

Two New Genera and Two New Species of Clingfishes from Japan, with Comments on Head Sensory Canals of the Gobiesocidae

Masaru Shiogaki and Yoshie Dotsu

(Received January 26, 1982)

Abstract Two new genera, *Propherallodus* and *Pherallodichthys* and their type species, *Propherallodus briggsi* sp. nov. and *Pherallodichthys meshimaensis* sp. nov. are described. *Propherallodus* is mainly diagnosed by the uniserial incisors with rounded tips on both jaws, lachrymal sensory canal with two openings, preopercular sensory canal with three openings and by the absence of mandibular sensory canal, and this genus is placed in the subfamily Diplocrepinae. *Pherallodichthys* is diagnosed by the uniserial incisors on both jaws, of which those in front have rounded tips but those at sides on upper jaw are highly compressed and hooked posteriorly, lachrymal and preopercular sensory canals with two openings each and mandibular sensory canal missing. This genus is tentatively placed in the subfamily Aspasminae. *Pherallodus smithi* is placed in *Propherallodus* gen. nov. and a key to *Propherallodus* species is given. *Pherallodus indicus* is described from newly collected larger specimens with accounts of unique head sensory canals. Arrangements of head sensory canals of the family Gobiesocidae are provisionally reviewed for 28 species of all eight subfamilies. These characters are found to be apparently important for higher classification.

Every April and May, from 1963 to 1968, tide-pool fish collections were carried out at Meshima Island (31°59'N, 128°20'E), Danjo Islands, off the west coast of Kyushu, Japan. The ichthyofauna of this island was previously reported mainly based on these collections (Miura et al., 1973). The clingfishes in these collections are represented by five species; *Pherallodus indicus*, *Aspasmichthys ciconiae*, *Lapadichthys frenatus* and two new species. In the former report (Miura et al., 1973), one of the two undescribed species was erroneously identified as *Pherallodus smithi*, though this species is distinct from *P. smithi*.

Here, two new genera and two new species will be described with the first description of *Pherallodus indicus* from Japan. In defining the genera, the character of the arrangements of openings in head sensory canals is used in the combination with other characters. These accounts of the head sensory canals of the family Gobiesocidae are reviewed for 28 species including all genera of the subfamilies Diplocrepinae, Aspasminae (excluding *Aspasmodon* Smith, 1957) and Diademichthyinae with *Alabes* of the Cheilobranchiidae (Gobiesociformes).

Methods and material

Measurements and counts were made in ac-

cordance with the methods of Briggs (1955), but the length was measured with a micrometer under a binocular microscope. In addition to Briggs' methods, some further explanation is necessary; vertebral counts included the urostyle centrum, eye diameter was measured at the horizontal diameter of the cornea, a pair of gill filaments on a gill arch was counted as one and a single gill filament as one half. Nomenclature for the openings in head sensory canals is shown in Fig. 1. Vertebrae were counted with the help of radiographs. Osteological descriptions were made from cleared and stained specimens. Measurement and count values for the paratypes differing from those of holotype are in parentheses.

Comparative materials. *Pherallodus smithi*, holotype, SU (Stanford University collection, now at California Academy of Sciences) 31349, 18.8 mm in standard length (SL), Durban, South Africa; *Aspasma minima*, ACAP (Aquaculture Center, Aomori Pref.) 1797~1801, 1997~2004, 23~58 mm SL, Nomo, near Nagasaki; *Aspasmichthys ciconiae*, ACAP 1759, 1795, 1796, 47~70 mm SL, Nomo, near Nagasaki; *Aspasmogaster liorynchus*, paratypes, SU 47665 (2), 35.3, 46.0 mm SL, Coogee, Australia; *Chorisochismus dentex*, SU 18729, 150 mm SL, Cape of Good Hope, South Africa; *Cochleocephalus spatula*, AMS (Australian Museum, Sydney) I. 13005, 34.0 mm SL, Wineglass Bay, Tasmania, AMS I. 13410, 54.0 mm SL, Oyster

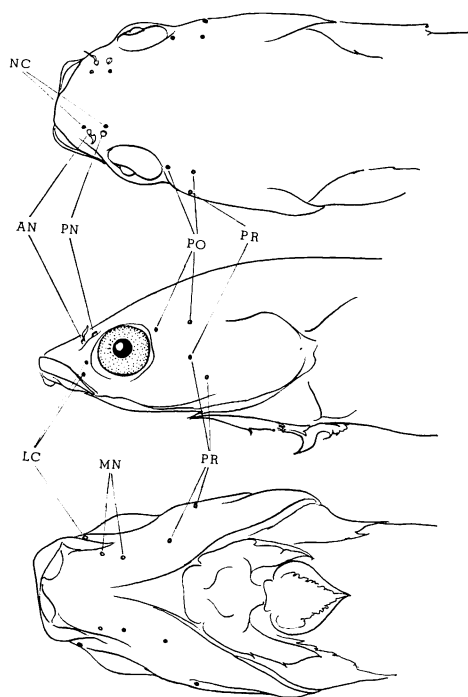


Fig. 1. Arrangement of head sensory canal openings of *Gastroscyphus hectoris*, SU 47677, 42 mm SL, Island Bay, New Zealand. Upper, dorsal view; middle, lateral view; lower, ventral view. Abbreviations are the same as in Fig. 3; MN, mandibular canal openings.

Bay, Tasmania; *Conidens laticephalus*, ACAP 1781~1794, 20~28 mm SL, Nomo, near Nagasaki; *Creocele cardinalis*, SU 47668 (2), 35.0, 38.0 mm SL, Lady Lucy Beach, Tasmania, SU 47671, 32.4 mm SL, Low Heads, Tasmania; *Diademichthys lineatus*, ACAP 1767~1770, 46~48 mm SL, Kuroshima I., Yaeyama Is., Okinawa, FNU (Faculty of Fisheries, Nagasaki University) 100089, 100090, 50, 55 mm SL, Tanabe Bay, Wakayama, FNU 100091, 27 mm SL, Hachijo I., Tokyo; *Diplocrepis puniceus*, SU 47673 (2), 47.0, 69.0 mm SL, Lyall Bay, New Zealand; *Discotrema crinophila*, ACAP 4245~4253, 15.0~37.6 mm SL, Kuroshima I., Yaeyama Is., Okinawa; *Gastrocyathus gracilis*, paratypes, SU 47674, 47675, 27.5, 21.5 mm SL, Lyall Bay, New Zealand; *Gastroscyphus hectoris*, SU 47677 (2), 27.5, 42.0 mm SL, Island Bay, New Zealand; *Lepadichthys frenatus*, FNU 100086~100088, 55.5~71.2 mm TL, Meshima I.; *Parvicrepis parvipinnis*, SU 47682 (2), 19.0, 20.5 mm SL, Ulladulla, Australia.

Propherallodus gen. nov.

(New Japanese name: Hime-ubauo-zoku)

Type-species: *Propherallodus briggsi* sp. nov.

Diagnosis. Gills three; gill membrane free from the isthmus; disc double, flattened papillae on disc region A and C, 4~5 and 2~3 rows across its width respectively (Fig. 3B). Teeth on both jaws, uniserial of incisors with rounded tips (Fig. 3F). Lachrymal canal openings two, preopercular canal openings three and mandibular canal missing. Premaxillaries closely approximated and not perforated at anterior median portion. Posterior margin of disc region B with free dermal ridge.

Description. D. 6~8, A. 6~8, C. 8~10, P. 20~24, vertebrae 31~33 (in *P. smithi*, 31).

Body slender, rounded anteriorly but compressed posteriorly, its depth 5.1~7.2 in SL. Head depressed, its length 2.7~3.5, and its width 3.9~4.8 in SL. Snout short and rounded or rather pointed in dorsal outline, its length 3.9~6.5; eye moderate, its diameter 3.9~4.5; pectoral fin large or moderate, its length 2.0~2.5 in HL. Disc large or moderate, its length 3.7~5.1 in SL. Dorsal and anal fins short, dorsal origin a little anterior to anal origin, dorsal length 0.9~1.2 in anal length. Caudal peduncle short or moderate, its depth 1.3~2.3 in its length. Postdorsal-caudal distance 0.7~1.2 in dorsal length. Dorsal-caudal length forward extends to a tip of pectoral fin. Upper attachment of gill membrane opposite 5~8th pectoral ray and that of axial dermal flap opposite 5~8th pectoral ray. No fleshy pad on lower pectoral base. Anus located a little closer to anal origin than to rear margin of disc. Subopercular bone present and its margin smooth. Branchiostegals six. In *Propherallodus briggsi*, the structure of pelvises and hypo-postcleithrals showing strong resemblance to those of *Pherallodichthys* gen. nov. (Figs. 3C, 5B). Epipleural ribs begin on second vertebra.

Relationship. This new genus is placed in the subfamily Diplocrepinae. The genus *Aspasmogaster* Waite, 1907 is related to this new genus in regard to the structure of articulation of pelvises and hypo-postcleithrals, general appearance of arrangement of flattened papillae on disc, but distinctive in rather primitive features, deep patches of conical teeth at front of both jaws, lachrymal sensory canal Y-shaped and mandi-

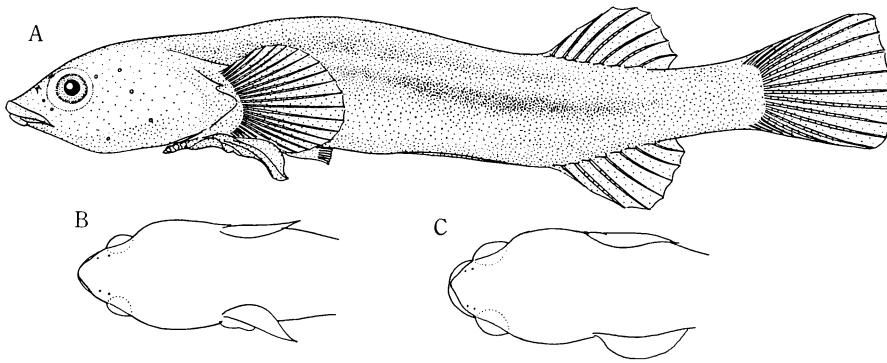


Fig. 2. A, holotype of *Propherallodus briggsi* sp. nov., FNU 100001, 23.3 mm SL, female, from Meshima I. B, dorsal view of the head of A. C, dorsal view of the head of the holotype of *P. smithi*, SU 31349, 18.8 mm SL, Durban, South Africa.

bular sensory canal partly remaining (Table 1). The specialized genus *Pherallodus* Briggs, 1955 is also related with the new genus in some points, but quite distinctive in the followings: rather long snout with perforated premaxillaries; highly compressed incisors with hooks on both jaws, their direction contrary to each other; no preopercular sensory canal openings (Fig. 7B~E).

Key to the species of *Propherallodus* gen. nov.

- 1a Head length 2.7, disc length 3.7 in SL; snout length 3.9 in HL, rounded in dorsal outline (Fig. 2C); caudal peduncle depth 1.3 in its length; posterior nostril located directly above anterior edge of eye; two rows of flattened papillae on disc region C across its width (Fig. 3A) *P. smithi* (Briggs, 1955)
- 1b Head length 3.1~3.5, disc length 4.4~5.1 in SL; snout length 5.4~6.5 in HL, rather pointed in dorsal outline (Fig. 2B); caudal peduncle depth 1.5~2.3 in its length; posterior nostril located a little behind anterior edge of eye; three rows of flattened papillae on disc region C across its width (Fig. 3B) *P. briggsi* sp. nov.

***Propherallodus briggsi* sp. nov.**

(New Japanese name: Hime-ubauo)

(Figs. 2A, B; 3B~F)

Pherallodus smithi (non Briggs, 1955): Miura et al., 1973: 69 (listed: Meshima I.).

Holotype. FNU 100001, 23.3 mm SL, female, from Meshima I., Apr. or May, 1968.

Paratypes. FNU 100002, 20.5 mm SL, Apr. 15,

1964; FNU 100003~100009, 17.9~29.0 mm SL, May 5, 1966 (100004, 100009, cleared and stained); FNU 100010, 18.2 mm SL, Apr. or May, 1968, all from Meshima I.

Diagnosis. Shown in the above key.

Description. D. 7 (6~8), A. 7 (6~8), C. 10 (8~10), P. 23 (20~24), vertebrae 15+17=32 (15+17~18=32~33).

Body slender, rounded anteriorly but compressed posteriorly, its depth 6.1 (5.1~7.2) in SL. Head depressed, its length 3.1 (3.1~3.5), and its width 4.2 (4.3~4.8) in SL. Snout short and rather pointed in dorsal outline, its length 5.7 (5.4~6.5) in HL. Eye moderate, its diameter 4.5 (4.2~4.5) in HL. Pectoral fin moderate, its length 2.4 (2.0~2.5) in HL. Mouth small, maxillary just extending to anterior edge of eye, lower jaw a little shorter than upper jaw. Interorbital flat, its width as large as eye diameter, its diameter 1.0 (0.8~1.0) in interorbital width. Nostrils tubular, posterior nostril located a little behind anterior edge of eye. Upper attachment of gill membrane opposite 5 (5~8) th pectoral ray. Flattened papillae on disc numerous; disc region A with 4 (4~5) rows of flattened papillae across its width; 7 (5~7) rows across width of disc region B; 3 rows across width of disc region C (Fig. 3B). Dorsal and anal fins short, dorsal length 1.0 (0.9~1.2) in anal length. Caudal peduncle length rather long, its depth 1.7 (1.5~2.3) in its length. Postdorsal-caudal distance 0.9 (0.7~1.0) in dorsal length.

On the second gill arch, six tiny rakers. Number of openings in each canal; nasal 2, postorbital 2, lachrymal 2, preopercular 3 and

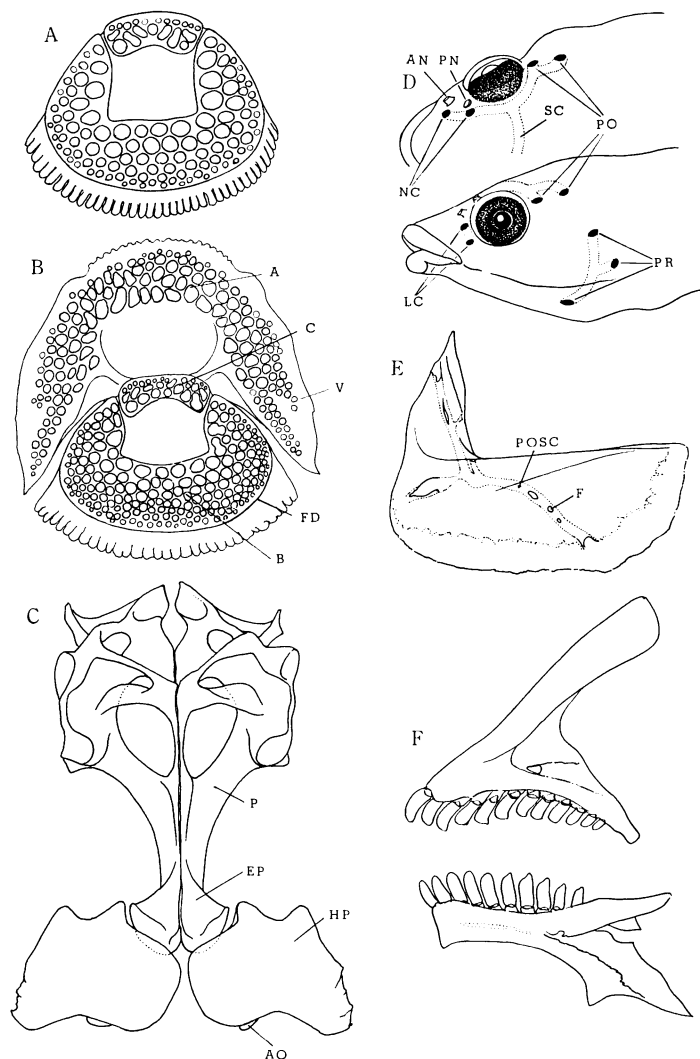


Fig. 3. Diagnostic characters of *Propherallodus smithi* (A) and *P. briggsi* sp. nov. (B~F). A, ventral view of the posterior disc of the holotype of *P. smithi*. B, ventral view of disc of the holotype of *P. briggsi*, FNU 100001. C, ventral view of the pelvic and hypo-postcleithral bones, paratype of *P. briggsi*, FNU 100009, 29.0 mm SL. D, head sensory canals: upper, dorsal view; lower, lateral view; paratype of *P. briggsi*, FNU 100005, 24.1 mm SL. E, outer view of right preopercular bone, paratype of *P. briggsi*, FNU 100009. F, inner view of right premaxillary and dentary bones, paratype of *P. briggsi*, FNU 100004, 20.3 mm SL. A, disc region A; AN, anterior nostril; AO, accessory ossicle; B, disc region B; C, disc region C; EP, enlarged portion of pelvic bone; F, foramen of the canal; FD, free dermal ridge; HP, hypo-postcleithral bone; LC, lachrymal canal openings; NC, nasal canal openings; P, pelvic bone; PN, posterior nostril; PO, postorbital canal openings; POSC, preopercular sensory canal; PR, preopercular canal openings; SC, supraorbital commissure; V, ventral fin.

mandibular 0 (Fig. 3D). Preopercular sensory canal well developed and Y-shaped having opening at each terminus (Fig. 3E). Enlarged por-

tions of pelvises and hypo-postcleithrals closely articulated laterally and the latter having accessory ossicles on the posterior margins (Fig. 3C).

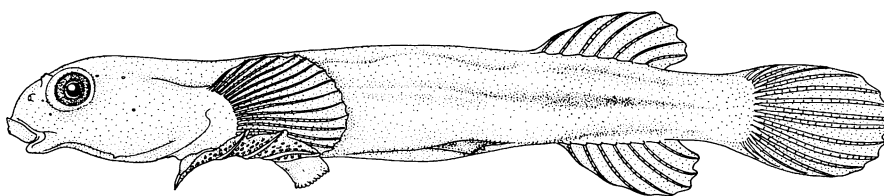


Fig. 4. *Pherallodichthys meshimaensis* sp. nov., holotype, FNU 100011, male, 18.3 mm SL, from Meshima I.

Pherallodichthys gen. nov.

(New Japanese name: Meshima-ubauo-zoku)

Type-species: *Pherallodichthys meshimaensis* sp. nov.

Diagnosis. Gills three; gill membrane attached to the isthmus; disc double, flattened papillae on disc region C, two rows across its width (Fig. 5A). Teeth on both jaws, uniserial of incisors, at front with rounded tips but at sides highly compressed and hooked posteriorly on upper jaw (Fig. 5E). Mouth small and inferior. Lachrymal and preopercular canal openings, two each and mandibular canal missing (Fig. 5C). Premaxillaries not perforated at anterior portion. Gill rakers present.

Description. There being but one species in the genus, important characters defining subfamilies and genera enumerated here, other characters in the species description.

No fleshy pad on lower pectoral base. Subopercular bone present and its margin smooth. Branchiostegals six. Disc comparatively large, its length 4.0~4.1 in SL, on posterior margin of disc region B without free dermal ridge (Fig. 5A). Distal ends of pelvises enlarged and closely articulated with hypo-postcleithrals and showing strong resemblance to those of *Propherallodus* rather than of *Aspasma*, enlarged portions of the latter widely grooved (Figs. 3C, 5B). Epipleural ribs begin on second vertebra.

Relationship. This new genus is tentatively placed in the subfamily Aspasminae after subfamily key by Briggs (1955), however there are no close relatives. In the Aspasminae, the genus *Liobranchia* Briggs, 1955 shares the inferior mouth and the arrangement of openings of head sensory canals with the new genus, but the former is distinctive in having no disc region C, no gill rakers and no hooked incisors (deep perpendicular ridges on body of the holotype are absent in the paratype from Bikini, after Schultz et al.

(1966). Internal characters of the genus *Liobranchia* were not available for the present study because of the paucity of specimens. This genus is rather related with the genus *Propherallodus* and *Pherallodus* of the subfamily Diplocrepinae in the followings: smaller number of rows of flattened papillae on disc region C, structure of pelvises and hypopostcleithrals, the arrangement of head sensory canals and dentition showing intermediate characters of two genera.

Pherallodichthys meshimaensis sp. nov.

(New Japanese name: Meshima-ubauo)

(Figs. 4, 5)

Holotype. FNU 100011, 18.3 mm SL, male, Apr. or May, 1968, from Meshima I.

Paratypes. FNU 100012, 18.7 mm SL, FNU 100013, 19.2 mm SL (cleared and stained), collection date unknown, all from Meshima I.

Description. D. 7 (6~7), A. 6 (6~7), C. 10 (9~10), P. 23, vertebrae 15+15=30 (14~15+15~16).

Body slender, rounded anteriorly but compressed posteriorly, its depth 6.6 (6.1) in SL. Head moderately depressed, its length 3.5, and its width 4.9 (4.7) in SL. Snout short and rounded in lateral outline, its length 4.9 (6.8) in HL. Eye moderate, its diameter 4.0 (3.4) in HL. Pectoral fin large, its length 1.8 (1.7) in HL. Mouth small, maxillary just extending to anterior edge of eye, lower jaw shorter than upper jaw. Interorbital flat, and its width as large as eye diameter, its diameter 1.1 in interorbital width. Nostrils tubular, posterior nostril located just above anterior edge of eye. Upper attachment of gill membrane opposite 5th pectoral ray, and that of axial dermal flap opposite 5 (5~6)th pectoral ray. Flattened papillae on disc numerous; disc region A with 3 rows of flattened papillae across its width; 6 (6~7) rows across width of disc region B; 2 rows across width of disc

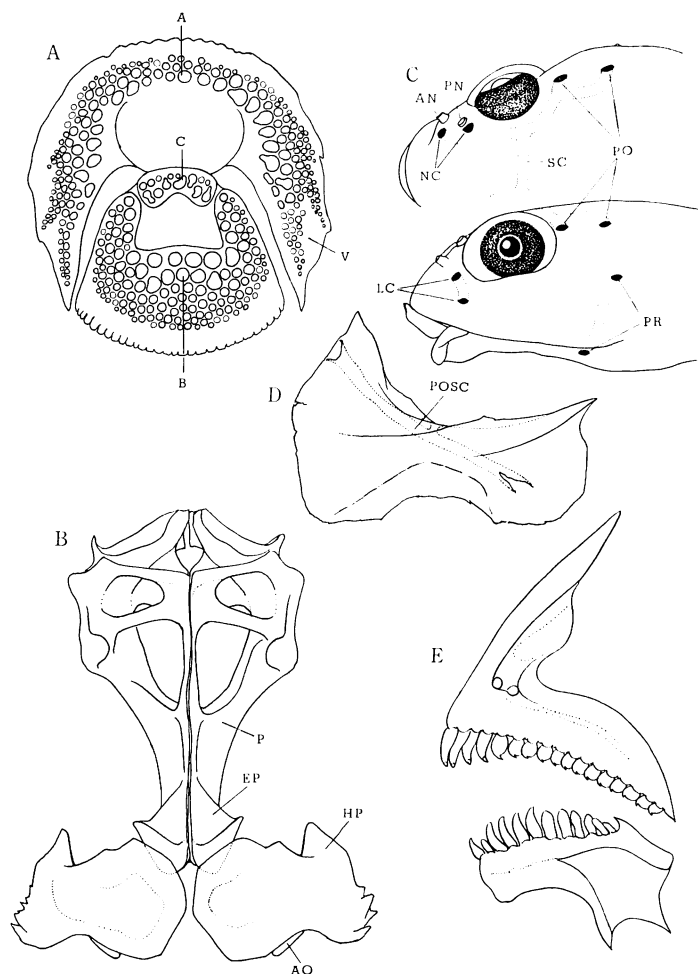


Fig. 5. Diagnostic characters of *Pherallodichthys meshimaensis* sp. nov. A, ventral view of disc, holotype, FNU 100011. B, ventral view of the pelvic and hypo-postcleithral bones, paratype, FNU 100013, 19.2 mm SL. C, head sensory canals: upper, dorsal view; lower, lateral view; holotype, FNU 100011. D, outer view of right preopercular bone, paratype, FNU 100013. E, inner view of right premaxillary and dentary bones, paratype, FNU 100013. Abbreviations are the same as in Fig. 3.

region C (Fig. 5A). Dorsal and anal fins short, dorsal length 0.9 in anal fin length. Caudal peduncle length moderate, its depth 1.2 (1.7) in its length. Dorsal-caudal distance forward extends to the tip of pectoral fin, postdorsal-caudal distance 0.9 (1.0) in dorsal length. Anus located a little closer to anal origin than to rear margin of disc.

On the second gill arch, six tiny rakers present. Number of openings in each canal; nasal 2, postorbital 2, lachrymal 2, preopercular 2 and mandibular 0; preopercular sensory canal without a branch canal and I-shaped (Fig. 5C,

D). Distal ends of enlarged portions of pelvises not deeply separated and hypo-postcleithrals accompanied with accessory ossicles on their posterior margins. Teeth on upper jaw numerous, anterior incisors larger than the posterior and with rounded tips recurved inward, posterior hooked incisors closely set, and teeth on lower jaw few in number and uniform blunt incisors (Fig. 5E).

Pherallodus indicus (Weber, 1913)
(Japanese name: Hoso-ubauo)
(Figs. 6, 7)

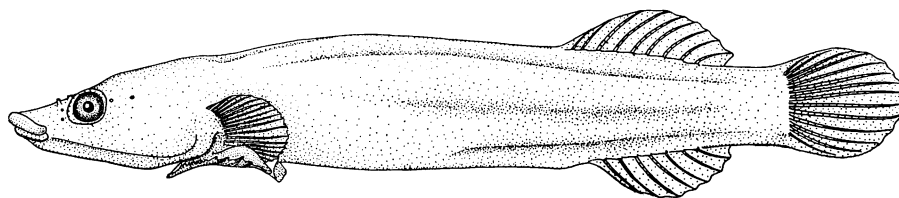


Fig. 6. *Pherallodus indicus*, FNU 100067, 32.0 mm SL, male, from Meshima I.

Crepidogaster indicus Weber, 1913: 525, fig. 111 (Sanana, Insel Sula Besi).

Pherallodus indicus: Briggs, 1955: 44, figs. 53, 77 (description: Raroia Atoll, Tuamotu Arch.; Soemba I., Lesser Sunda Is.; Sanana I.) — Briggs, 1962a: 447, fig. 98 (brief description) — Briggs, 1962b: 852 (listed: Kikai I., Amami Is.) — Shiogaki and Dotsu, 1973: 29 (listed: Nomo, near Nagasaki) — Miura et al., 1973: 69 (listed: Meshima I.) — Yoshino and Nishijima, 1981: 64 (listed: Sesoko I., Okinawa).

Aspasma minima (non Döderlein in Steindacher and Döderlein, 1887): Nakamura, 1970 (in part): 20, pl. 12, fig. 3 (listed: Manazuru, Kanagawa).

Specimens examined. FNU 100022, 19.7 mm SL (cleared and stained), Apr. 15, 1964; FNU 100048 ~ 10067, 15.6 ~ 32.0 mm SL, Apr. or May, 1968 (100063, 23.3 mm SL, cleared and stained), all from Meshima I.

Description. D. 7 ~ 9, A. 6 ~ 8, C. 9 ~ 11, P. 20 ~ 23, vertebrae 14 ~ 15 + 17 ~ 18 = 32 ~ 33.

Body slender, rounded anteriorly but compressed posteriorly, its depth 5.7 ~ 6.9 in SL. Head moderate and depressed, its length 3.1 ~ 3.5 and its width 4.9 ~ 5.5 in HL. Snout depressed and sharp, but roundly produced in dorsal outline, its length 3.7 ~ 4.4 in HL. Eye moderate, its diameter 4.1 ~ 4.7 in HL. Pectoral fin small, its length 2.3 ~ 2.8 in HL. Mouth small, posterior end of maxillary much anterior to edge of eye. Interorbital width rather narrow, eye diameter 0.7 ~ 0.8 in its width. Anterior nostril with long tube, posterior one not tubular and located a little behind anterior edge of eye. Gills three. Gill membrane free from the isthmus. Upper attachment of gill membrane opposite 9 ~ 11th pectoral ray, its position rather low. No fleshy pad on lower pectoral base. Subopercular bone present and its margin smooth. Disc double. Flattened papillae on disc relatively large and few; disc region A without row of papillae across its width; 5 or 6 rows across

width of disc region B; one or no row across disc region C. Posterior margin of disc region B, without free dermal ridge (Fig. 7A). Dorsal and anal fins short, dorsal length 0.8 ~ 1.0 in anal length. Caudal peduncle length moderate, its depth 1.1 ~ 1.3 in its length. Postdorsal-caudal distance 1.1 ~ 1.6 in dorsal length (quite different from the values of Briggs, 1955: 3.2 ~ 3.8). Dorsal-caudal distance forward extends to a point behind pectoral fin.

Six tiny rakers present on the second gill arch. Head sensory canals highly degenerated; preopercular sensory canal missing or remaining as a narrow canal without outer openings. Number of openings in each canal; nasal 2, postorbital 2, lachrymal 2, preopercular and mandibular 0 (Fig. 7C, D). Anterior portion of the paired premaxillaries perforated by a narrow median opening. Distal ends of enlarged portions of pelvises rather deeply separated and closely articulated with hypo-postcleithrals and its posterior margin with accessory ossicles (Fig. 7B). Teeth on both jaws uniserial of incisors, front ones with rounded tips recurved inward, but at sides of both jaws highly compressed and hooked. On upper jaw, hooked incisors small in size and closely set, directed posteriorly; on lower jaw, hooked incisors small in number and directed anteriorly (Fig. 7E). Epipleural ribs begin on second vertebra. Branchiostegals six.

Remarks. Most common clingfish in tide-pools of Meshima I., collected 72 specimens, 16.8 ~ 34.0 mm TL. Over ca. 22 mm TL female mature and have ca. 50 ovarian eggs. Males grow larger than females. Sexual dimorphism is found in the head shape, that is, cheeks are convex dorsally and laterally in males but slender in females.

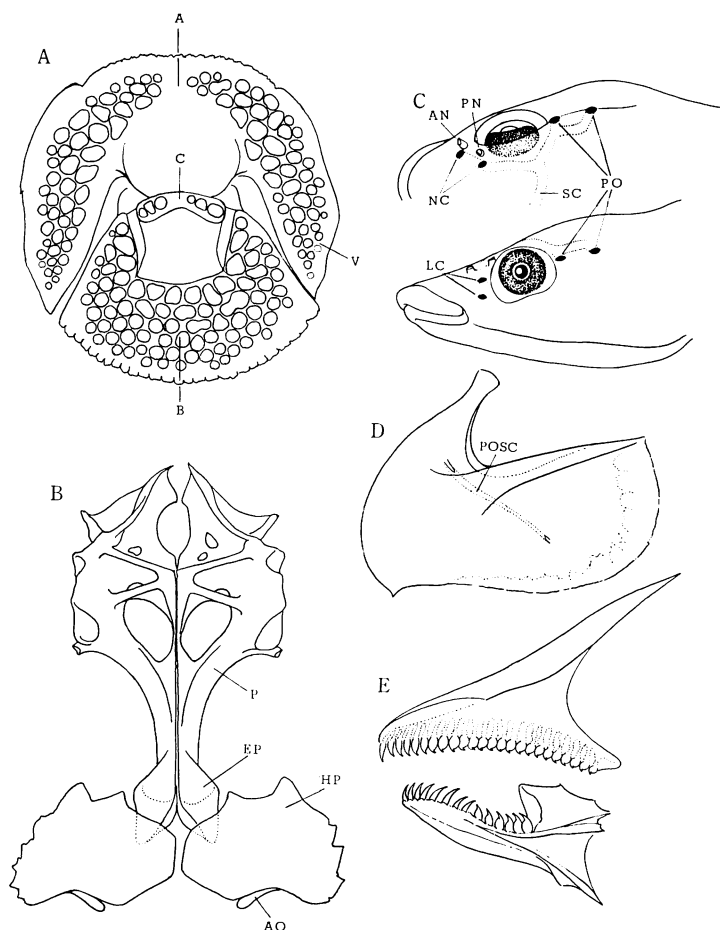


Fig. 7. Diagnostic characters of *Pherallodus indicus*. A, ventral view of disc, FNU 100067, 32.0 mm SL. B, ventral view of the pelvic and hypo-postcleithral bones, FNU 100022, 19.7 mm SL. C, head sensory canals: upper, dorsal view; lower, lateral view; FNU 100067. D, outer view of right preopercular bone, FNU 100022. E, inner view of right premaxillary and dentary bones, FNU 100022. Abbreviations are the same as in Fig. 3.

Comments on head sensory canals in the family Gobiesocidae

The head sensory canals of the family Gobiesocidae are poorly known. As far as is known there are descriptions of only ten species (*Gastrocymba* and *Haplocylix* partially) of four subfamilies (Guitel, 1888; Böhlke and Robins, 1970; Fraser, 1970; Smith-Vaniz, 1971; Shioyaki and Dotsu, 1971; Springer and Fraser, 1976). We have examined 18 more species in four other subfamilies and found that the head sensory canal system is apparently important for higher classification. Table 1 shows the arrangements

of openings in each sensory canal of 28 species in all known subfamilies of the Gobiesocidae together with Cheilobranchidae (Springer and Fraser (1976) synonymized Cheilobranchidae with Gobiesocidae, however we regard it as a distinct family in the order Gobiesociformes because of overall high reduction in many features).

In the family Gobiesocidae, the lateral line is degenerated and the sensory canals are restricted to the head. They are classified into three parts, i.e., the supraorbital, infraorbital and the preoperculo-mandibular sensory canals. These canals are isolated from one another. Supraor-

Table 1. The head sensory canals of the families of Gobiesocidae and Cheilobranchidae in the order Gobiesociformes. NC, nasal canal openings; PO, postorbital canal openings; LC, lachrymal canal openings; PR, preopercular canal openings; MN, mandibular canal openings. 1, Shiogaki and Dotsu, 1971; 2, Springer and Fraser, 1976; 3, Böhlke and Robins, 1970; 4, Guitel, 1888; 5, Fraser, 1970; 6, Smith-Vaniz, 1971; 7, Springer (personal communication). Asterisks indicate that there is no information.

Species name	Number of openings in each sensory canal ¹				
	NC	PO	LC	PR	MN
Gobiesocidae					
Trachelochisminae					
<i>Conidens laticephalus</i> ¹	2	2	3	3	3
<i>Creocele cardinalis</i>	2	2	3	3	1
<i>Gastrocymba quadriradiata</i> ²	*	*	*	0	0
Haplocylichinae					
<i>Haplocylix littoreus</i> ³	*	*	*	3	3
<i>Gymnoscyphus ascites</i> ³	2	2	3	3	2
Lepadogastrinae					
<i>Lepadogaster lepadogaster purpurea</i> ⁴	2	2	3	3	3
<i>Lepadogaster candolei</i> ⁴	2	2	3	3	2
Chorisochisminae					
<i>Chorisochismus dentex</i>	2	2	3	3	2
Diplocrepinae					
<i>Diplocrepis puniceus</i>	2	2	3	3	3
<i>Gastrocyathus gracilis</i>	2	2	3	3	2
<i>Aspasmogaster liorynchus</i>	2	2	3	3	1
<i>Gastroscyphus hectoris</i>	2	2	2	3	2
<i>Cochleocephus spatula</i>	2	2	2	2	3
<i>Propherallodus smithi</i>	2	2	2	3	0
<i>Propherallodus briggsi</i> sp. nov.	2	2	2	3	0
<i>Pherallodus indicus</i>	2	2	2	0	0
<i>Parvicrepis parvipinnis</i>	2	1	2	0	0
Gobiesocinae					
<i>Gobiesox meandricus</i> ⁴	2	2	3	3	2
<i>Derilissus kremnobates</i> ⁵	2	2	2	3	2
<i>Derilissus vitteger</i> ⁵	2	2	2	3	2
<i>Derilissus altifrons</i> ⁶	2	2	2	3	2
Aspasminae					
<i>Aspasmichthys ciconiae</i>	2	2	2	3	1
<i>Aspasma minima</i>	2	2	2	3	0
<i>Pherallodichthys meshimaensis</i> sp. nov.	2	2	2	2	0
<i>Liobranchia stria</i> ⁷	2	2	2	2	0
Diademichthyinae					
<i>Lepadichthys frenatus</i>	2	2	2	3	0
<i>Diademichthys lineatus</i>	2	2	2	2	0
<i>Discotrema crinophila</i>	2	2	2	0	0
Cheilobranchidae					
<i>Alabes</i> ²	1~2	1~2	2	0	0

bital canal on both sides is anastomosed on the frontal by the supraorbital commissure, but this canal has no openings. The supraorbital canal is conveniently divided into the nasal and

postorbital canals; with the most consistent number of openings being nasal 2, postorbital 2 (a single exception in *Parvicrepis*, of which the posterior one is disappearing). The infraor-

bital canal is represented by the lachrymal canal only, having 2 or 3 openings. The preopercular and mandibular canals have 3 openings each at most, and in the most specialized species these canals are missing.

The most reduced form is found in *Parvicrepis* (Diplocrepinae), lacking the posterior opening of the postorbital sensory canals, but this genus has many primitive characters; the gill membrane free from the isthmus, disc double, front teeth in deep patches of sharp conicals, distal ends of pelvises without enlarged portions. Thus it is considered to be an aberrant genus. In Table 1 are found three other genera with a complete loss of the preoperculo-mandibular sensory canals; *Gastrocymba* (Trachelochisminae), *Pherallodus* (Diplocrepinae) and *Discotrema* (Diademichthyinae). They are all the same in the arrangement of the remaining canal openings. It is very interesting that greatly reduced head sensory canal systems appeared in both the most primitive subfamily and the most specialized one in Briggs' (1955) phyletic outline.

Springer and Fraser (1976) pointed out on the basis of their limited materials that the most reduced form in the Gobiesocidae is *Gastrocymba* having the following characters; 1) loss of preoperculo-mandibular sensory canal, 2) loss of hyper-postcleithrals, 3) epipleural ribs begin on third vertebra (but this character observed also in *Conidens* of Trachelochisminae and *Discotrema* of Diademichthyinae), 4) high number of vertebrae. Hence, it is considered that there are two phyletic paths in the Gobiesocidae; one to the reduction of disc, the other to high specialization of disc. The former is represented by *Gastrocymba* and *Parvicrepis* (no information of internal characters) and may be related with Cheilobranchidae. The latter is represented by *Discotrema* which shows much specialization in the articulation of the hypopostcleithrals and pelvises with deeply separated enlarged portions, loss of the anterior free margin of disc region C and high adaptation of a sucking function. However, the separation of two phyletic paths is not clear. There is a need of revision for higher classification of the family Gobiesocidae.

We would like to obtain such information of all known species to discuss the validity of head sensory canal systems for defining genera, toge-

ther with other internal characters.

Acknowledgments

We are deeply grateful to Dr. John C. Briggs, University of South Florida, for his valuable suggestions on the determination of *Propherallodus briggsi* as an undescribed species and his critical reading of the manuscript, and to the following persons who allowed us to examine the specimens in their collections or donated specimens for this study: Dr. William N. Eschmeyer, California Academy of Sciences; Dr. Douglass F. Hoese, Australian Museum, Sydney; Mr. Teruo Fukuda, Marine Parks Center of Japan; Mr. Chuichi Araga, Seto Marine Biological Laboratory, Kyoto University; Mr. Taira Matsuoka, Institute of Japanese Fisheries Resources Conservation. We also thank Dr. Victor G. Springer, National Museum of Natural History, Smithsonian Institution, for giving information on the head sensory canals of the holotype of *Liobranchia stria*, and Dr. Tetsushi Senta, Faculty of Fisheries, Nagasaki University, for his valuable advice.

Literature cited

- Böhlke, J. E. and C. R. Robins. 1970. A new genus and species of deep-dwelling clingfish from the Lesser Antilles. *Notul. Nat.*, (434): 1~12.
- Briggs, J. C. 1955. A monograph of the clingfishes (Order Xenopterygii). *Stanf. Ichthyol. Bull.*, 6: i~iv+1~224.
- Briggs, J. C. 1962a. Order Xenopterygii, pp. 444~453. In Beaufort, L. F. de and J. C. Briggs, The fishes of Indo-Australian Archipelago, 11. E. J. Brill, Leiden, xi+481 pp.
- Briggs, J. C. 1962b. Results of the Amami Islands Expedition No. 5: The clingfishes (Gobiesocidae). *Copeia*, 1962(4): 851~852.
- Fraser, T. H. 1970. Two new species of the clingfish genus *Derilissus* (Gobiesocidae) from the western Atlantic. *Copeia*, 1970 (1): 38~42.
- Guitel, F. C. 1888. Recherches sur les Lepadogasters. *Archiv. Zool. Exper. Gen.*, Ser. 2, 6: 423~647, pls. 24~37.
- Miura, N., Y. Dotsu and H. Iwamoto. 1973. Tide-pool fishes of Meshima Island, Danjo Islands. *Sci. Res. Danjo Islands*, pp. 59~72. (In Japanese).
- Nakamura, K. 1970. The tidal fish fauna of Sagami Bay and its adjacent waters. *Res. Rep. Kanagawa Pref. Mus. Nat. Hist.*, (1): 1~33, pls. 1~12. (In Japanese).
- Schultz, L. P., L. P. Woods and E. A. Lachner. 1966.

- Fishes of the Marshall and Marianas Islands, 3. Bull. U. S. Nat. Mus., 202: i~vii+1~176, pls. 124~148.
- Shiogaki, M. and Y. Dotsu. 1971. The life history of the clingfish, *Conidens laticephalus*. Bull. Fac. Fish. Nagasaki Univ., (32): 7~16. (In Japanese).
- Shiogaki, M. and Y. Dotsu. 1973. Fishes collected from the coastal waters of Nomozaki near Nagasaki. Bull. Fac. Fish. Nagasaki Univ., (35): 11~31, pls. 1~8. (In Japanese).
- Smith, J. L. B. 1957. Fishes of Aldabra. Part VIII. Ann. Mag. Nat. Hist., (12) 10: 395~400, pls. 13~14.
- Smith-Vaniz, W. F. 1971. Another new species of the clingfish genus *Derilissus* from the western Atlantic (Pisces: Gobiesocidae). Copeia, 1971 (2): 291~294.
- Springer, V. G. and T. H. Fraser. 1976. Synonymy of the fish families Cheilobranchidae (=Alabetidae) and Gobiesocidae, with descriptions of two new species of *Alabes*. Smithsonian Contr. Zool., (234): 1~23.
- Steindachner, F. and L. Döderlein. 1887. Beiträge zur Kenntniss der Fische Japans. IV. Denkschr. Akad. Wiss. Wien, 53: 257~296, pls. 1~4.
- Waite, E. R. 1907. The generic name *Crepidogaster*. Rec. Austr. Mus., 6 (4): 315.
- Weber, M. 1913. Die Fische der Siboga-Expedition. In Siboga-Expeditie. Uitkomsten op zoologisch, botanisch, oceanographisch en geologisch gebied verzameld in nederlandsch Oost-Indië, etc. Leiden, xii+710 pp., 12 pls.
- Yoshino, T. and S. Nishijima. 1981. A list of fishes found around Sesoko Island, Okinawa. Sesoko Mar. Sci. Lab. Tech. Rep., (8): 19~81, pls. 1~3.

(MS: Aomori Regional Fisheries Extension Station of Aomori Prefecture, 2-3-2 Minato-machi, Aomori 030, Japan; YD: Faculty of Fisheries, Nagasaki University, 1-14 Bunkyo-machi, Nagasaki 852,

Japan)

日本産ウバウオ科魚類の2新属, 2新種の記載, および頭部感覚管系について

塩垣 優・道津喜衛

九州西方沖合の男女群島女島産のウバウオ科魚類の2新属, 2新種および日本ではあまり知られていないホソウバウオの記載を行った。 *Propherallodus* gen. nov., *Pherallodichthys* gen. nov. はそれぞれ, *Propherallodus briggsi* sp. nov., *Pherallodichthys meshimaensis* sp. nov. を模式種として記載し, 2新種にはそれぞれ新称ヒメウバウオ, メシマウバウオを与えた。新属ヒメウバウオ属は先端が丸い門歯が両顎に1列に並ぶこと, 眼前感覚管, 前鰓蓋感覚管の開口数がそれぞれ2, 3であり, 下顎感覚管が消失していること, 新属メシマウバウオ属は両顎歯とも1列の門歯からなり, 上顎側部のそれは先端に後方に向う鈎状突起を具えること, 眼前感覚管, 前鰓蓋感覚管の開口数がそれぞれ2であり, 下顎感覚管が消失していること等の特徴を有する。南アフリカ産の *Pherallodus smithi* をヒメウバウオ属に移し, 同属2種の検索を与えた。

ウバウオ科魚類の頭部感覚管系について, 既知の10種(うち2種については一部)の他に, 新たに18種を追加し, 全亜科にわたる各感覚管の開口数について, 資料不足の段階ではあるが検討を加えた。同感覚管の退化は一部のものでは, 従来ウバウオ科の特化形質であるとされた鰓膜の峽部への付着, 歯の特化, 複吸盤から単型吸盤への特化, 腰帯と下後鎖骨との関節部の特殊化等を伴わないうで進行しており, ウバウオ科内で吸盤の退化傾向を示すものと, さらに特殊化へ向うものの2つの大きな系統の存在が想定された。さらに, 同属内の各種間の感覚管の開口数については, 原則的には同一であることは確かなことと考えられ, 属を識別する場合の一つの有効形質となり得ると考えられた。

(塩垣: 030 青森市港町 2-3-2, 青森県青森地方水産業改良普及所; 道津: 852 長崎市文教町 1-14, 長崎大学水産学部)