.

Diagnosis.-

In *Z. altipinnis* the dorsal and anal fins are completely joined with the caudal fin. Eye tentacles absent.

Description.-

Based on 16 specimens ranging from 27-204 mm sl. Males: 7, females: 4, immature: 5.

D 74-88, A 62-74, V 5, C-17-18, Ll 105-135.

In percentage of standard length: head length 19.7-25.9 (M: 21.6), head depth 26.2-31.3 (M: 28.4), body depth 35.0-46.4 (M: 40.4), snout length 4.8-7.4 (M: 5.8), post-orbital length 10.6-14.8 (M: 12.4), eye diameter 2.5-4.4 (M: 3.7).

Lateral line developed on both sides. Scales ctenoid on both sides; scales on tip of snout on blind side with short fringes. Gillrakers and pyloric caecae absent.

Distribution.-

Along east coast of India to Malay Archipelago and Gulf of Thailand.

Brachirus orientalis
(Bloch & Schneider, 1801) (Fig. 23)

Brachirus sundaicus Bleeker, 1866: 20, pl. 236, fig. 4, pl. 239, fig. 2.

Common name.-

Oriental Sole.

Diagnosis.-

Differs from species of *Synaptura* in having a broad oval body.

Description.-

Based on four specimens ranging from 71-192 mm sl. Male: 1, female: 2, immature: 1.

D 65-69, A 50-53, P 7-8, V 5, C 17-18, Ll 82-87.

In percentage of standard length: head length 23.0-26.8 (M: 24.2), head depth 28.2-35.2 (M: 31.2), body depth 48.7-63.1 (M: 59.2), snout length 4.0-6.8 (M: 5.8), post-orbital length 13.1-15.3 (M: 14.0), eye diameter 9.2-10.2 (M: 9.6).

Lateral line developed on both sides. Scales ctenoid on both sides; scales on dark pigmented region with blackish papillae, scales of head region on blind side with white papillae. Gillrakers and pyloric caecae absent.

Distribution.-

From Persian Gulf, Seas of India through Malay Peninsula to China and Australia. Inhabits shallow coastal waters, estuaries and even fresh waters.

Synaptura albomaculata Kaup, 1858
(Fig. 24)

Common name.-

Sole.

Diagnosis.-

Differs from *S. commersoniana* in having a broader body, a large right pectoral fin, and in showing rows of white blotches along upper and lower margins of the body.

Description.-

Based on 28 specimens ranging from 109-232 mm sl. Males: 17, females: 11.

D 63-79, A 52-62, P 6-9, V 3-4, C 12-16, Ll 110-142.

In percentage of standard length: head length 17.0-21.1 (M: 19.6), head depth 17.5-26.6 (M: 24.0), body depth 28.8-35.8 (M: 31.8), snout length 4.5-6.4 (M: 5.8), post-orbital length 10.1-11.9 (M: 11.0), eye diameter 2.3-3.7 (M: 3.2).

Lateral line present on both sides of body. Scales small, ctenoid on eyed side, cycloid on blind side; scales on head region of blind side

produced into barbel-like structures. Gillrakers and pyloric caecae absent.

Distribution.-

From Singapore and Seas of India. Inhabits muddy shallow coastal waters, also in estuaries and fresh waters.

Synaptura commersoniana (Lacépède, 1802)
(Fig. 25)

Solea Russellii Bleeker, 1851b: 15.

Common name.-

Commerson's Sole.

Diagnosis.-

Differs from *Synaptura albomaculata* in having a narrow body, and a small right pectoral fin. No white blotches along body.

Description.-

Based on 44 specimens ranging from 105-202 mm sl. Males: 22, females: 21, immature: 1.

D 70-80, A 56-67, P 6-8, V 2-3, C 10-13, Ll 155-170.

In percentage of standard length: head length 17.4-21.3 (M: 18.8), head depth 21.3-26.7 (M: 23.4), body depth 25.8-36.5 (M: 29.6), snout length 4.8-8.0 (M: 5.7), post-orbital length 9.2-12.4 (M: 10.4), eye diameter 2.5-4.0 (M: 2.9).

Lateral line developed on both sides. Scales small, highly ctenoid on eyed side, cycloid on blind side. Gillrakers and pyloric caecae absent.

Distribution.-

Seas of India to the Malay Archipelago, Gulf of Thailand. It inhabits muddy bottoms of marine, estuarine and even fresh waters.

Solea ovata Richardson, 1846
(Fig. 26)

Solea humilis Cantor, 1849: 1201-1202.

Common name.-

Ovate Sole.

Diagnosis.-

Pectoral fins well-developed, dorsal profile much arched; eyed side with numerous black spots and blotches.

Description.-

Based on 42 specimens ranging from 54-83 mm sl. Males: 15, females: 27.

D 55-64, A 43-49, P 6-10 (eyed side), 5-7 (blind side), V 5, C 18-20, Ll 92-109.

In percentage of standard length: head length 24.3-29.1 (M: 26.2), head depth 30.2-39.3 (M: 34.3), body depth 44.5-54.8 (M: 48.9), snout length 6.2-9.7 (M: 7.7), post-orbital length 12.5-16.1 (M: 14.3), eye diameter 4.1-6.7 (M: 5.1).

Lateral line developed on both sides. Scales strongly ctenoid on both sides; scales on head of blind side with filamentous structures. Gillrakers and pyloric caecae absent.

Distribution.-

Coasts of India, through Malay Peninsula and Archipelago, including Gulf of Thailand to China.

Pardachirus pavoninus (Lacépède, 1802)
(Fig. 27)

Common name.-

Broad Sole.

Diagnosis.-

Differs from other species of the family Soleidae in having a pore at the base of each ray of dorsal and anal fin. Numerous dark-edged, white blotches of various shapes scattered over the eyed side of the body.

Description.-

Based on one specimens, 164 mm sl, males.

D 67, A 51, V 5, C 17, Ll 93.

In percentage of standard length: head length 22.0, head depth 27.5, body depth 47.0, snout length 7.9, post-orbital length 11.6, eye diameter 3.7.

Lateralline present on both sides. Scales feebly ctenoid or cycloid on both sides. Gillrakers and pyloric caecae absent.

Distribution.-

East coast of India, Andaman Islands, through the Malay Peninsula and Archipelago including the Gulf of Thailand to Japan, Australia and the Pacific. Inhabits deeper part of the seas. It is a rare species along Porto Novo coast.

Aseraggodes cyaneus (Alcock, 1890)
(Fig. 28)

Solea umbralitis Alcock, 1894: 131, pl. vii, fig. 3.

Common name.-

Sole.

Diagnosis.-

Pectoral fins absent, dorsal and anal fins not confluent with caudal fin; dorsal and anal fin rays without basal pores. Rostral hook not well-developed. Body showing two rows of dark brown blotches.

Description.-

Based on 23 specimens ranging from 30-79 mm sl. Males: 6, females: 2, immature: 15.

D 67-78, A 45-53, V 5, C 18, LL 58-68.

In percentage of standard length: head length 25.6-30.0 (M: 27.9), head depth 30.5-36.0 (M: 33.3), body depth 38.1-44.0 (M: 40.4), snout length 8.1-11.4 (M: 9.7), post-orbital length 13.2-17.5 (M: 15.3), eye diameter 2.0-4.1 (M: 3.0).

Lateral line developed on both sides. Scales highly ctenoid on both sides, very small. Gillrakers and pyloric caecae absent.

Distribution.-

From Persian Gulf, through seas of India and Archipelago to Timor Sea.

Family CYNOGLOSSIDAE

Paraplagusia bilineata (Bloch, 1787)
(Fig. 29)

Plagusia marmorata Bleeker, 1851a: 411.

Common name.-

Two-lined Tongue-sole.

Diagnosis.-

Differs from other species of the family Cynoglossidae in having fringed lips.

Description.-

Based on three specimens ranging from 146-168 mm sl. Males: 2, female: 1.

D 114-115, A 91-92, P 4, C 12, Ll 98-113, scales between lateral lines of eyed side 18.

In percentage of standard length: head length 23.8-25.4 (M: 24.4), head depth 23.5-24.4 (M: 23.9), body depth 25.4-26.8 (M: 26.2), snout length 12.5-13.0 (M: 12.8), post-orbital length 9.3-9.6 (M: 9.5), eye diameter 1.9-2.4 (M: 2.1).

Two lateral lines on eyed side: one at upper profile of body, the second along middle; they are connected and branched on head region. Lateral line absent on blind side. Scales ctenoid on both sides of body. Gillrakers and pyloric caecae absent.

Distribution.-

From East Africa, through Indian Ocean and Malay Archipelago to China and Japan. Inhabiting deeper waters.

Cynoglossus arel

(Bloch & Schneider, 1801) (Fig. 30)

Cynoglossus melampetala Richardson, 1846: 281.
Plagusia grandisquamis Cantor, 1849: 1214-1215.
Plagusia macrolepidota Bleeker, 1851a: 415-416.
Plagusia Cantoris Bleeker, 1853a: 153.
Plagusia oligolepis Bleeker, 1854: 445.
Cantorina pinangenensis Kaup, 1858: 106.
Arelia kaupii Bleeker, 1860: 73
Cynoglossus elongatus Günther, 1862: 501

Common name.-

Large-scaled Tongue-sole.

Diagnosis.-

Number of scales between lateral lines 6 or 7; scales large in size.

Description.-

Based on 44 specimens ranging from 85-378 mm sl. Males: 25, females: 16, immature: 3.

D 102-115, A 73-89, C 10-12, Ll 50-66, scales between lateral lines 6-7.

In percentage of standard length: head length 21.3-25.9 (M: 22.8), head depth 19.1-22.5 (M: 20.6), body depth 21.8-24.9 (M: 23.3), snout length 8.6-12.4 (M: 10.0), post-orbital length 9.4-13.0 (M: 10.9), eye diameter 1.4-2.9 (M: 2.1).

Two lateral lines on eyed side, connected and branched on head region. Lateral line absent on blind side. Scales large, ctenoid on eyed side, cycloid on blind side. Gillrakers and pyloric caecae absent.

Distribution.-

From Persian Gulf along coast of Southern Asia to China, Seas of India and also in Malay Archipelago.

Cynoglossus puncticeps

(Richardson, 1846) (Fig. 31)

Plagusia brachyrhynchus Bleeker, 1851a: 414-415.

Common name.-

Spotted Tongue-sole.

Diagnosis.-

16 to 21 scales between lateral lines. Irregular vertical bands over eyed side of body, fins with black streaks.

Description.-

Based on 86 specimens ranging from 90-163 mm sl. Males: 24, females: 60, immature: 2.

D 96-109, A 73-83, V 4, C 7-12, Ll 90-112, scales between lateral lines 16-21.

In percentage of standard length: head length 18.5-22.4 (M: 20.6), head depth 20.7-26.3 (M: 23.5) body depth 26.1-31.1 (M: 28.2), snout length 6.7-9.5 (M: 7.8), post-orbital length 8.8-12.3 (M: 10.5), eye diameter 1.7- 3.9 (M: 2.9).

Two lateral lines on eyed side, connected anteriorly near nape, branched on head region. Scales ctenoid on both sides of body. Gillrakers and pyloric caecae absent.

Distribution.-

From Indian Ocean, Malay Archipelago and Gulf

of Thailand to Philippines and China. Inhabits shallow seas, migrates into estuaries for feeding.

Cynoglossus semifasciatus Day, 1878
(Fig. 32)

Common name.-
Tongue-sole.

Diagnosis.-
12-14 scales between lateral lines. Fins uniform dark.

Description.-
Based on 88 specimens ranging from 63-138 mm sl. Males: 37, females: 45, immature: 6.
D 93-105, A 73-82, V 4, C 10-12, Ll 73-86, scales between lateral lines 12-15.

In percentage of standard length: head length 20.4-25.4 (M: 22.7), head depth 21.0-26.9 (M: 24.2), body depth 25.7-31.5 (M: 28.4), snout length 6.3-9.5 (M: 7.7), post-orbital length 9.8-14.4 (M: 12.8), eye diameter 1.2-3.1 (M: 2.4).

Two lateral lines on eyed side, connected near nape, branched over head. Lateral line absent on blind side. Scales highly ctenoid on both sides. Gillrakers and pyloric caecae absent.

Distribution.-
West and east coasts of India to Gulf of Thailand.

Cynoglossus monopus (Bleeker, 1849)
(Fig. 33)

Plagusia melanopterus Bleeker, 1851a: 415.
Arelia ceratophrys Kaup, 1858: 108.

Common name.-
Tongue-sole.

Diagnosis.-
Eyes very small and stalked; snout pointed. Caudal tapering; body greyish brown.

Description.-
Based on 98 specimens ranging from 100-154 mm sl. Males: 31, females: 67.

D 114-125, A 91-99, V 4, C 10, Ll 103-126, scales between lateral lines 16-20.

In percentage of standard length: head length 18.8-22.2 (M: 20.8), head depth 18.8-23.0 (M: 21.1), body depth 21.8-26.2 (M: 24.4), snout length 6.5-9.0 (M: 7.8), post-orbital length 11.1-13.5 (M: 12.0), eye diameter 1.0-2.7 (M: 1.5).

Two lateral lines on eyed side, connected anteriorly on nape, branched over head. Lateral line absent on blind side. Scales small and ctenoid on both sides of body. Gillrakers and pyloric caecae absent.

Distribution.-
East coast of India through Malay Archipelago and Gulf of Thailand to China.

Cynoglossus lida (Bleeker, 1851)
(Fig. 34)

Cynoglossus intermedius Alcock, 1889: 288.

Common name.-
Shoulder-spot Tongue-sole.

Diagnosis.-
Black pigment on gill cover; body with small scales; liſ not fringed. Body uniform brown.

Description.-
Based on 60 specimens ranging from 84-191 mm sl. Males: 27, females: 21, immature: 12.
D 92-113, A 77-88, V 4, C 9-10, Ll 82-95, scales between lateral lines 10-15.

In percentage of standard length: head length 19.7-24.7 (M: 22.9), head depth 19.9-24.2 (M: 21.9), body depth 23.0-26.7 (M: 24.8), snout length 6.3-12.0 (M: 10.3), post-orbital length 9.0-11.7 (M: 10.4), eye diameter 1.4-3.0 (M: 2.4).

Two lateral lines on eyed side, connected anteriorly near nape, branched over head. No lateral line on blind side. Scales small, ctenoid on both sides of body. Gillrakers and pyloric caecae absent.

Distribution.-
From coast of Natal, South Africa, Seas of India to Philippines. Migrates to estuaries.

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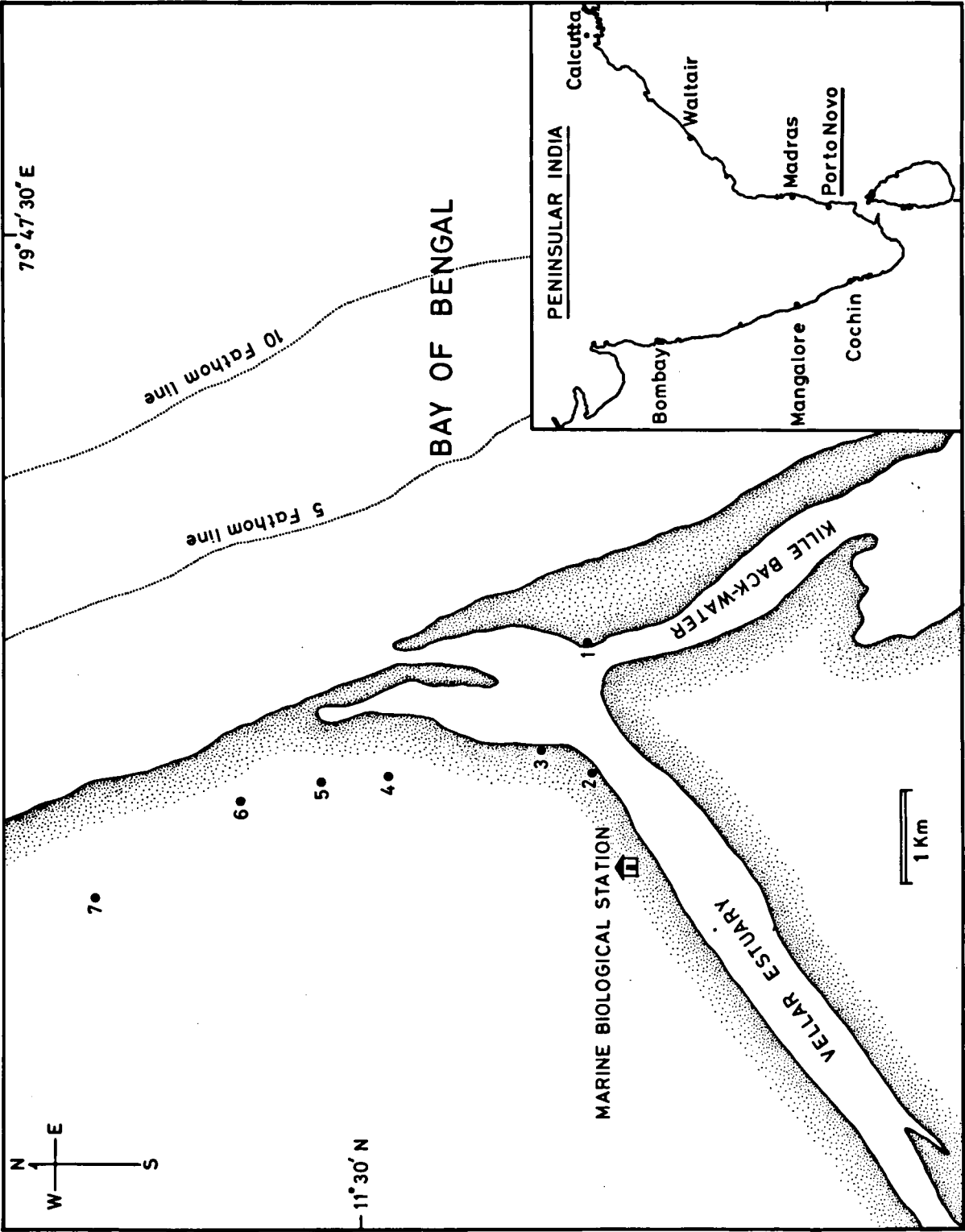


Fig. 1. Map showing the Vellar estuary, 5 & 10 fathom lines and the fishing villages of Porto Novo coast with inset map of Peninsular India.
1. Mudasodai, Annankoil, 3. Parangipettai, 4. Chinmoor South, 5. Chinmoor North, 6. Pudupettai, 7. Pudukuppam.

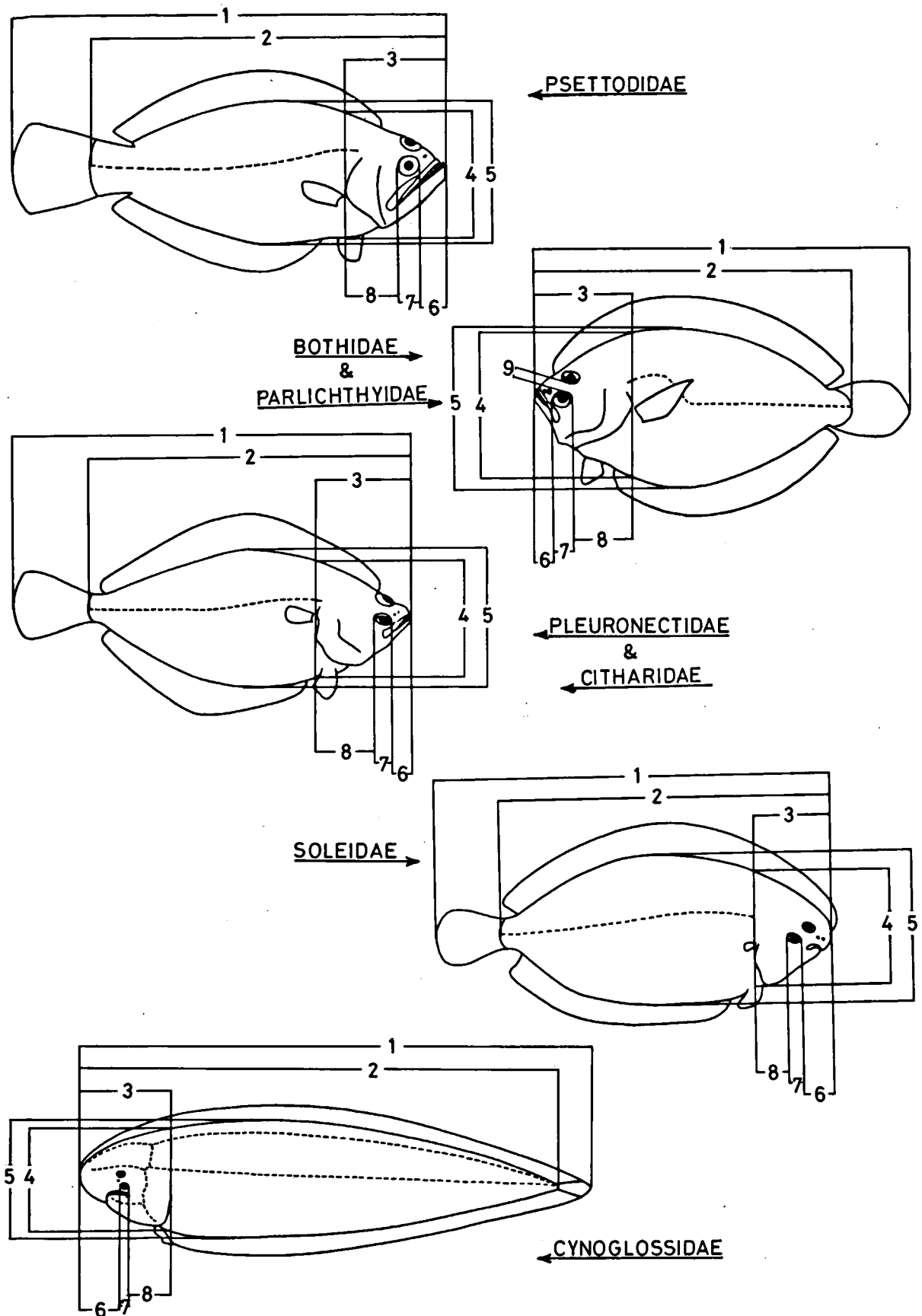


Fig. 2. Diagram showing morphometric characters of flat fishes. 1. Total length, 2. Standard length, 3. Head length, 4. Head depth, 5. Body depth, 6. Snout length, 7. Eye diameter, 8. Post-orbital length, 9. Interorbital space.

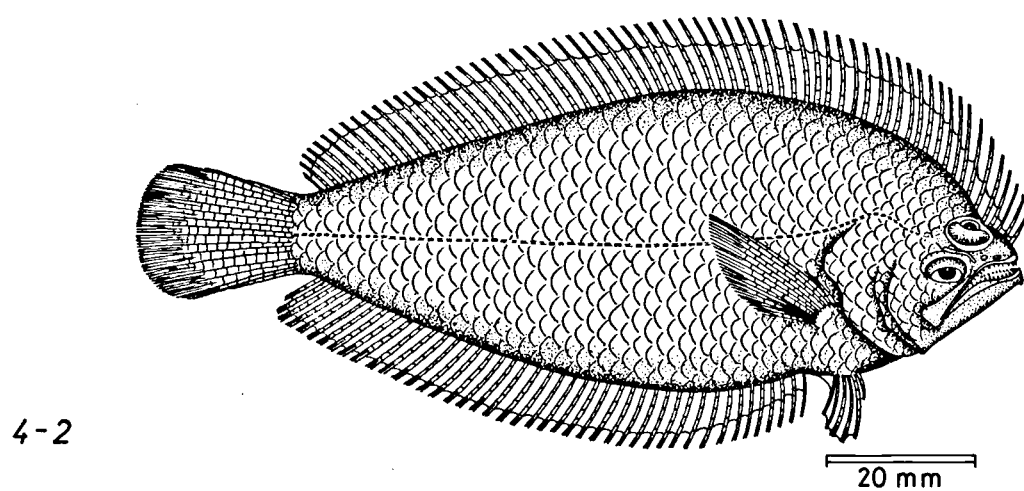
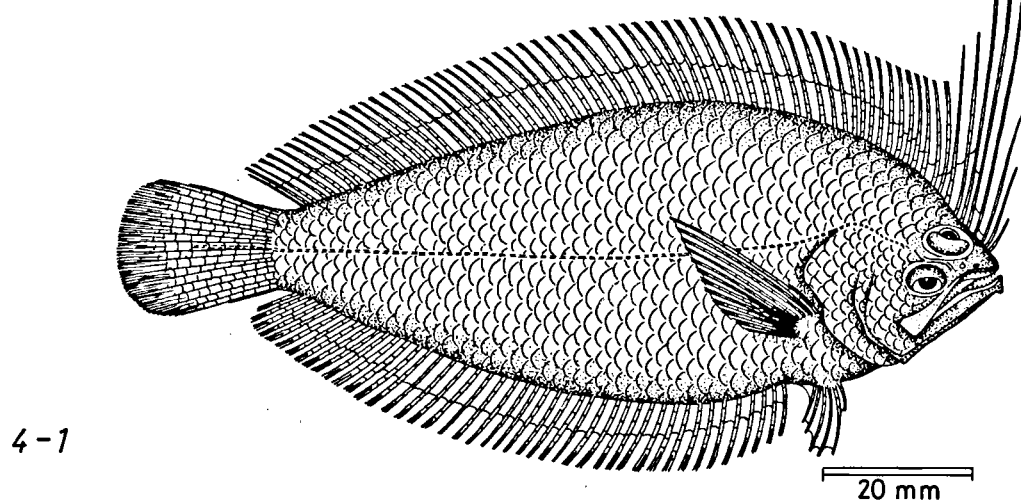
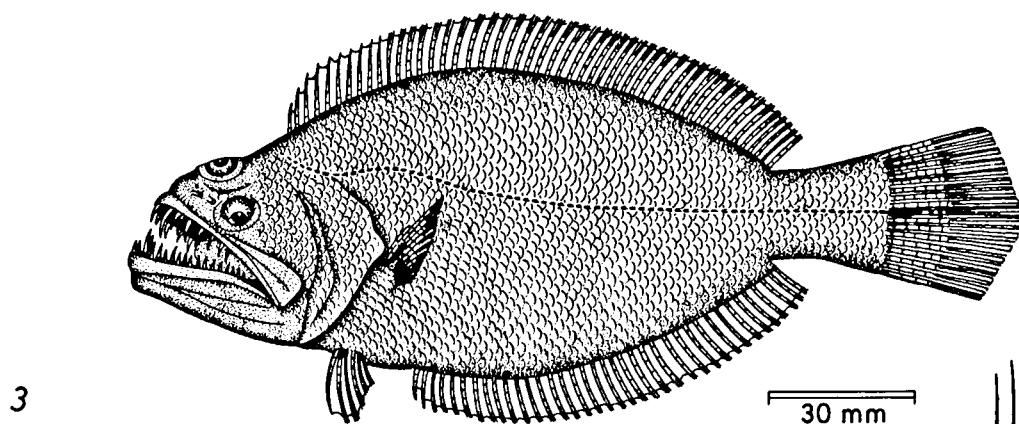


Fig. 3. *Psettodes erumei* (Bloch & Schn.) (Male).

Fig. 4. *Brachypleura novaezeelandiae* Günther. 1. Lateral view of male, 2. Lateral view of female.

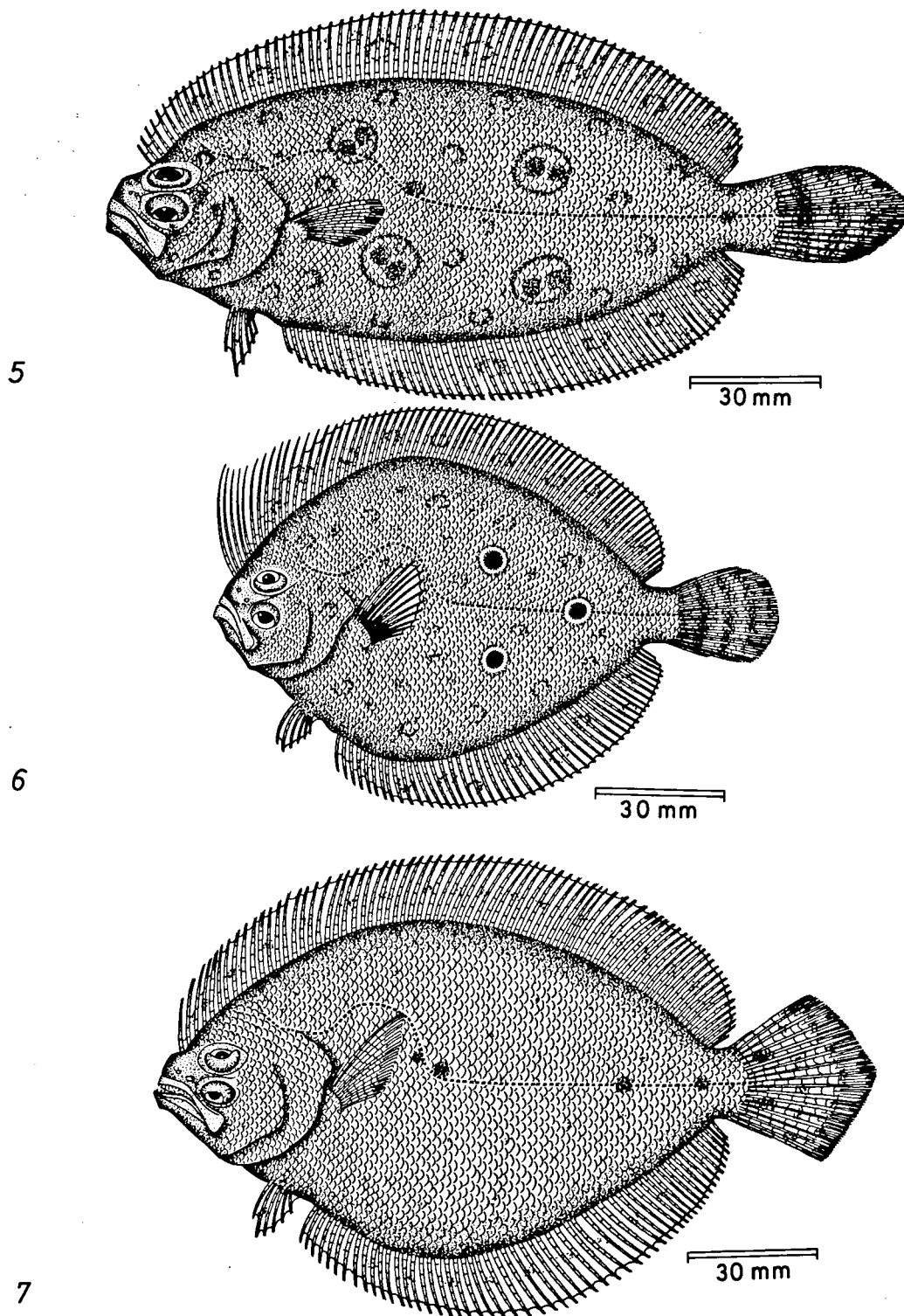


Fig. 5. *Pseudorhombus dupliciocellatus* Regan (Female).

Fig. 6. *Pseudorhombus triocellatus* (Bloch & Schn.).

Fig. 7. *Pseudorhombus malayanus* Bleeker (Male).

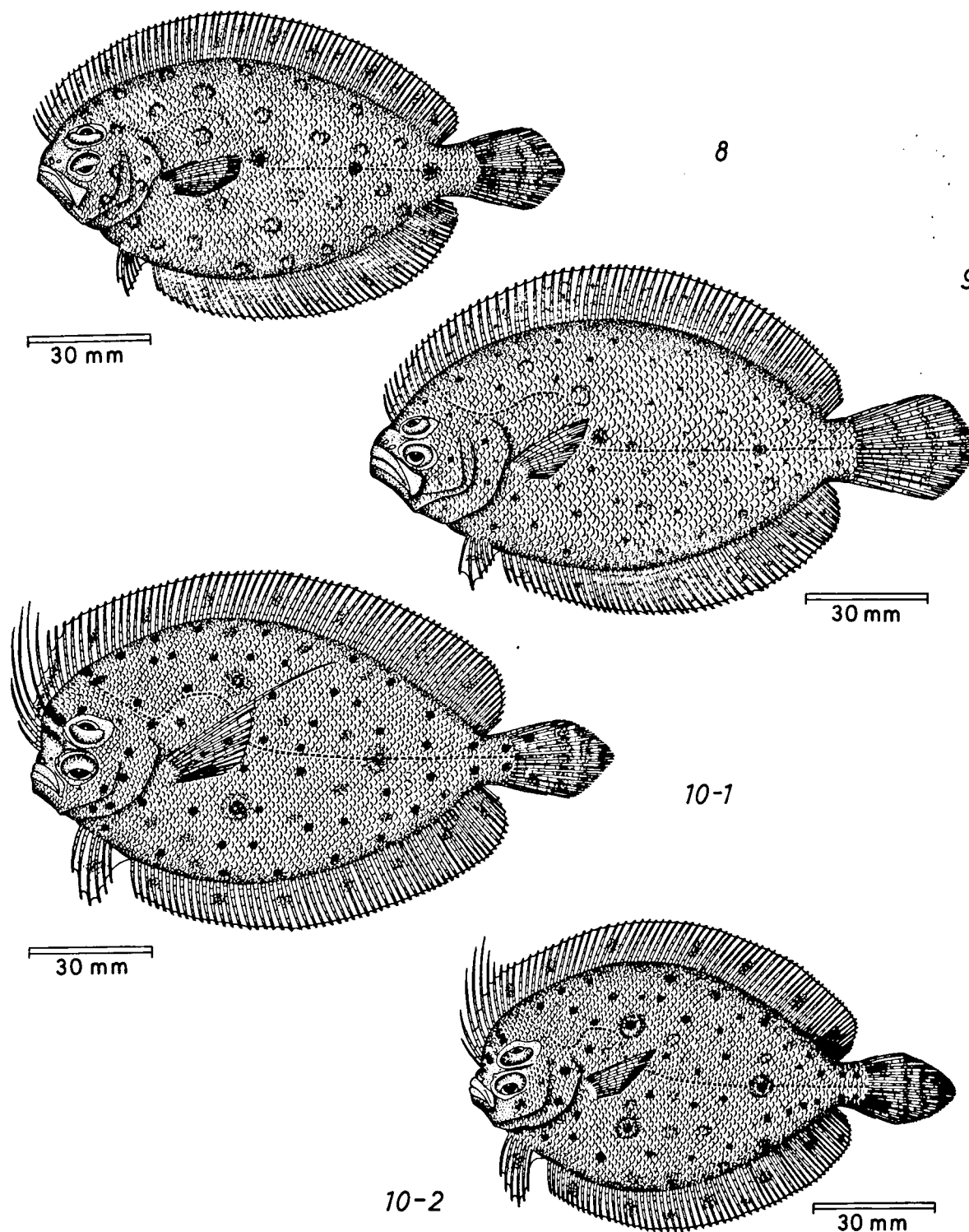


Fig. 8. *Pseudorhombus elevatus* Ogilby (Female).

Fig. 9. *Pseudorhombus arsius* (Hamilton) (Male).

Fig. 10. *Grammatobothus polyophthalmus* (Bleeker). 1. Lateral view of male, 2. Lateral view of female.

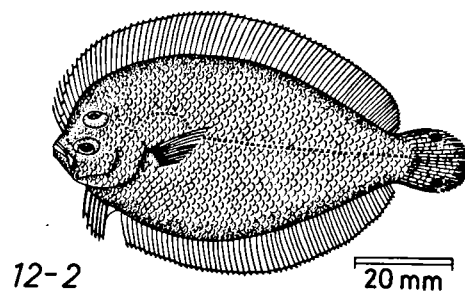
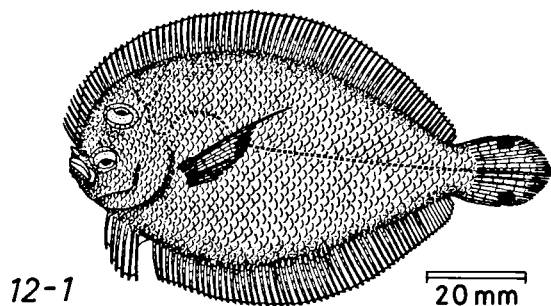
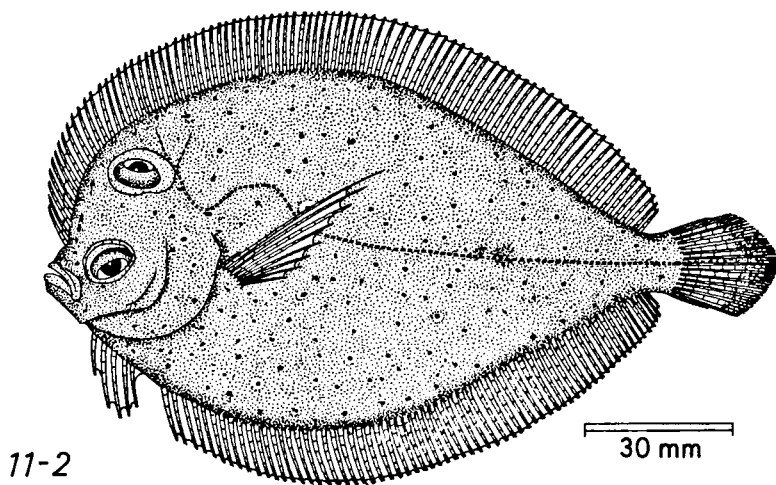
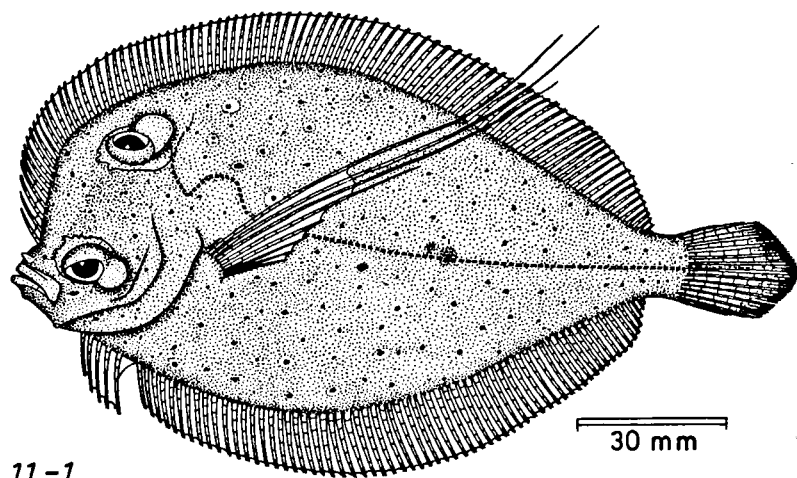


Fig. 11. *Bothus myriaster* (Temminck & Schlegel). 1. Lateral view of male, 2. Lateral view of female
 Fig. 12. *Engyprosopon grandisquama* (Temminck & Schlegel). 1. Lateral view of male, 2. Lateral view of female.

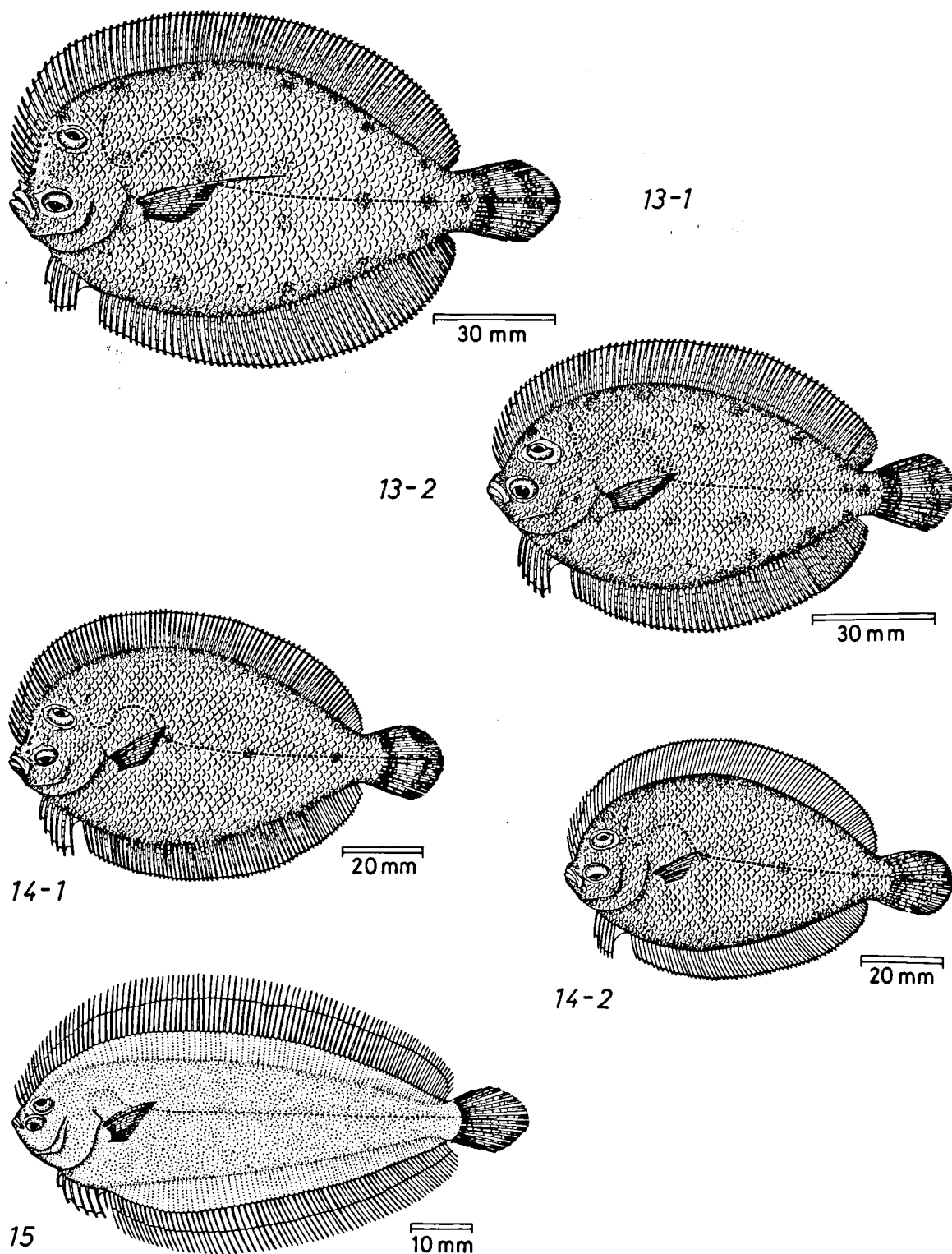
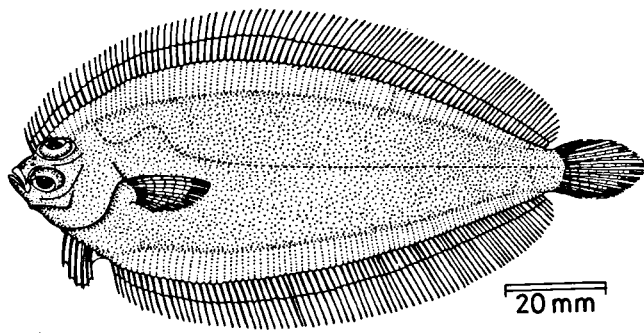


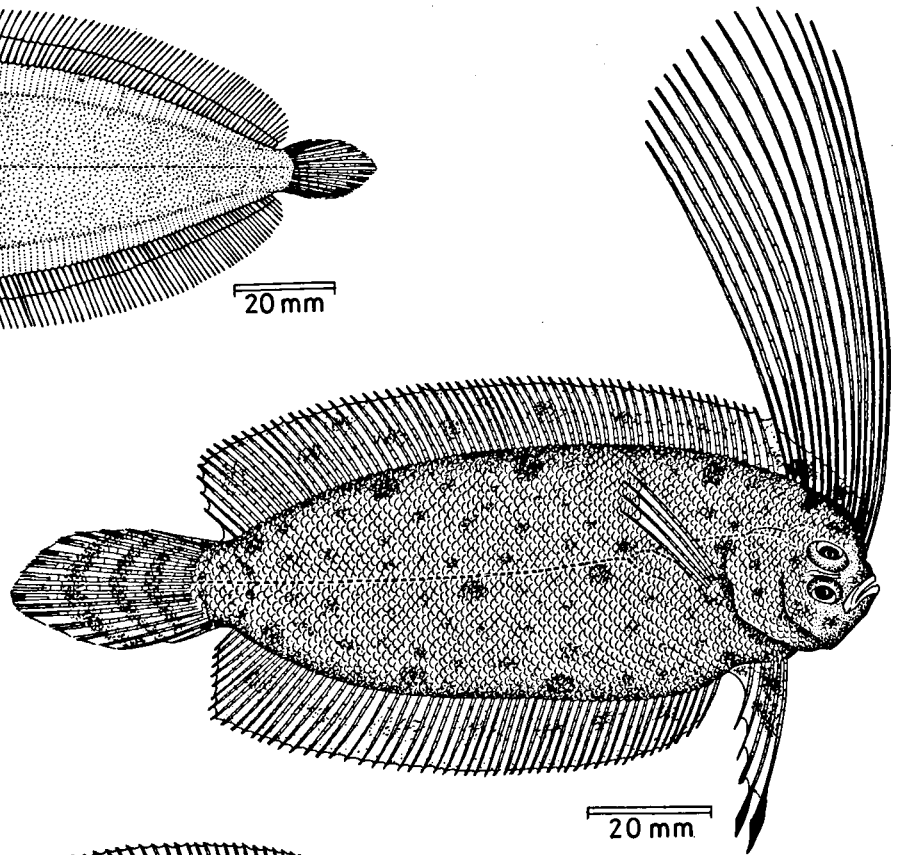
Fig. 13. *Crossorhombus azureus* (Alcock). 1. Lateral view of male, 2. Lateral view of female.

Fig. 14. *Crossorhombus valderostratus* (Alcock). 1. Lateral view of male, 2. Lateral view of female.

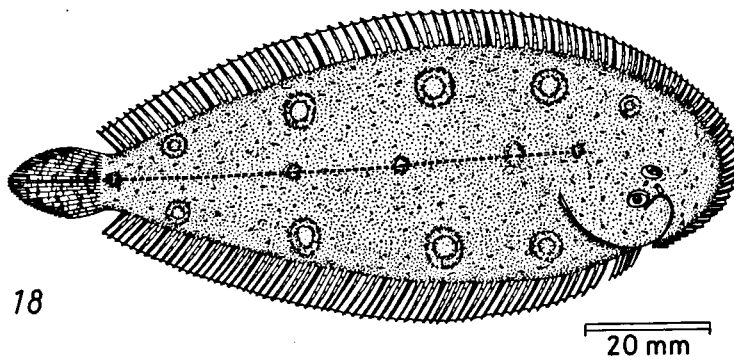
Fig. 15. *Laeops guentheri* Alcock (Male).



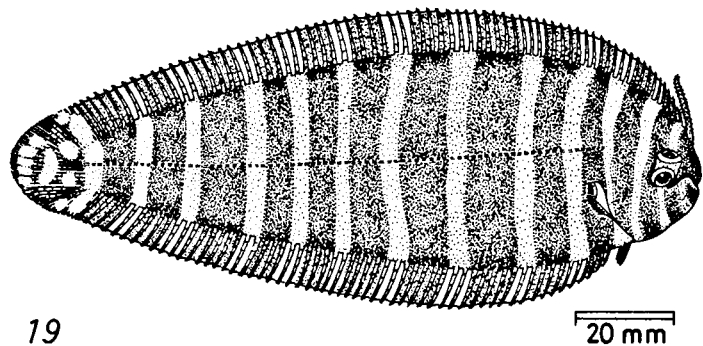
16



17



18



19

Fig. 16. *Laeops nigrescens* Lloyd (Male).

Fig. 17. *Samaris cristatus* Gray (Female).

Fig. 18. *Heteromycteris oculus* (Alcock) (Male).

Fig. 19. *Aesopia cornuta* Kaup (Male).

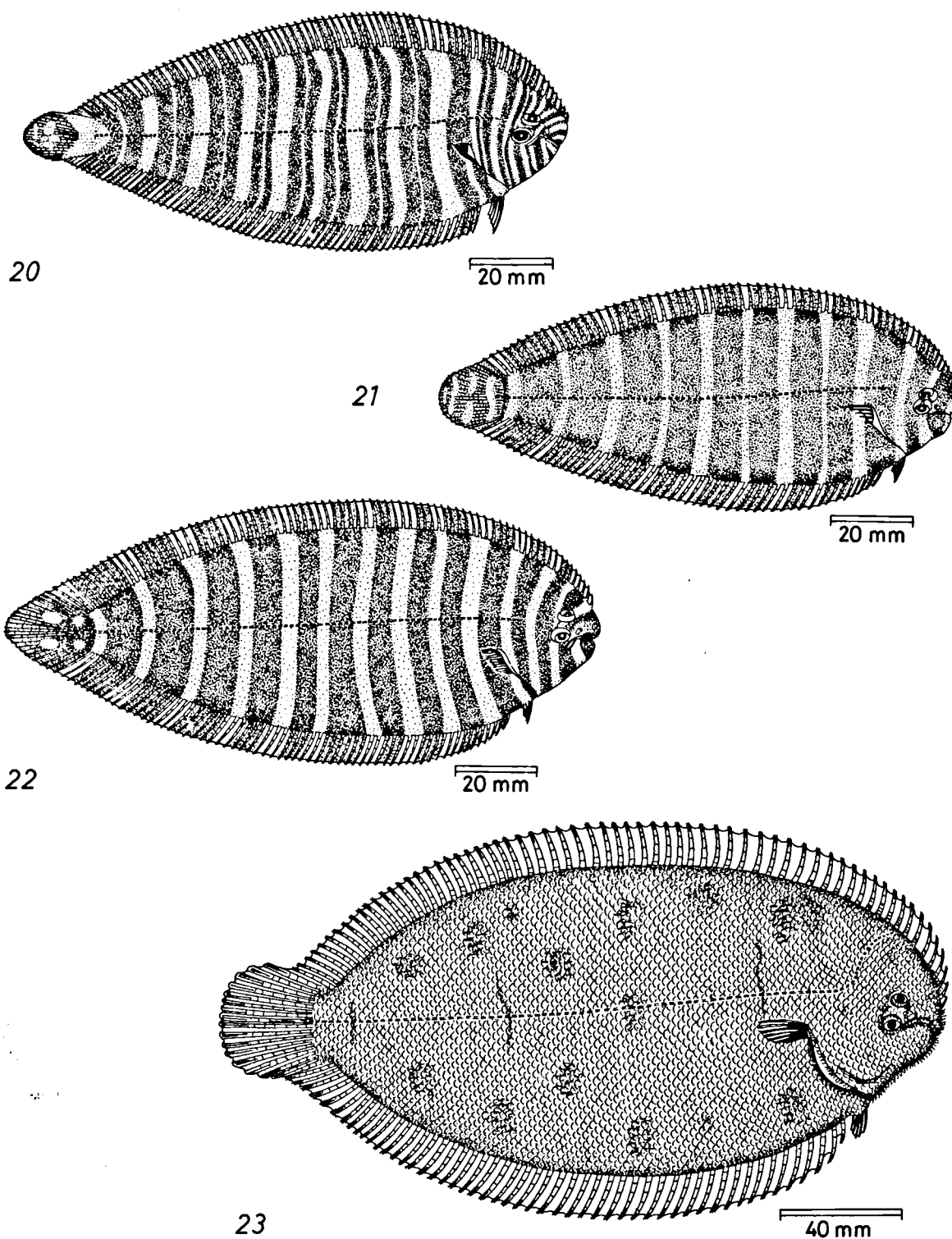
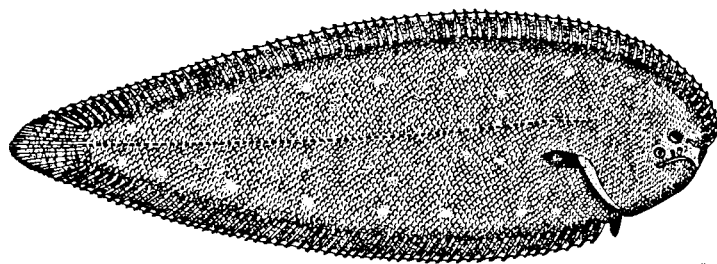


Fig. 20. *Zebrias synapturoides* (Jenkins) (Male).

Fig. 21. *Zebrias quagga* (Kaup) (Male).

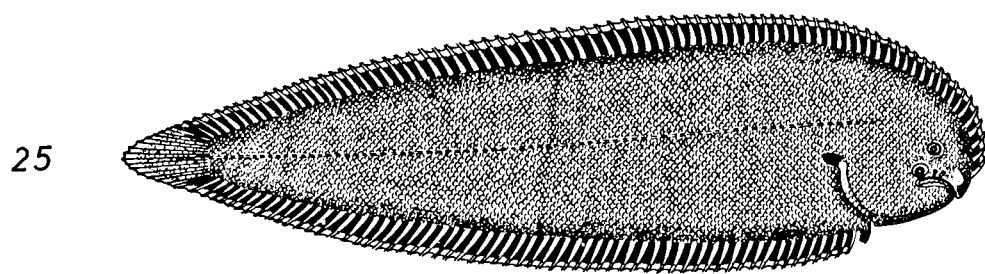
Fig. 22. *Zebrias altipinnis* (Alcock) (Male).

Fig. 23. *Brachirus orientalis* (Bloch & Schn.) (Male).



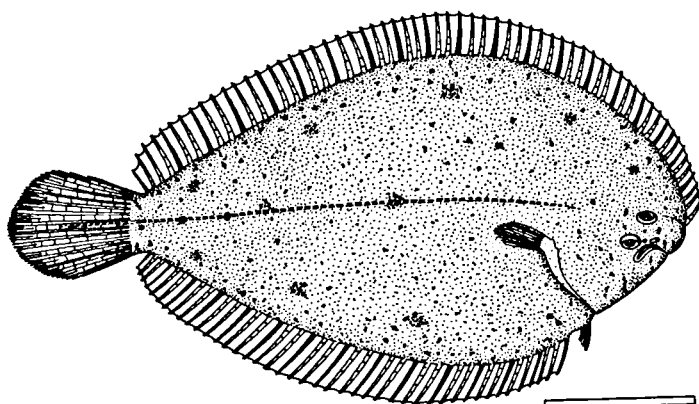
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30 mm



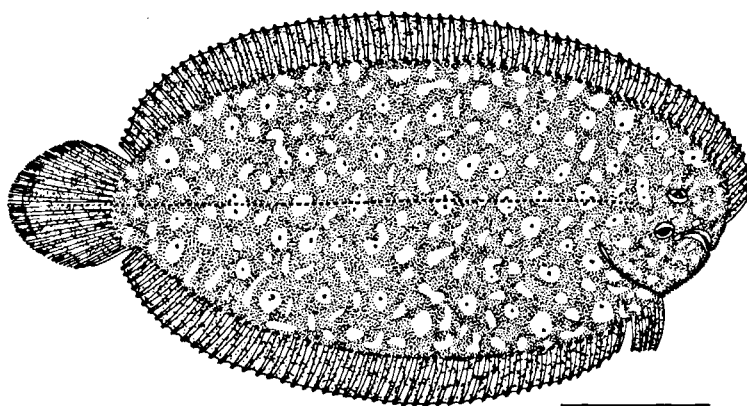
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30 mm



26

20 mm



27

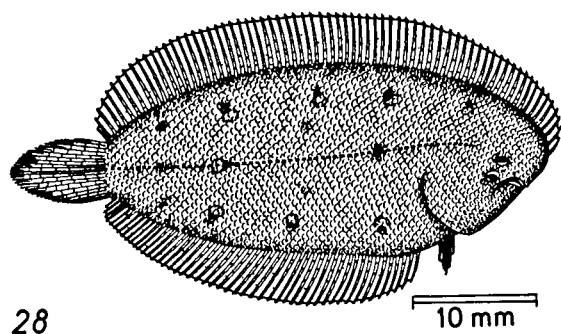
40 mm

Fig. 24. *Synaptura albomaculata* Kaup (Male).

Fig. 25. *Synaptura commersoniana* (Lacép.) (Female).

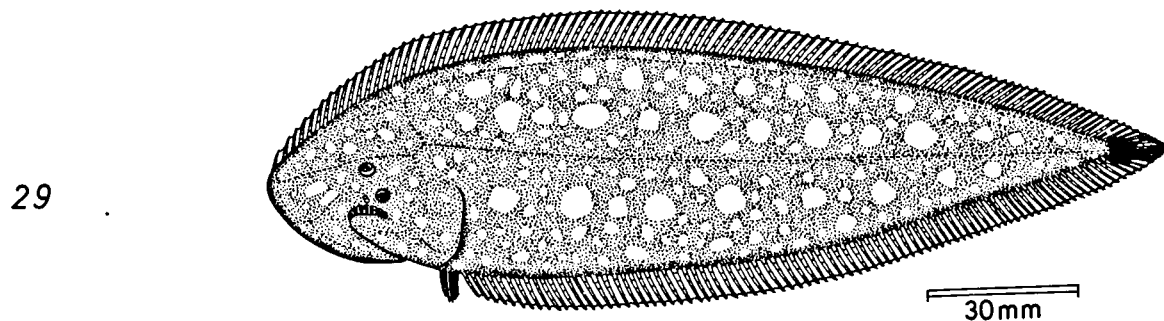
Fig. 26. *Solea ovata* Rich. (Female).

Fig. 27. *Paradachirus pavoninus* (Lacép.) (Male).



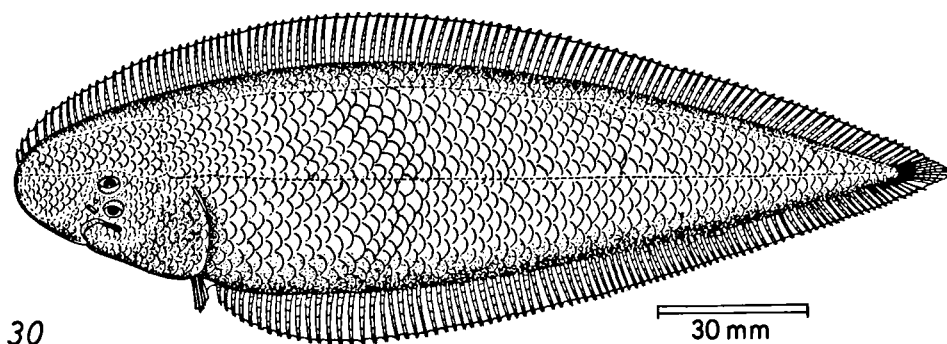
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10 mm



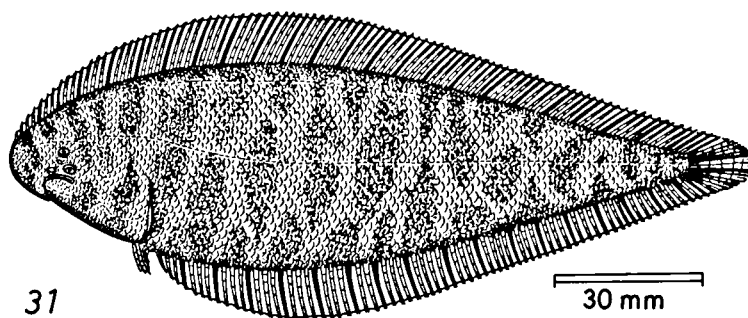
29

30 mm



30

30 mm



31

30 mm

Fig. 28. *Aseraggodes cyaneus* (Alcock) (Female).

Fig. 29. *Paraplagusia bilineata* (Bloch) (Female).

Fig. 30. *Cynoglossus arel* (Bloch & Schn.) (Female).

Fig. 31. *Cynoglossus puncticeps* (Rich.) (Male).

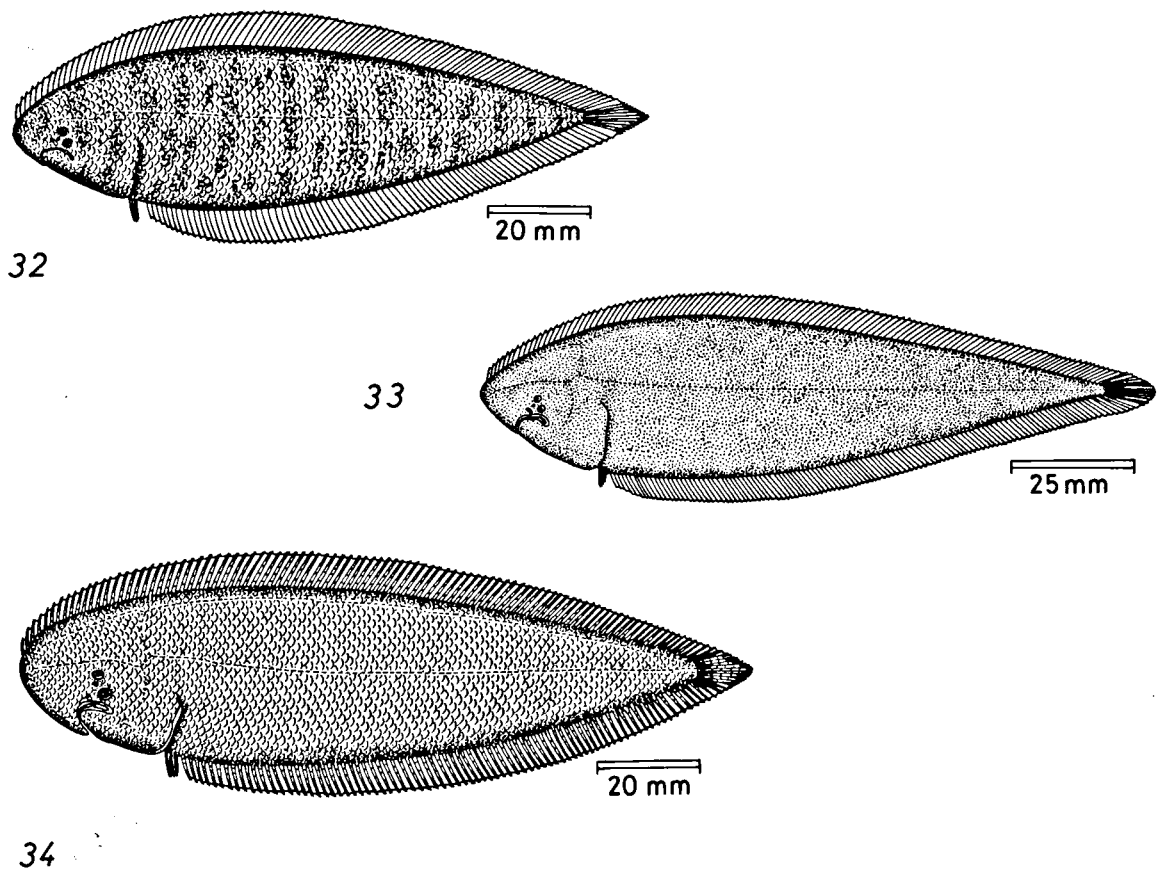


Fig. 32. *Cynoglossus semifasciatus* Day (Male).

Fig. 33. *Cynoglossus monopus* (Bleeker) (Male).

Fig. 34. *Cynoglossus lida* (Bleeker) (Male).

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