Eleven species of flounders collected from the South China Sea*

By
Kunio AMAOKA

Introduction

Eleven species of the flounders were identified among a collection of fishes caught by trawl during May 23 to August 15, 1957 in the Gulf of Tonking, South China Sea: *Psettodes erumei* (BLOCH and SCHNEIDER), *Brachypleura novaezeelandiae* GÜNTHER, *Pseudorhombus dupliciocellatus* REGAN, *Pseudorhombus oligodon* (BLEEKER), *Pseudorhombus quinquocellatus* WEBER and BEAUFORT, *Pseudorhombus elevatus* OGILBY, *Arnoglossus tapeinosoma* (BLEEKER), *Arnoglossus japonicus* HUBBS *Psettina gigantea* A'MAOKA, *Crossorhombus azureus* (ALCOCK) and *Samaris cristatus* GREY. This paper describes in detail six of the species, and give only the counts and proportional measurements for five of the species, which have already been described in AMAOKA (1969).

Counts and measurements were made following the method of NORMAN (1934). The species are deposited in the Department of Fisheries, Faculty of Agriculture, Kyoto University.

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Description

Family Psettodidae

Genus *Psettodes*, BENNETT, 1831

Psettodes erumei (BLOCH and SCHNEIDER) (Pl. I, A)

Synonyms see AMAOKA (1969)

Materials: Sinistral specimens—No. S.191, 255.7 mm in standard length, June 4, 1957; Nos. S.556, S.561, S.563-564, S.566, 160.9-271.2 mm, August 6, 1957. Dextral specimens—No. S.258, 295.0 mm, June 17, 1957; Nos. S.554-555, S.558, S.562, 178.0-196.5 mm, August 6, 1957.

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Dorsal fin rays 52-56; anal fin ray 37-43; pectoral fin rays 14 on each side; scales in lateral line 65-72; gill-rakers on first arch 18-20; vertebrae including urostyle 10+14=24.

In standard length: Head 3.16-3.47; depth 2.08-2.42. In head length: Snout 3.5-3.94; upper eye 5.71-8.26; lower eye 6.5-7.76; maxillary 1.35-1.44 on ocular side, 1.35-1.45 on blind side; lower jaw 1.22-1.30 on ocular side, 1.22-1.31 on blind side; depth of caudal peduncle 2.07-2.64; first dorsal fin ray 10.1-14.8; longest dorsal fin rays 2.22-2.75; first anal fin ray 10.1-14.8; longest anal fin ray 2.12-2.74; pectoral fin 1.98-2.32 on ocular side, 1.89-2.19 on blind side; ventral fin 2.76-3.20 on ocular side, 2.51-2.90 on blind side.

A sinistral or dextral flounder with dorsal fin not extending forward head, and anterior rays spinous; upper eye placed on dorsal surface of head. The detailed description and figure were shown in AMAOKA (1969).

Family Citharidae

Genus *Brachypleura*, GÜNTHER, 1862

Brachypleura novaezeelandiae GÜNTHER (Pl. I. B)

Brachypleura novaezeelandiae GÜNTHER, 1862, 419. – GÜNTHER, 1880, 49. –NORMAN, 1927, 43, fig. 12. –FOWLER, 1928, 43. –WEBER and BEAUFORT, 1929, 145, fig. 37. –NORMAN, 1934, 400, fig. 289. –HERRE, 1941, 319. –HUBBS, 1945, 34. –PUNPOKA, 1964, 29, fig. 7. –SHIH-CHIEH, 1966, 194, figs. 81-84.

Brachypleura xanthosticta ALCOCK, 1889, 281, pl. 17, fig. 3. –ALCOCK, 1896, 327, –REGAN, 1908, 232.

Leiopteryx xanthosticta. WEBER, 1913, 423.

Materials: Male—Nos. S.192-193, S.207, 101.0-108.0 mm in standard length, June 4, 1957; Nos. S.586-589, 69.1-113.2 mm, August 4, 1957. Female—Nos. S.194-195, 91.9-96.1 mm, June 4, 1957; Nos. S.583-585, S.619, 54.9-119.5 mm, August 6, 1957.

Dorsal fin rays 68-72; anal fin rays 45-49; pectoral fin rays 12-13 on each side; scales in lateral line 28-32; gill-rakers on first arch 5-6+8-9; vertebrae including urostyle 10+20-22=30-32.

In standard length: Head 3.26-3.60; depth 2.34-2.67. In head length: Snout 3.57-4.43; upper eye 3.65-4.85; lower eye 3.59-4.85; maxillary 1.80-2.0 on each side; lower jaw 1.49-1.75 on ocular side, 1.46-1.75 on blind side; depth of caudal peduncle 2.45-2.94; longest dorsal ray 2.29-2.60 (except for elongated anterior dorsal rays); longest anal ray 2.28-2.53; pectoral fin 1.17-1.38 on ocular side, 1.35-1.79 on blind side; ventral fin 2.65-3.4 on ocular side, 2.08-2.62 on blind side; base of ventral fin 8.7-11.5 on ocular side, 10.1-16.1 on blind side.

Body elliptical and moderately compressed, highest at middle part of body, its depth much lower than half length of body; dorsal and anal contours gently arched, with shallow notch on abdominal region. Caudal peduncle moderate in depth, a little higher than 1/4 depth of body.

Head rather large, much longer than 1/4 length of body, upper profile with or without

slight notch in front of eye. Snout large, about as long as eye diameter. Eyes dextral, about equal size, separated by a narrow ridge, diameter a little less than half length of maxillary; upper slightly in advance of lower. Nostrils on ocular side set in advance of interorbital ridge, anterior nostril tubular with triangular flap posteriorly, posterior not tubular without flap; those on blind side placed above origin of dorsal fin and near dorsal margin, anterior one small with rudimental tube, posterior not tubular.

Mouth oblique, slightly arched anteriorly and large in size, maxillary extends to below middle part of lower eye, or beyond, but not beyond posterior margin of eye; lower jaw well protruded at mandibular symphysis, and projecting beyond tip of maxillary when mouth is closed. Teeth all small, pointed, in bands in both jaws (Fig. 1, B). Gill-rakers rather slender and long, well developed on upper and lower limbs of arch, each armed with many spinules in bands, the longest one about half diameter of eye (Fig. 1, C); inner side of gill-arch provided regularly with wart-like and spiny tubercles (Fig. 1, A). Scales large and deciduous, ctenoid on ocular side, cycloid on blind side; snout, both jaws and all fins except for base of caudal fin naked. Lateral line with a distinct curve above pectoral fin.

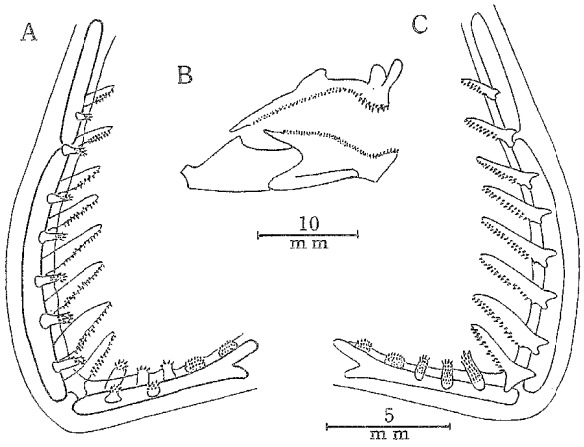

Fig. 1. Lateral view of first gill-arch on ocular side (A, inner side; C, outer side) and dentition of both jaws on ocular side (B) in *Brachypleura novaezeelandiae* GÜNTHER.

Dorsal fin starting on blind side, in front of lower margin of upper eye, anterior several rays prolonged and filamentous in male; succeeding rays becoming higher, and greatest height at posterior region; all rays simple. Anal fin starting on a vertical line through rear of basal part of pectoral fin, similar in shape and structure to dorsal. Pectoral fins well developed on both sides of body, and placed on much lower region than level of lateral line of body; that on ocular side longer than that on blind side; middle rays on ocular side branched, but all simple on blind side. Ventral fins short based, and subequal, starting slightly in rear of a vertical line through posterior end of preopercle bone; that on ocular side slightly in advance of that on blind side; fins composed of one spine, one simple and four branched rays on both sides. Caudal fin rounded, inner 13-14 rays branched, but upper and lower rays simple respectively.

Vent opens in front of origin of anal fin on mid-ventral line; genital papilla located on ocular side, immediately above vent.

Color in formalin: General ground color of body milky brownish; median fins paler than body, dorsal and anal with traces of darker spots; blind side of body milky white.

Sexual dimorphism: Remarkable sexual dimorphism is found to exist in the present species in the external character. In the male fish, the fourth to ninth dorsal rays are

greatly elongated; the fourth ray 0.7-2.64 in head, the fifth 0.48-1.61, the sixth 0.49-1.07, the seventh 0.49-1.05, the eighth 0.6-1.77, the ninth 1.01-1.31. In the female fish, the dorsal fin rays are not elongated.

Family Paralichthyidae

Genus *Pseudorhombus*, BLEEKER, 1862

Pseudorhombus dupliciocellatus REGAN (Pl. I, C)

Synonyms see AMAOKA (1969).

Materials: No. S.214, 224.0 mm in standard length, June 5, 1957; Nos. S.572-573, 199.2-247.0 mm, August 6, 1957.

Dorsal fin rays 72-76; anal fin rays 56-58; pectoral fin rays 11-12 on ocular side, 10-11 on blind side; gill-rakers on first arch 5-6+9-11; scales in lateral line 77-83; vertebrae including urostyle 10+26=36.

In standard length: Head 3.59-3.86; depth 2.19-2.36. In head length: Snout 4.54-5.04; upper eye 4.44-4.87; lower eye 4.58-5.86; maxillary 2.39-2.53 on ocular side, 2.30-2.38 on blind side; lower jaw 1.88-1.93 on ocular side, 1.78-1.86 on blind side; depth of caudal peduncle 2.36-2.77; longest dorsal ray 2.16-2.20; longest anal ray 2.04-2.40; pectoral fin 1.67-1.71 on ocular side, 2.13-2.39 on blind side; ventral fin 2.65-3.15 on ocular side, 2.92-3.10 on blind side; base of ventral fin 7.98-9.56 on ocular side, 9.12-10.1 on blind side.

The flounder with two or four large double ocelli; gill-rakers palmate in shape and as broad as long; maxillary extending to below middle part of eye or beyond it. The detailed description and figure were shown in AMAOKA (1969).

Pseudorhombus oligodon (BLEEKER) (Pl. II, A)

Synonyms see AMAOKA (1969)

Materials: Nos. S.626-634, 99.8-218.2 mm in standard length, August 6, 1957.

Dorsal fin rays 78-81; anal fin rays 62-64; pectoral fin rays 12-13 on ocular side, 11-12 on blind side; gill-rakers on first arch 4-6+8-10; scales in lateral line 84-88; vertebrae including urostyle 10+28=38.

In standard length: Head 3.32-3.84; depth 2.04-2.29. In head length: Snout 4.41-4.98; upper eye 4.22-5.37; lower eye 4.34-5.37; maxillary 2.14-2.30 on ocular side, 2.09-2.25 on blind side; lower jaw 1.71-1.77 on ocular side, 1.60-1.70 on blind side; depth of caudal peduncle 2.37-2.83; longest dorsal ray 2.13-2.49; longest anal ray 2.14-2.49; pectoral fin 1.52-1.71 on ocular side, 1.50-2.32 on blind side; ventral fin 2.94-3.31 on ocular side, 2.98-3.27 on blind side; base of ventral fin 8.82-9.67 on ocular side, 8.82-10.8 on blind side.

The flounders with ctenoid scales on both sides; two dark spots below base of pectoral fin—on boundary of opercle and trunk. The detailed description and figure were shown in AMAOKA (1969).

Pseudorhombus quinquocellatus WEBER and BEAUFORT (Pl. II. B)

Pseudorhombus quinquocellatus WEBER and BEAUFORT, 1929, 104. —NORMAN, 1934, 100, fig. 61. —PUNPOKA, 1964, 27, fig. 6. —SHIH-CHIEH, 1966, 173, figs. 17-20.

Materials: Nos. S.55-57, 137.2-189.9 mm in standard length, May 31, 1957; Nos. S.567-571, 122.8-157.5 mm, August 6, 1957.

Dorsal fin rays 68-71; anal fin rays 52-55; pectoral fin rays 12-13 on ocular side, 10-12 on blind side; gill-rakers on first arch 3-4+9-10; scales in lateral line 74-79; vertebrae including urostyle 10+25-26=35-36.

In standard length: Head 3.13-3.39; depth 1.90-2.09. In head length: Snout 3.6-3.99; upper eye 4.13-5.04; lower eye 4.35-4.98; maxillary 2.11-2.24 on ocular side, 2.10-2.23 on blind side; lower jaw 1.67-1.78 on ocular side, 1.65-1.73 on blind side; depth of caudal peduncle 2.56-3.03; longest dorsal ray 2.23-2.84; longest anal ray 2.09-2.54; pectoral fin 1.65-1.91 on ocular side, 2.16-2.39 on blind side; ventral fin 3.12-3.50 on ocular side, 2.94-3.33 on blind side; base of ventral fin 7.18-9.45 on ocular side, 8.01-9.86 on blind side.

Body ovate, and rather compressed, highest at middle part of body, equal to or somewhat lower than half length of body; dorsal and anal contours gently arched. Caudal peduncle rather narrow, much less than 1/4 depth of body.

Head large, a little shorter than 1/3 length of body, head with a large notch in front of middle part of upper eye. Snout large, and well protruded, slightly longer than eye diameter. Eye large, as long as or a little shorter than half length of maxillary, separated narrow ridge; upper a little in advance of lower or both about same vertical line. Nostrils on ocular side set in front of interorbital ridge, anterior nostril tubular with a short slender flap posteriorly; posterior not tubular without flap; nostrils on blind side located below origin of dorsal fin, anterior one with a flap posteriorly, which covers on posterior one when it is depressed posteriorly.

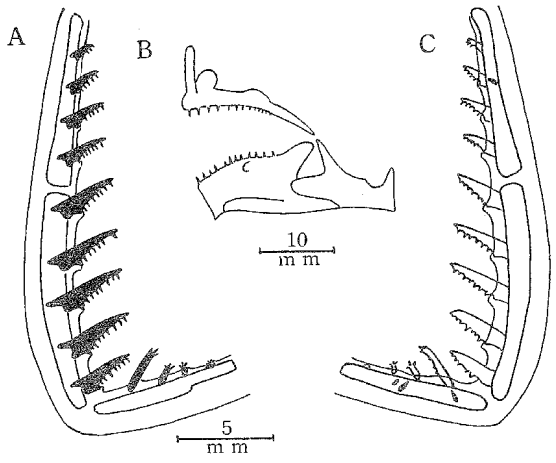

Fig. 2. Lateral view of first gill-arch on ocular side (A, outer side; C, inner side) and dentition of both jaws on ocular side (B) in *Pseudorhombus quinquocellatus* WEBER and BEAUFORT.

Mouth oblique, gently arched, and large in size; maxillary extending to middle part of lower eye or slightly beyond it. Teeth uniserial on both sides, rather small; those on upper jaw somewhat enlarged anteriorly, and becoming smaller and much close-set backward; those on lower jaw larger than upper lateral ones, about 9-12 on blind side (Fig. 2, B). Gill-rakers well developed on both limbs, moderate in size, and with spinules on each posterior margin, longest one a little less than half diameter of eye (Fig. 2, A); inner side of gill-arch with three tubercles

on epihyal and one on ceratohyal (Fig. 2, C). Scales moderate in size and undeciduous, ctenoid on ocular side, cycloid on blind side; both jaws and anterior part of interorbital ridge scaled; all fins with scales at base; tip of snout naked. Lateral line well developed on both sides, strongly curved above pectoral fin, length of curved portion about as long as length of pectoral fin; height about 1/3 of its length.

Dorsal fin originating on blind side, in front of middle part of upper eye, becoming higher to in rear of middle part of body, and decreasing in height backward; all rays simple. Anal fin similar in shape and structure to dorsal. Pectoral fins unequal, that on ocular side much shorter than that on blind side, inner seven to nine on ocular side branched, other ones simple; all rays on blind side unbranched. Ventral fin originates on a vertical line through posterior margin of preopercle bone; anterior two rays simple, but others branched. Caudal fin pointed posteriorly, inner 13 rays branched, but others simple.

Vent opens on blind side, above origin of anal fin; genital papilla displaced on ocular side.

Color in formalin: General ground color of body reddish brown with five dark blotches, arranged four above and below lateral line and one on lateral line; a series of paler rings along dorsal and anal edges of body; median fins with many brown spots; blind side of body yellowish white.

Pseudorhombus elevatus OGILBY (Pl. II, C)

Pseudorhombus elevatus OGILBY, 1912, 45. —NORMAN, 1926, 234, fig. 3. —NORMAN, 1927, 15. —MCCULLOCH, 1929, 279. —NORMAN, 1934, 108, fig. 66. —PUNPOKA, 1964, 23, fig. 5.
Pseudorhombus affinis WEBER, 1913, 426, pl. 11, fig. 1. —WEBER and BEAUFORT, 1929, 110, fig. 25.

Materials: No. S.298, 101.0 mm in standard length, June 30, 1957.

Dorsal fin rays 69; anal fin rays 52; pectoral fin rays 12 on ocular side, 11 on blind side; gill-rakers on first arch 6+15; scales in lateral line 66; vertebrae including urostyle 10+24=34.

In standard length: Head 3.3; depth 1.86. In head length: Snout 4.47; upper eye 4.02; lower eye 4.07; maxillary 2.26 on ocular side, 2.3 on blind side; lower jaw 1.77 on ocular side, 1.87 on blind side; depth of caudal peduncle 2.63; longest dorsal ray 2.31; longest anal ray 2.26; pectoral fin 1.54 on ocular side, 2.01 on blind side; ventral fin 2.47 on ocular side, 2.63 on blind side; base of ventral fin 6.19 on ocular side, 7.86 on blind side.

Body deep ovate and compressed, highest at middle part of body, its depth more than half length of body; dorsal and anal contours strongly arched. Caudal peduncle narrow, much less than 1/4 depth of body.

Head moderate, about as long as 1/3 length of body, dorsal profile deeply concave in front of middle part of upper eye. Snout rather small, subequal to eye diameter. Eyes moderate, about equal to half length of maxillary, separated by a bony ridge, upper slightly in advance of lower. Nostrils on ocular side setting closely in front of upper margin of lower eye, anterior nostril tubular, with a short triangular flap posteriorly, posterior without flap; nostrils on blind side below origin of dorsal fin, anterior nostril tubular with long

slender flap posteriorly, which extends to anterior edge of posterior when it is depressed backward, posterior one without flap.

Mouth oblique, gently arched, maxillary extending to below a little beyond middle part of eye. Teeth all small on both jaws, rather close-set, scarcely enlarged anteriorly; those on lower jaw of blind side more than 20 in number. Gill-rakers well developed on both limbs, rather long and slender, those margins strongly serrated (Fig. 3, A); inner side of gill-arch with a tubercle on upper limb (Fig. 3, B). Scales strongly ctenoid on ocular side, cycloid on blind side. Lateral line well developed on both sides; strongly arched above pectoral fin, length of curved portion about as long as length of pectoral fin, and height lower than half of its length.

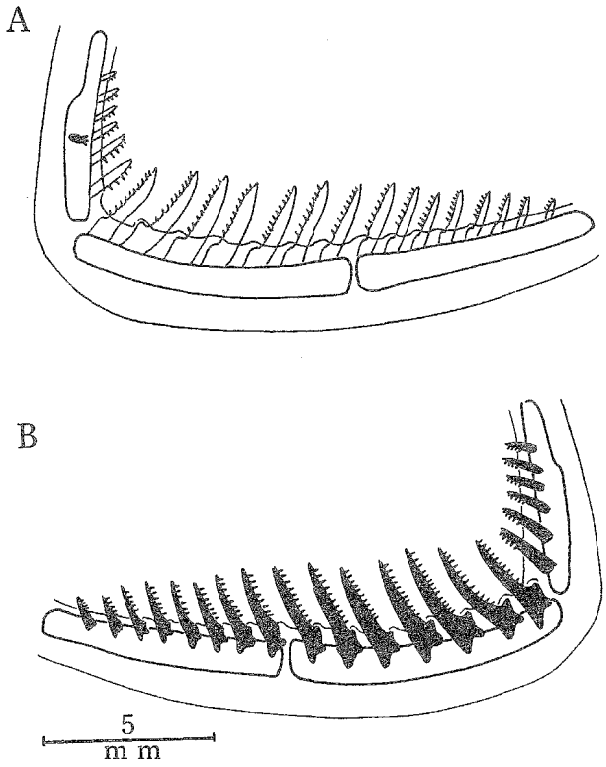

Fig. 3. Lateral view of first gill-arch on ocular side (A, inner side; B, outer side) in *Pseudorhombus elevatus* OGILBY.

Dorsal fin originating on blind side and above nostrils, becoming higher to slightly in rear of middle part of body, and thus decreasing in height posteriorly; all rays simple. Anal fin starting on a vertical line through base of pectoral fin, similar in shape and structure to dorsal. Pectoral fins moderate in length, inner eight rays on ocular side branched, but others simple; all rays on blind side simple. Ventral fin starting slightly in rear of vertical line through posterior margin of preopercle bone, anterior three rays on ocular side and anterior four rays on blind side simple. Caudal fin pointed posteriorly and rather long, uppermost and lowermost two rays simple, but others branched.

Vent opens on blind side, and above and a little in front of origin of anal fin; genital papilla displaced on ocular side.

Color in formalin: General ground color of body greyish brown, with three diffuse dark blotches, one at junction of curved and straight portions of lateral line and two on the straight portion; a series of dark rings paler than blotch, near upper and lower edges of body, and above and below of lateral line; median fins with brown spots; blind side of body milky white.

Family Bothidae
Genus *Crossorhombus*, REGAN, 1920
Crossorhombus azureus (ALCOCK) (Pl. IV, A)

Rhomboidichthys azureus ALCOCK, 1889, 283, pl. 16, fig. 3. —ALCOCK, 1890, 435.
Platophrys microstoma WEBER, 1913, 427, pl. 7, fig. 3.
Crossorhombus azureus NORMAN, 1927, 30. —WU, 1932, 93. —NORMAN, 1934, 219, fig. 167. —SHIH-CHIEH, 1966, 184, figs. 58-61.
Bothus (Arnoglossus) microstoma, WEBER and BEAUFORT, 1929, 126.
Bothus microstoma, CHABANAUD, 1929, 379.

Materials: Female—No. S.206, 105.3 mm in standard length, June 4, 1957.

Dorsal fin rays 89; anal fin rays 70; pectoral fin rays 13 on ocular side, 11 on blind side; gill-rakers on first arch 0+7; scales in lateral line 57; vertebrae including urostyle 10+27=37.

In standard length: Head 3.91; depth 1.96. In head length: Snout 3.9; upper eye 3.69; lower eye 3.9; interorbital width 3.37; maxillary 3.79 on ocular side, 3.84 on blind side; lower jaw 2.5 on ocular side, 2.42 on blind side; depth of caudal peduncle 2.06; longest dorsal ray 1.85; longest anal ray 1.7; pectoral fin 1.35 on ocular side, 1.89 on blind side; ventral fin 2.08 on ocular side, 2.24 on blind side; base of ventral fin 2.66 on ocular side, 6.72 on blind side.

Body ovate, moderately compressed, highest at middle part of body, its depth a little more than half length of body; dorsal and anal contours evenly arched except for head region. Caudal peduncle medium in depth, about 1/4 depth of body.

Head small, slightly shorter than half depth of body; head with a deep notch in front of upper margin of lower eye, from which it rises steeply above upper eye. Snout small, much less than eye diameter. Eyes rather small, subequal to length of maxillary, separated by deep concave space; lower slightly in advance of upper. Nostrils on ocular side closely set in front of upper margin of lower eye, anterior nostril tubular with a flap posteriorly, posterior with feeble and short tube; nostrils on blind side setting closely below origin of dorsal.

Mouth oblique, very small in size, maxillary extending to below anterior edge of lower eye. Teeth uniserial in both jaws, very small and rather close-set. Gill-rakers very short and slender (Fig. 4, B). Scales rather small and undeciduous; those on ocular side finely ctenoid armed with elongate spinules along apical margin (Fig. 4, A); those on blind side cycloid; snout, both jaws and narrow vertical zone immediately before interorbital naked. Lateral line on ocular side strongly curved above pectoral fin, length of curved portion about 2/3 length of head, height about half length of its portion; lateral line absent on blind side.

Dorsal fin originating on blind side, before a horizontal line through upper margin of lower eye; rays gradually increasing in height towards near middle of fin, and evenly decreasing in height posteriorly. Anal fin starting below a vertical line through basal part of pectoral fin, similar in shape and structure to dorsal. Pectoral fin rather short, much shorter than head. Ventral fin on ocular side inserting at tip of isthmus, fourth ray on ocular side opposite first on blind side. Caudal fin rounded posteriorly, uppermost and

lowermost two rays simple, but others branched.

Vent placed on blind side, above origin of anal fin; genital papilla displaced on ocular side, on opposite side of vent.

Color in formalin: General ground color on ocular side of body brown, furnished with traces of darker spots and blotches, and with a dark spot below base of pectoral fin–boundary of opercle and trunk; all fins paler than body, caudal fin provided with two broad distinct blackish bands across hinder and basal portions.

Sexual dimorphism: No male fishes have come under author's examination, but according to NORMAN (1934), the male fish of this species can be distinguished from the female and young in having wider interorbital width and strong rostral spine.

Remarks: The present species closely resembles *Crossorhombus kanekonis* (TANAKA) known from the Japanese waters in general physiognomy, but it is separable from the latter in having uniserial teeth.

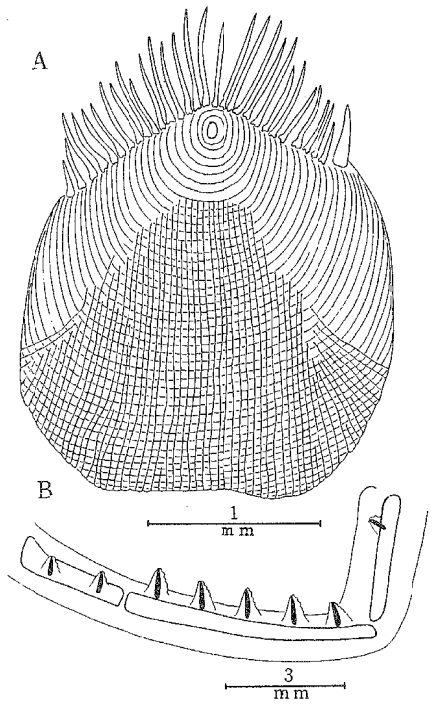

Fig. 4. Lateral view of scale on ocular side (A) and first gill-arch on ocular side (B) in *Crossorhombus azureus* (ALCOCK).

Genus *Psettina*, HUBBS, 1915

Psettina gigantea AMAOKA (Pl. III, C)

Synonyms see AMAOKA (1969)

Materials: Nos. S.53-54, 106-106.2 mm in standard length, May 31, 1957; Nos. S.609-618, 91.1-134.1 mm, August 6, 1957.

Dorsal fin rays 94-100; anal fin rays 74-79; pectoral fin rays 11-12 on ocular side, 8-11 on blind side; gill-rakers on first arch 0+6-7; scales in lateral line 56-60; vertebrae including urostyle 10+28-29=38-39.

In standard length: Head 3.86-4.23; depth 2.25-2.41. In head length: Snout 4.43-6.31; upper eye 2.91-3.76; lower eye 3.04-3.72; maxillary 2.91-3.18 on ocular side, 2.79-3.18 on blind side; lower jaw 2.09-2.35 on ocular side, 1.87-2.15 on blind side; depth of caudal peduncle 2.01-2.46; longest dorsal ray 1.54-2.00; longest anal ray 1.63-2.14; pectoral fin 1.43-1.76 on ocular side, 2.17-2.64 on blind side; ventral fin 2.18-2.64 on ocular side, 2.29-2.94 on blind side; base of ventral fin 2.67-3.23 on ocular side, 5.15-6.78 on blind

side.

A flounder with strongly ctenoid armed with the elongated spinules; a large number of scales on lateral line; maxillary rather large; snout and both jaws pale brown. The detailed description and figure were shown in AMAOKA (1969).

Genus *Arnoglossus*, BLEEKER, 1862

Arnoglossus tapeinosoma (BLEEKER) (Pl. III, A)

Platophrys (Arnoglossus) tapeinosoma BLEEKER, 1866, 49. —BLEEKER, 1866-72, 13, pl. 4, fig. 4.
Arnoglossus macrolophus ALCOCK, 1889, 280, pl. 18, fig. 2. —ALCOCK, 1890, 433. —WEBER, 1913, 432. —NORMAN, 1927, 21, fig. 3. —FOWLER, 1928, 90.
Bothus (Arnoglossus) tapeinosoma. WEBER and BEAUFORT, 1929, 127.
Arnoglossus tapeinosoma. NORMAN, 1934, 185, fig. 131. —FOWLER, 1934, 63, fig. 18. —SHIH-CHIEH, 1966, 175, fig. 42, a-b.

Materials: Female—No. S.281, 78.0 mm in standard length, June 26, 1957; No. S.605, 70.4 mm, August 6, 1957.

Dorsal fin rays 96-97; anal fin rays 75-76; pectoral fin rays 13-14 on ocular side, 10 on blind side; gill-rakers on first arch 0+12; scales in lateral line 55-57; vertebrae including urostyle 10+31-32=41-42.

In standard length: Head 3.68-3.86; depth 2.65-2.73. In head length: Snout 4.34-4.48; upper eye 3.18-3.31; lower eye 3.10-3.13; maxillary 2.52-2.58 on ocular side, 2.69-2.84 on blind side; lower jaw 1.91-2.00 on ocular side, 2.00-2.05 on blind side; depth of caudal peduncle 2.69-2.72; longest dorsal ray 1.91-2.00; longest anal ray 1.87-1.90; pectoral fin 1.61-1.85 on ocular side, 2.46-2.69 on blind side; ventral fin 2.58-2.76 on ocular side, 2.44-2.69 on blind side; base of ventral fin 3.10-3.13 on ocular side, 6.36-6.51 on blind side.

Body elliptical, strongly compressed, highest at middle part of body, its depth a little more than 1/3 length of body; dorsal and anal contours gently arched. Caudal peduncle moderate, its depth slightly more than 1/4 depth of body.

Head very small, more compressed than body, a little longer than 1/4 length of body. Snout short, much shorter than eye diameter. Eyes moderate in size, separated by a narrow bony ridge, lower a little in advance of upper or both about same vertical line, upper closely approaches to dorsal margin of head. Nostrils on ocular side set in front of upper margin of lower eye; anterior nostril tubular with a short flap posteriorly; posterior more or less tubular; nostrils on blind side rudimental.

Mouth oblique, slightly arched, maxillary extending to below anterior margin of lower eye or slightly beyond. Teeth on both sides uniserial, all small and close-set, scarcely enlarged anteriorly (Fig. 5, A). Gill-rakers rather long and slender without spinules on each posterior margin; none on upper limb (Fig. 5, B). Scales large and deciduous, feebly ctenoid on ocular side, cycloid on blind side; snout, tip of both jaws naked. Lateral line on ocular side curved anteriorly, length of curved portion about half length of head, height about 1/3 its length; lateral line on blind side absent.

Dorsal fin originating on blind side, on a level with interorbital ridge, fin rays except

for some anterior rays becoming higher toward a little in rear of middle of body, and evenly decreasing in height posteriorly. Anal fin starting on a vertical line through basal part of pectoral fin similar in shape and structure to dorsal. Pectoral fins unequal and slender, all rays simple. Ventral fin on ocular side originating on a vertical line through posterior margin of lower eye, ray as well as base longer than those on blind side, fourth ray on ocular side opposite first on blind side. Caudal fin pointed posteriorly; uppermost and lowermost two rays simple, but remaining ones branched.

Vent located on blind side, above origin of anal fin; genital papilla displaced on ocular side, on opposite to vent.

Color in formalin: General ground color on ocular side of body brownish with traces of dark blotches on lateral line and along dorsal and ventral edges of body; a large dark spot at base of posterior parts of dorsal and anal; blind side of body yellowish white.

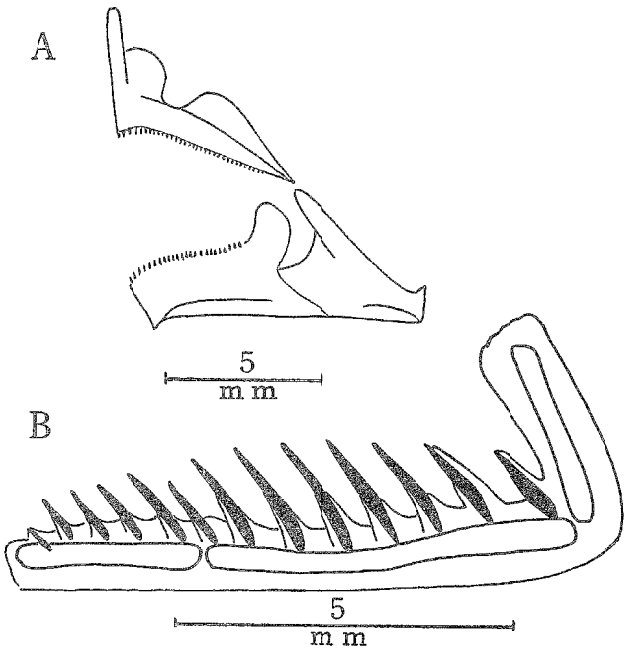

Fig. 5. Lateral view of dentition of both jaws on ocular side (A) and first gill-arch on ocular side (B) in *Arnoglossus tapeinosoma* (BLEEKER).

Sexual dimorphism: No male fish have come under author's examination, but according to NORMAN (1934), the male fish of this species can be distinguished from the female and young in having some anterior dorsal rays much elongated.

Arnoglossus japonicus HUBBS (Pl. III, B)

Synonyms see AMAOKA (1969).

Materials: Male—Nos. S.602-603, S.608, 94.1-102.5 mm in standard length, August 6, 1957. Female—Nos. S.600-601, S.606, 57.9-101,6 mm, August 6, 1957.

Dorsal fin rays 101-105; anal fin rays 79-82; pectoral fin rays 11-13 on ocualr side, 8-11 on blind side; gill-rakers on first arch 0+7-8; scales in lateral line 65-68; vertebrae including urostyle 11+33-34=44-45.

In standard length: Head 3.83-3.97; depth 2.67-2.96. In head length: Snout 4.09-4.78; upper eye 3.02-3.39; lower eye 2.95-3.26; maxillary 2.33-2.54 on ocular side, 2.23-2.39 on blind side; lower jaw 1.77-2.02 on ocular side, 1.77-1.91 on blind side; depth of caudal peduncle 2.71-3.18; longest dorsal ray 1.67-1.96; longest anal ray 1.95-2.22; pectoral fin 1.45-1.67 on ocular side, 2.95-3.77 on blind side; ventral fin 2.85-3.46 on ocular side,

2.51-3.63 on blind side; base of ventral fin 2.91-3.21 on ocular side, 6.94-8.32 on blind side.

A flounder of slender body with prolonged second dorsal ray in male. The detailed description and figure were shown in AMAOKA (1969).

Family Pleuronectidae
Genus *Samaris*, GREY, 1831
Samaris cristatus GREY (Pl. IV, B)

Samaris cristatus GREY 1831, 5. –GÜNTHER, 1862, 420. –ALCOCK, 1889, 291, pl. 17, fig. 4. –ALCOCK, 1896, 327. –NORMAN, 1927, 44. –WEBER and BEAUFORT, 1929, 138, fig. 34. –NORMAN, 1934, 403, fig. 291. –SMITH, 1949, 156, pl. 10, fig. 303. –MATSUBARA, 1955, 1279. –KAMOHARA, 1958, 62. –KAMOHARA, 1964, 83. –PUNPOKA, 1964, 30, fig. 8. –SHIH-CHIEH, 1966, 195, figs. 89-92.
Materials: No. S.252, 126.2 mm in standard length, June 17, 1957.

Dorsal fin rays 78; anal fin rays 56; pectoral fin rays 4 on ocular side, absent on blind side; ventral fin rays 5 on each side; gill-rakers on first arch 4+8; scales in lateral line 80; vertebrae including urostyle 11+30=41.

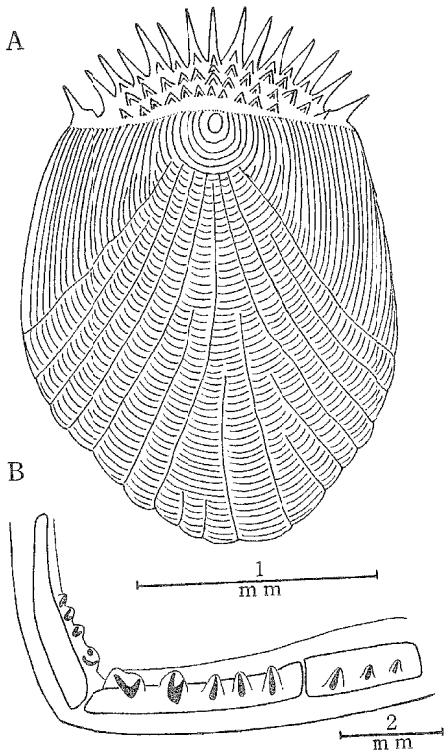

Fig. 6. Lateral view of scale on ocular side (A) and first gill-arch on ocular side (B) in *Samaris cristatus* GREY.

In standard length: Head 5.52; depth 2.74. In head length: Snout 4.6; upper eye 3.03; lower eye 3.19; maxillary 2.83 on ocular side, 3.28 on blind side; lower jaw 2.0 on ocular side, 1.9 on blind side; depth of caudal peduncle 1.39; longest dorsal ray 1.03 except for some elongated rays; longest anal ray 0.96 except for some elongated rays, pectoral fin 0.66 on ocular side; ventral fin 0.61 on ocular side, 1.26 on blind side; base of ventral fin 3.33 on ocular side, 3.76 on blind side.

Body elongated elliptical, strongly compressed, highest a little in front of middle part of body, its depth about two times as much as head length; dorsal and anal contours except for head region, nearly horizontal at anterior 2/3 of body, and slightly arched on posterior 1/3 of body. Caudal peduncle rather wide, about 1/3 depth of body.

Head directed downward and very small, a little shorter than 1/5 length of body, head profile with a slight notch in front of middle of upper eye, from which it slowly raised. Snout blunt and very short, about half diameter of upper eye. Eyes dextral and moderate, subequal to length of maxillary, separated by a narrow high bony ridge; upper very slightly in front of upper. Nostrils on ocular side set in advance of interorbital ridge, provided with long tube which covers on maxillary;

nostrils on blind side absent.

Mouth oblique, rather small, maxillary extending to below anterior edge of lower eye, and slightly projecting beyond tip of lower jaw when mouth is closed. Teeth well developed on both sides, small and villiform in bands, not enlarged anteriorly. Gill-rakers on both limbs small and slender, sometimes bifurcated (Fig. 6, B). Scales rather small, and undeciduous, strong ctenoid on both sides (Fig. 6, A), but those on blind side feebler; snout, both jaws and all fins except for base of caudal fin naked. Lateral line nearly straight, bifurcated behind upper eye; line entirely absent on blind side.

Origin of dorsal fin slightly on blind side, on a horizontal line of middle part of upper eye; first 13 rays greatly elongated and filamentous, the longest one five times as long as head; succeeding rays gradually increasing in height to near posterior part of body, and then strongly decreasing in height; all rays simple. Anal fin starting on a vertical through basal part of pectoral fin, and connected to ventral fin on ocular side by a membrane, similar in shape and structure to dorsal except for first 13 rays. Pectoral fin on ocular side slender, but rather long, much longer than head length; rays surrounded by strong fin membrane; fin on blind side absent. Ventral fins with rather broad base, originated on a vertical line through posterior margin of lower eye; fin on ocular side a little in advance of that on blind side; rays on ocular side elongate, first ray longest, and succeeding ones becoming shorter posteriorly; rays on blind side moderate in length. Caudal fin rounded posteriorly, rather slender and long, and 16 rays simple.

Vent opens nearly mid-ventral line, immediately before origin of anal fin; genital papilla displaced on ocular side, above origin of anal fin.

Color in formalin: General ground color on ocular side dark brownish; a series of distinct blackish blotches along dorsal and ventral margins of body, and with many small dark dots on body; snout and both jaws pale; all fins blackish except for whitish on anterior elongated dorsal rays; body on blind side milky white.

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PLATE

Explanation of Plate I.

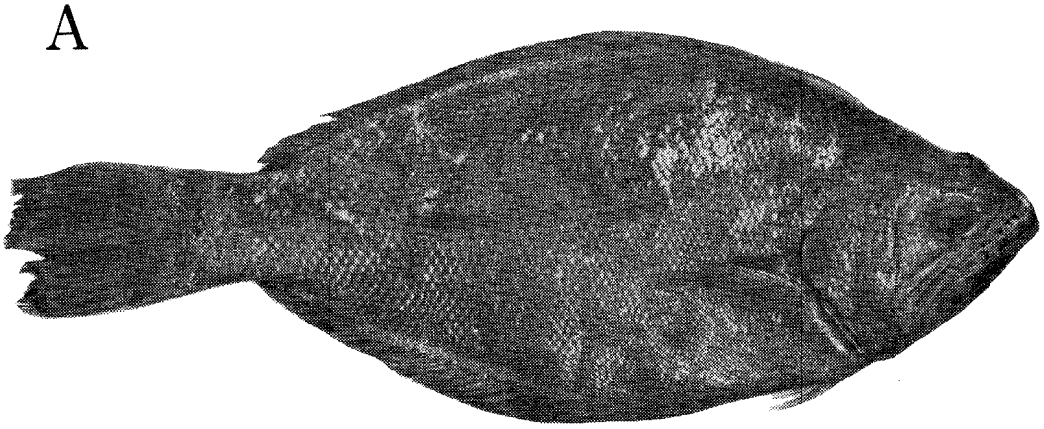
A. *Psettodes erumei* (BLOCH and SCHNEIDER), No. S.562, 196.0mm in standard length. Scale bar indicates 30mm.

B. *Brachypleura novaezeelandiae* GÜNTHER, No. S.586, 101.9mm in standard length. Scale bar indicates 30mm.

C. *Pseudorhombus dupliciocellatus* REGAN, No. S.572, 199.2mm in standard length. Scale bar indicates 30mm.

PLATE I

A



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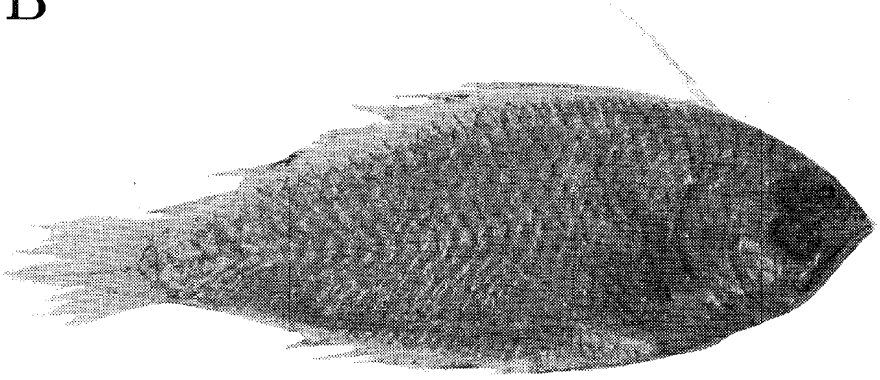

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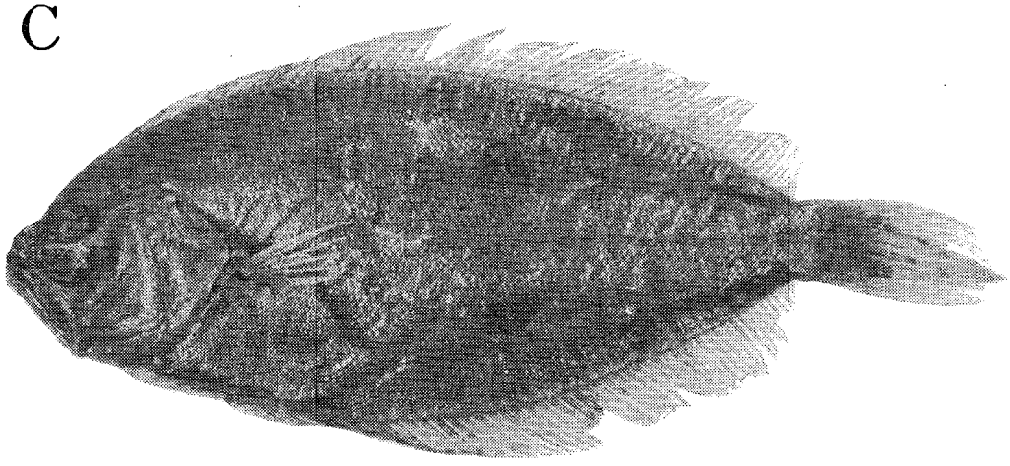


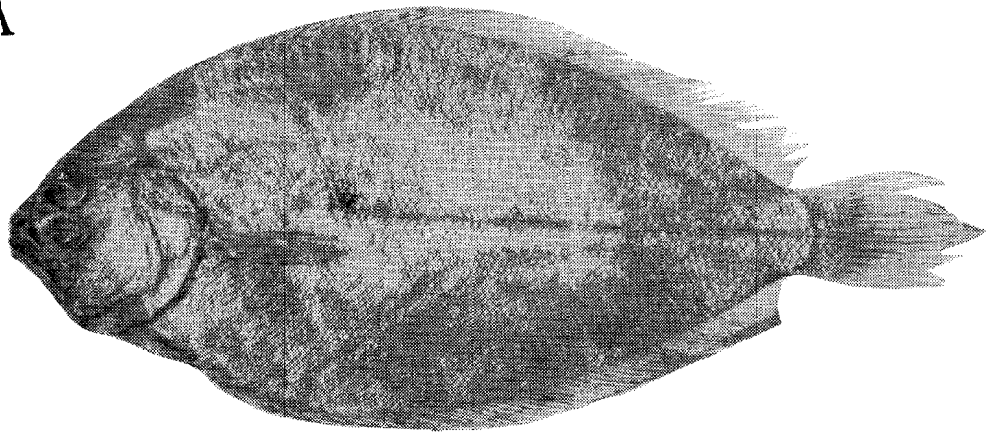
Explanation of Plate II.

A. *Pseudorhombus oligodon* (BLEEKER), No. S.629, 194.2mm in standard length. Scale bar indicates 30mm.

B. *Pseudorhombus quinquocellatus* WEBER and BEAUFORT, No. S.569, 154.1mm in standard length. Scale bar indicates 30mm.

C. *Pseudorhombus elevatus* OGILBY, No. S.298, 101.0mm in standard length. Scale bar indicates 30mm.

A



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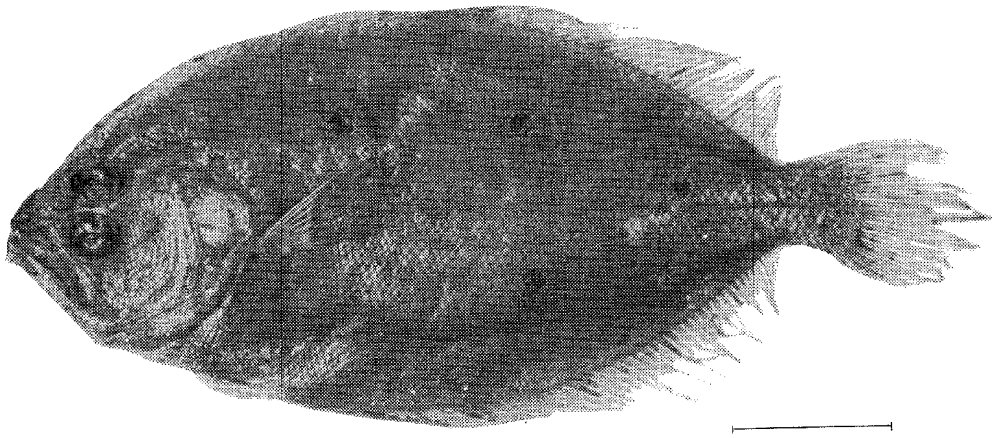

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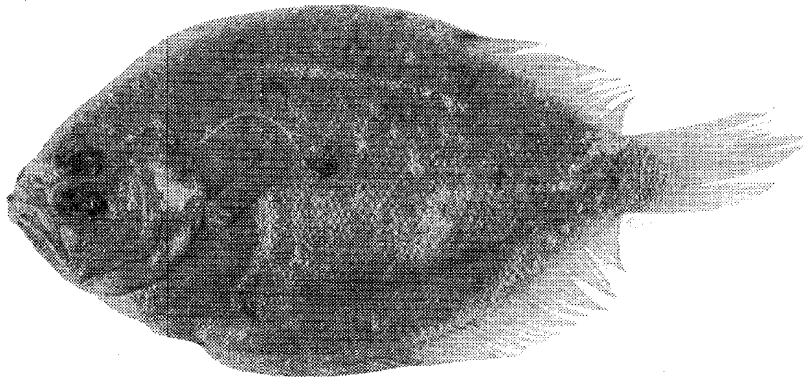


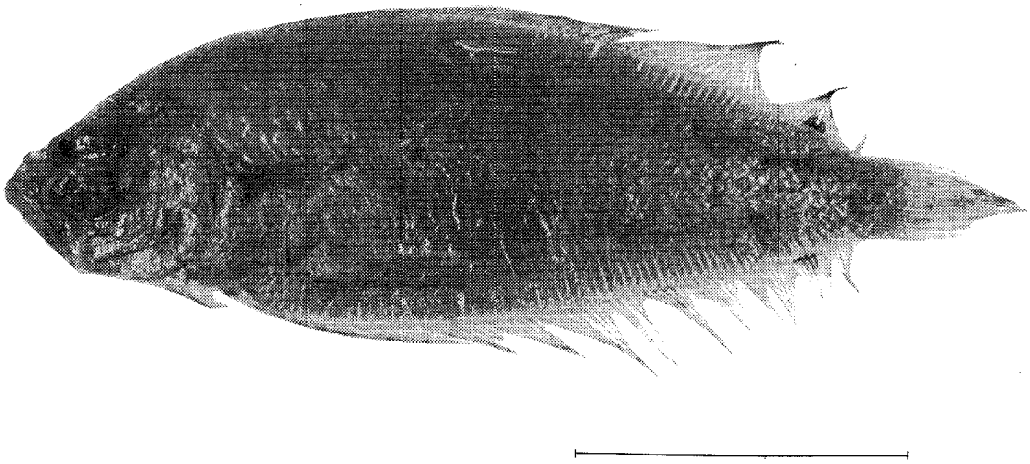
Explanation of Plate III.

A. *Arnoglossus tapeinosoma* (BLEEKER), No. S.281, 78mm in standard length. Scale bar indicates 30mm.

B. *Arnoglossus japonicus* HUBBS, No. S.602, 102.5mm in standard length. Scale bar indicates 30mm.

C. *Psettina gigantea* AMAOKA, No. S.618, 111.5mm in standard length. Scale bar indicates 30mm.

A



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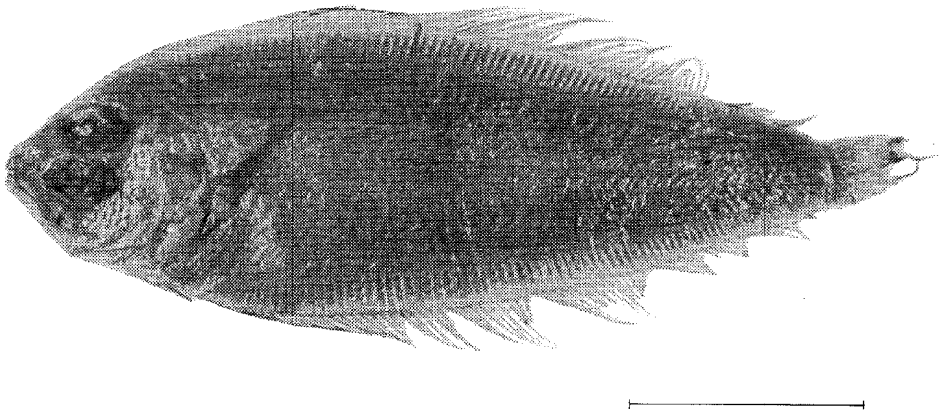

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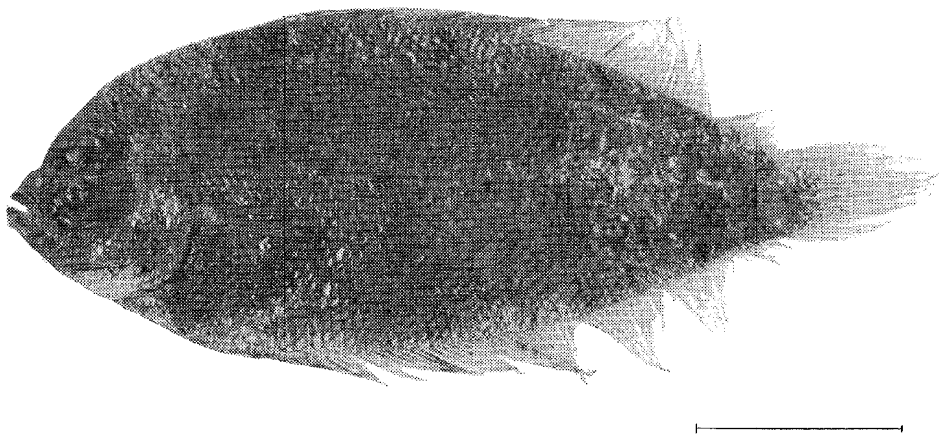


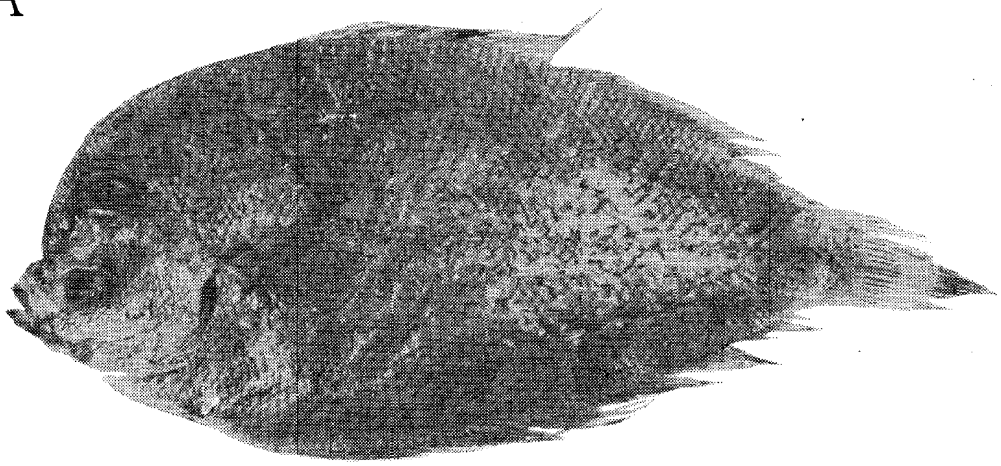
Explanation of Plate IV.

A. *Crossorhombus azureus* (ALCOCK), No. S.206, 105.3mm in standard length. Scale bar indicates 30mm.

B. *Samaris cristatus* GREY, No. S.252, 126.2mm in standard length. Scale bar indicates 30mm.

PLATE IV

A



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