

**First Record of the Deep-sea Cottid  
Fish *Psychrolutes inermis*  
from Japan**

**Kiyoshi Suzuki and Seishi Kimura**

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In the course of a study of the deep-sea ichthyofauna off Mie Prefecture, we examined five specimens belonging to the subfamily Psychrolutinae, which had been taken by deep-sea trap nets operated by the staff of the Mie Hamajima Fisheries Experimental Station. A careful examination of these specimens revealed that they can be assigned to *Cottunculoides inermis* (Vaillant). This species has hitherto been known only from off the Atlantic coast of Africa. In this paper, the specimens were described as the first record of this species from the region around Japan. The species is transferred here from *Cottunculoides* to *Psychrolutes* (see discussion below).

The specimens used here were preserved in 10% formalin and deposited in the Fisheries Research Laboratory, Mie University (FRLM). Counts and measurements were made generally in accordance with the methods proposed by Hubbs and Lagler (1958). Those which were not adopted in their method but employed in the present study are as follows: snout length, the distance from the tip of the snout to the anterior margin of the cornea; post-ocular length of head, the distance between

the posterior margin of the cornea and the posterior end of the opercular membrane; length of longest pectoral or pelvic ray, the distance from the structural base of the longest ray to its tip; length of pectoral base, the distance between the structural bases of the first ray and the last one. The structural base of each fin ray was confirmed by dissection. For counts of vertebrae, branchiostegals and fin rays X-ray was used except pelvic fin rays which were counted by dissection.

***Psychrolutes inermis* (Vaillant)**

(New Japanese name: Kumano-kajika)

Specimens examined: FRLM 1998~2001 (119.4~186.5 mm in standard length, young) taken from off Mie Prefecture (34°5'55''N, 136°43'45''E), at a depth of about 750 m, on January 24, 1979; FRLM 2002 (410.2 mm, adult female), off Mie Prefecture (34°5'30''N, 136°2'30''E), at a depth of about 1000 m, on December 14, 1978.

Counts and measurements of the specimens are shown in Table 1.

External features: Body tadpole-shaped, abruptly tapering from very large head toward compressed caudal peduncle. Greatest width at preopercular region and greatest depth at gill opening. Head very wide, roundish above, and its length slightly longer than depth. Snout broad, short, and obtuse. Gill membranes broadly united to isthmus, without fold across isthmus. Mouth rather large and broadly round. Upper jaw slightly



Fig. 1. *Psychrolutes inermis* from off Mie Prefecture, Japan, FRLM 2002 (410.2 mm in standard length, female).

longer than the lower; posterior end of maxillary extending beneath the anterior margin of eye. Eye very small, placed on a level with the posterior end of opercular flap. Interorbital space rather convex and extremely wide. Anterior and posterior nostrils widely separated from each other, the anterior one at tip of long tube. Nasal, preorbital and preopercular spines entirely absent. Head without mucous pores visible with naked eye. Small cirri very abundant on the lower side

of head, also on snout, above eyes, on cheeks, opercles, and occiput. Corners of mouth without large tentacles. Head and body with very loose and moveable skin, without either scales or tubercles. Dorsal fins continuous, beginning over opercular angles, slightly concave between spines and soft rays; spinous dorsal fin and rays slender and flexible, and almost enclosed by lax skin except tips which are visible without dissection; the last ray not reaching to caudal fin.

Table 1. Counts and measurements of *Psychrolutes inermis*.

Characters	Catalogue number (FRLM)				
	1998	1999	2000	2001	2002
Total length (mm)	144.2	180.6	222.4	225.0	489.4
Standard length (mm)	119.4	148.0	182.0	186.5	410.2
In standard length:					
Head length	2.22	2.13	2.39	2.34	2.52
Body depth	3.55	3.16	3.90	3.14	3.20
Head width	4.42	4.09	4.09	3.56	3.48
Distance from tip of snout to anterior margin of anus	2.02	1.79	—	1.86	1.60
Length of dorsal base	1.64	1.59	—	1.90	1.82
Length of anal base	3.14	3.02	—	3.26	3.67
Distance from tip of snout to origin of dorsal fin	2.61	2.53	—	2.49	2.39
Distance from tip of snout to origin of anal fin	1.64	1.69	—	1.59	1.51
Length of longest pectoral ray (6th ray)	3.80	3.61	—	3.49	3.88
In head length:					
Snout length	3.84	3.47	3.82	3.31	3.08
Length of upper jaw	2.66	2.80	2.58	2.61	2.59
Length of eye	9.34	8.26	7.23	8.79	11.64
Interorbital width	3.16	2.92	—	2.62	2.90
Postocular length of head	1.68	1.77	—	1.52	1.47
Length of longest dorsal ray (9th soft ray)	—	2.78	—	2.49	2.49
Length of longest anal ray (6th ray)	—	3.15	—	2.65	2.72
Length of longest pelvic ray (3rd soft ray)	3.02	3.28	—	2.60	3.26
Length of pectoral base	2.82	2.93	—	2.57	2.95
Length of caudal fin	3.51	3.15	—	2.84	3.29
Length of caudal peduncle	5.38	5.79	—	4.89	4.51
Depth of caudal peduncle	5.93	5.28	—	4.46	4.00
Counts:					
Dorsal fin	VIII, 17	VIII, 17	—	VIII, 17	VIII, 17
Anal fin	13	14	—	13	13
Pectoral fin (branched+unbranched)	7+13	7+13	7+14	7+13	7+14
Pelvic fin	I, 3	I, 3	I, 3	I, 3	I, 3
Caudal fin	v, 14, iv	v, 13, iv	—	—	v, 14, iv
Branchiostegals	7	7	7	7	7
Gill rakers	1+8	1+8	2+9	1+7	1+5
Pyloric caeca	3	5	—	3	6
Vertebrae	34	34	34	34	—

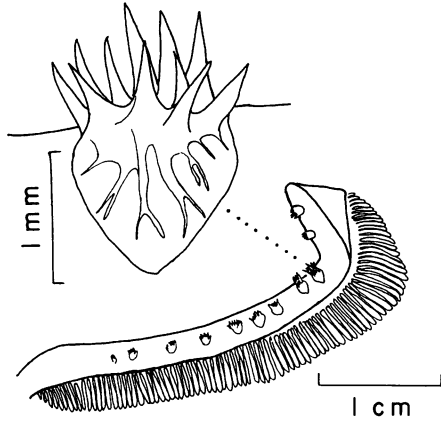


Fig. 2. Lateral view of outer side of the first gill arch, especially showing gill rakers, FRLM 2000 (182.0 mm in standard length).

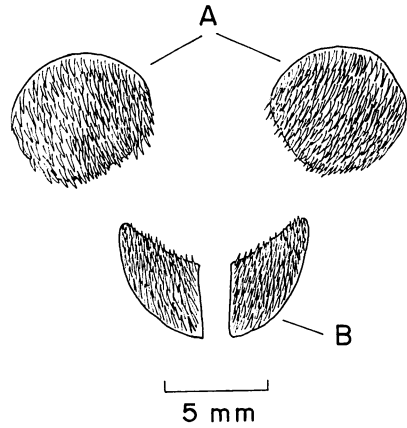


Fig. 3. Anterior view of pharyngeal teeth, FRLM 2000 (182.0 mm in standard length). A: Upper pharyngeal teeth. B: Lower pharyngeal teeth.

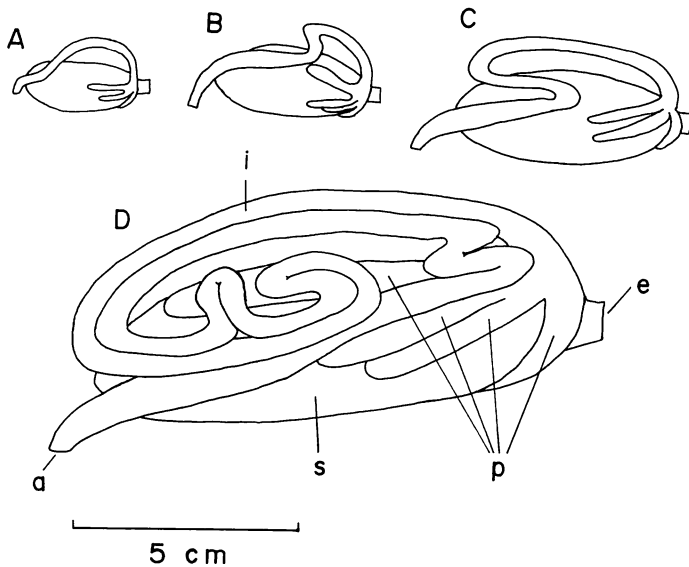


Fig. 4. Right side view of alimentary canals. A: FRLM 1998 (119.4 mm in standard length). B: FRLM 1999 (148.0 mm). C: FRLM 2001 (186.5 mm). D: FRLM 2002 (410.2 mm). a, anus; e, esophagus; i, intestine; p, pyloric caeca; s, stomach.

Anal fin slightly lower than dorsal. Pectoral fin somewhat large, but not reaching to origin of anal fin. Pelvic spine completely hidden in lax skin, invisible without dissection. Caudal fin truncate with free tips of rays. Lateral line entirely obsolete.

Internal features: Jaws with narrow bands of crowded, small conical teeth. Vomer and

palatines edentulous. No slit behind the last gill arch. Pseudobranchiae small. Gill rakers stump-like in appearance, and armed with small spines (Fig. 2). Upper pharyngeal tooth plate in a single pair; teeth well developed, slightly larger than those on jaws (Fig. 3). Skull and suspensorium very thin and fragile; posterior end of preopercle with no trace of

spine. Stomach extremely large, thick, and tough. Intestine thin and rather long, its coiling becomes complicated with growth of the fish (Fig. 4).

Coloration: In formalin, body generally blackish dark brown, ventral side not pale. Sides of head and body with white cloud-like markings. All fins blackish dark brown, without any marking, except tips of simple pectoral rays and those of pelvic rays which are white. Inside of gill covers white. Peritoneum black.

#### Comparison between *Cottunculoides* and *Psychrolutes*

The genus *Psychrolutes* Günther, 1861, was established for the accommodation of *P. paradoxus* Günther, 1861, which had been taken from the Gulf of Georgia, Vancouver. Recently, Stein and Bond (1978) reported *P. phricus* from the eastern North Pacific. They emphasized close affinities of *Psychrolutes* with such genera as *Neophrynichthys* and *Cottunculoides* with no character clearly separating them, and suggested that *Psychrolutes* would be synonymous with *Cottunculoides*. The genus *Cottunculoides* Barnard, 1927, was erected for those species formerly placed in the genus *Cottunculus* Collett, 1875, which lack vomerine teeth. Barnard included two South African species, *C. inermis* and *C. spinosus* (Gilchrist), in the genus. Comparison of the characters of *Psychrolutes* and *Cottunculoides*, based on the descriptions by Günther (1861), Jordan and Everman (1896), Jordan and Starks (1904), Barnard (1927) and Smith (1949), indicates that these genera coincide well with each other in the following important characters: head large, body tapering rapidly to slender tail; mouth large, villiform teeth on jaws, none on vomer or palatines; no slit behind the last gill arch; gill membranes broadly joined to isthmus; pseudobranchiae present; skin naked, loose and flabby; spinous and soft dorsal united by and concealed in skin; pelvic short, with 3 rays. Among the genus *Cottunculoides*, *C. inermis* has no character which clearly separates it from *Psychrolutes*, and should be included in *Psychrolutes*. Another species, *C. spinosus*, the type species of the genus *Cottunculoides*, can-

not be placed in *Psychrolutes* because of having spinous projections on the head.

Moreover, so far as our specimens are concerned, *C. inermis* shows a close resemblance to *P. phricus* in the following characters: dorsal spines (VIII in the former, VII~IX in the latter), anal fin rays (13~14, 12~14), principal caudal rays (13~14, 13), gill rakers on first arch (6~11, 9~13), vertebrae (34, 33~35), and many proportional measurements. In spite of these affinities, these two species are clearly distinguished from each other in the following points: soft dorsal rays (17 in *C. inermis*, 19~20 in *P. phricus*), pectoral fin rays (20~21, 22~26), lateral line (entirely obsolete, developed), and color of peritoneum (black, pale).

#### Key to the species of *Psychrolutes*

- A<sub>1</sub> Head small (standard length/head length > 3). Shore fish ..... *P. paradoxus*
- A<sub>2</sub> Head large (standard length/head length < 3). Deep-sea fishes.
  - B<sub>1</sub> Soft dorsal rays 17~18. Lateral line obsolete. Peritoneum black ..... *P. inermis*
  - B<sub>2</sub> Soft dorsal rays 19~20. Lateral line developed. Peritoneum pale ..... *P. phricus*

In addition, Nelson (1977) studied the genus *Neophrynichthys* Günther, 1876, and suggested that *C. inermis* bears a strong affinity to *Neophrynichthys marcidus* McCulloch, 1926, which will almost certainly have to be placed in *Psychrolutes*.

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- (KS: Faculty of Fisheries, Mie University, Edobashi, Tsu 514, Japan; SK: Fisheries Research Laboratory, Mie University, Wagu, Shima-cho, Shima-gun, Mie-ken 517-07, Japan)
- 三重県沖の深海より得られた日本初記録のクマノカジカ (新称)
- 鈴木 清・木村清志
- 三重県沖で行われた深海カゴ網の試験操業によって漁獲された標本の中から5個体の *Psychrolutes inermis* (Vaillant) が得られた。これは本邦初記録で、和名としてクマノカジカを提唱する。本種は従来 *Cottunculooides inermis* として記載されていたが、近縁と思われるウラナイカジカや *Psychrolutes phricus* Stein et Bond の記載と比較した結果、ウラナイカジカ属 *Psychrolutes* に帰属させるべきであるとの結論に達した。本種は背鰭条数 (VII~VIII, 17~18)、胸鰭条数 (20~21) および側線が完全に退化していることなどにより近縁種と区別される。
- (鈴木: 514 津市江戸橋 2-80 三重大学水産学部; 木村: 517-07 三重県志摩郡志摩町和具 4190-172 三重大学水産学部附属水産実験所)