

A New Gobiid Fish of the Genus *Clariger* from Mutsu Bay, Northern Japan

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Abstract A new species of the genus *Clariger* was described on the basis of thirty-two specimens collected from the subtidal zone of Mutsu Bay, Aomori Pref. This species is distinguishable from other congeners in the following: body naked; a series of large white patches on the back, one on the nape passing through the pectoral fin base and axil part; fin rays of both the second dorsal and anal fins, I, 12–14; vertebrae, 34–35; a single free filamentous ray on the upper lobe of pectoral fin. A new key to all the known species of the genus *Clariger* is prepared.

Thirty-two undescribed specimens of the genus *Clariger* were collected from the rocky shore of Moura, near the Office of Aquaculture Center of Aomori Pref., Mutsu Bay. They were found under the boulders and rocks deposited in shallow subtidal zones, but not in intertidal zones where *Clariger cosmurus* was very common.

As regards the classification of the genus *Clariger* Jordan et Snyder, 1901, systematic relationships between the genera *Clariger* and *Astrabe* Jordan et Snyder, 1901, have not been established. Jordan and Snyder (1901) distinguished the genus *Clariger* from the genus *Astrabe* by the body form like *Luciogobius*, the skin with a few cycloid scales on the tail, and a few barbels below the eye. In 1911, Snyder described *C. exilis*, which has a rather heavy squamation on the posterior part of body, as a member of *Clariger*. This suggests that the character of squamation lost its validity in the differentiation between *Clariger* and *Astrabe*. Thereafter, Japanese ichthyologists treated the genera *Clariger* and *Astrabe* in various ways: Tomiyama (1936) synonymized *Clariger* with *Astrabe*; Matsubara (1955) included *C. exilis* in *Astrabe* by the heavy squamation; Akihito et al. (1984) admitted two genera as Jordan and Snyder (1901) and Snyder (1911) did.

However, the genus *Clariger* is distinguished from *Astrabe* by the following: only one or two free filamentous rays on the upper part of the pectoral fin (5–6 in *Astrabe*), several well developed barbels below the eye (except *C. sirahamaensis*) and the slender body similar to that of the genus *Luciogobius*.

In the present study, the author followed the

classification of Akihito et al. (1984) and prepared a new key to all the known species of *Clariger*.

Materials and methods

Comparative materials. *Astrabe fasciata*: NSMT-P 44535, holotype, 48.0 mm SL; NSMT-P 44536, paratype, 27.2 mm SL, both from Tappi, Minmaya, Aomori Pref., Sep. 19, 1982.

Clariger papillosus: ACAP 4881–4884, 24.3–30.3 mm SL, Kami-utetsu, Minmaya, Aomori Pref., July 17, 1982; ACAP 5010–5014, 23.3–32.0 mm SL, Narukami, Minmaya, July 31, 1982; ACAP 5087, 5089–5099, 5101, 5103–5106, 5108, 5109, 5112–5114, 22 specimens, 20.0–32.0 mm SL, Kami-utetsu, Minmaya, Aug. 1, 1982; ACAP 5587, 5588, 29.7, 31.0 mm SL, Tappi, Minmaya, Nov. 6, 1982.

Clariger cosmurus: ACAP 6106, 6107, 23.8, 29.3 mm SL, Moura, Aug. 20, 1985; ACAP 6118–6120, 6122–6127, 9 specimens, 25.0–38.2 mm SL, Moura, Aug. 25, 1985; ACAP 6131, 36.6 mm SL, Moura, Aug. 31, 1985; ACAP 6187–6204, 18 specimens, 24.3–37.0 mm SL, Kotategami, Nomo, near Nagasaki, Apr. 27, 1986; ACAP 6205–6207, 33.9–36.0 mm SL, Tanokojima I., Nomo, Apr. 26, 1986.

Clariger exilis: USNM 68242, holotype, 27.0 mm SL, Tanegashima I., Kagoshima Pref., Albatross Expedition of 1906; USNM 74583, paratypes, 6 specimens, 16.8–29.5 mm SL, collected with the holotype; SU 21428, paratypes, 3 specimens, 20.3–28.0 mm SL, collected with the holotype; FNU 100100–100118, 19 specimens, 26.7–35.0 mm SL, Tanokojima I., Nomo, Mar. 17, 1972; FNU 100119–100136, 18 specimens, 19.8–34.4 mm SL, Akase, Nomo, Oct. 7, 1971; FNU 100137, 100138, Ohtategami, Nomo, Jan. 19, 1972; ACAP 6173–6186, 14 specimens, 30.7–34.0 mm SL, Tanokojima I., Nomo, Apr. 26–27, 1986.

Abbreviations of depositories of specimens ex-

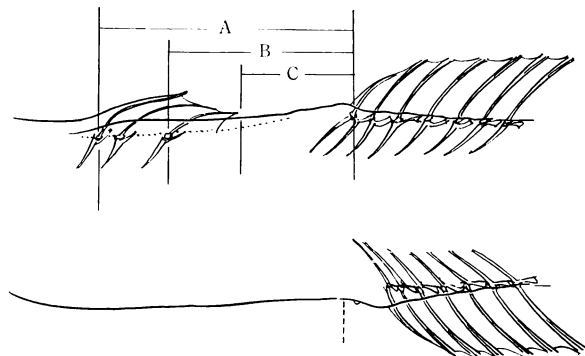


Fig. 1. Schematic drawing for measurements of the distances of two dorsal fins. A, distance from the 1st spine base of the 1st dorsal fin to the spine base of the 2nd dorsal fin; B, distance from the 3rd spine base of the 1st dorsal fin to the spine base of the 2nd dorsal fin; C, distance from the tip of the last spine of the depressed 1st dorsal fin to the origin of the 2nd dorsal fin.

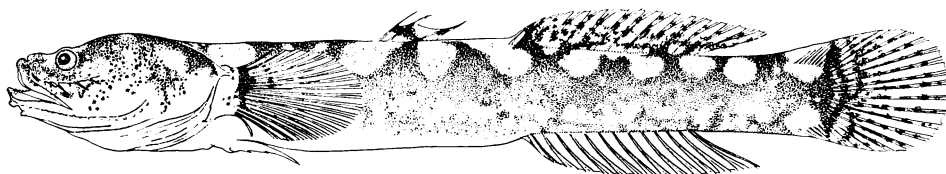


Fig. 2. Holotype of *Clariger chionomaculatus* sp. nov., NSMT-P 44537, 42.6 mm SL, female, collected from Moura, Mutsu Bay, Aomori Pref., Aug. 20, 1985.

amined are as follows: ACAP (Aquaculture Center, Aomori Pref.), FNU (Faculty of Fisheries, Nagasaki Univ.), NSMT (National Science Museum, Tokyo), SU (Stanford University Collection in CAS (California Academy of Sciences)), USNM (United States National Museum).

Rays of unpaired fins and vertebrae including the urostyle were counted on radiographs.

Distance in two dorsal fins were measured in three ways: A) distance from the 1st spine base of the 1st dorsal fin to the spine base of the 2nd dorsal fin, B) distance from the 3rd spine base of the 1st dorsal fin to the spine base of the 2nd dorsal fin, and C) distance from the tip of the last spine of the depressed 1st dorsal fin to the origin of the 2nd dorsal fin (Fig. 1). Measuring method follows Hubbs and Lagler (1949) unless otherwise stated.

Clariger chionomaculatus sp. nov.

(New Japanese name: Awayuki-sejiro-haze)

(Figs. 2, 3; Tables 1, 2)

Holotype. NSMT-P 44537, 42.6 mm SL, 50.7 mm TL, female, collected from the shallow rocky shore of Moura, Hiranai-machi, Aomori Pref., Mutsu Bay (40°56'N, 140°52'E), Aug. 20, 1985.

Paratypes. NSMT-P 44538–44542 (44539, cleared and stained), 5 specimens, 33.1–46.3 mm SL, collected with the holotype; NSMT-P 44543–44559, 17 specimens, 27.3–38.7 mm SL, collected near the locality of the holotype, Aug. 11, 1986; FNU 100200–100208, 9 specimens, 31.3–41.7 mm SL, collected near the locality of the holotype, Aug. 11, 1986.

Diagnosis. Broad white bands on the back; one on the nape, passing through base of the pectoral fin and axil part. The ground color of the back and dorso-lateral body chocolate brown. Only one filamentous ray on upper lobe of the pectoral fin. Body naked. Rays of the 2nd dorsal and anal fins, I, 12–14. The interval of

Table 1. Measurements and counts of the holotype and 31 paratypes of *Clariger chionomaculatus* sp. nov. * See the text and Fig. 1.

Cat. No.	Holotype			Paratypes				FNU 100200-100206; NSMT-P 44538-44540, 44545-44559 (33.3-48.0)
	NSMT-P 44537 female 42.6 (50.7)	NSMT-P 44541 female 46.3 (54.3)	FNU 100200 male 41.7 (50.0)	NSMT-P 44543 male 38.7 (47.3)	NSMT-P 44544 female 37.3 (44.0)	FNU 100207 female 33.3 (40.4)	FNU 100208 male 31.3 (38.3)	
Sex	female	female	male	male	female	female	male	
SL (TL) in mm	42.6 (50.7)	46.3 (54.3)	41.7 (50.0)	38.7 (47.3)	37.3 (44.0)	33.3 (40.4)	31.3 (38.3)	27.3-40.1 (33.3-48.0)
Measurements:								
In SL								
Head length	4.0	4.0	3.7	4.0	4.1	4.0	3.9	3.7-4.3
Body depth	7.3	8.4	7.6	7.9	7.8	6.9	6.8	6.7-8.6
Body depth at anal origin	7.7	8.4	8.0	9.7	10.7	9.5	8.7	6.8-10.8
Preal anal length	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6-1.7
Second dorsal fin base length	4.2	4.2	4.2	4.0	4.6	4.1	4.1	3.9-4.4
Anal fin base length	4.7	4.7	4.7	4.5	4.8	4.5	4.6	4.3-5.0
In HL								
Snout length	5.9	5.6	5.7	4.9	5.0	5.2	5.3	4.4-5.5
Eye diameter	8.9	9.8	10.3	9.7	8.2	8.3	8.0	7.3-10.3
Interorbital width	4.9	4.7	5.7	5.7	5.0	5.5	5.0	4.7-7.1
Head width	1.3	1.5	1.3	1.4	1.4	1.5	1.4	1.3-1.7
Pectoral fin length	1.7	1.7	1.7	1.5	1.5	1.7	1.6	1.3-1.7
Pelvic fin length	2.8	2.3	2.5	2.3	2.4	2.4	2.2	2.0-2.9
Caudal fin length	1.6	1.5	1.5	1.3	1.3	1.4	1.3	1.2-1.5
Caudal peduncle length	1.7	1.7	1.7	1.6	1.7	1.7	1.7	1.3-1.8
Caudal peduncle depth	2.5	2.8	2.7	2.7	2.8	2.6	2.5	2.4-2.9
In body depth at anal origin								
Distance in two dorsal fins (A)*	0.8	0.7	0.9	0.7	0.6	0.6	0.8	0.6-0.9
Distance in two dorsal fins (B)*	1.1	1.0	1.3	1.0	0.9	0.9	1.1	0.9-1.3
Distance in two dorsal fins (C)*	1.7	1.6	2.1	1.8	1.4	1.4	1.9	1.3-1.8
Counts:								
Dorsal fin rays	III-I, 13	III-I, 13	III-I, 13	III-I, 14	III-I, 12	III-I, 13	III-I, 13	III-I, 12-14
Anal fin rays	I, 13	I, 13	I, 13	I, 14	I, 13	I, 13	I, 13	I, 12-14
Pectoral fin rays (right)	20	20	20	20	19	20	20	19-20
Vertebrae	15+19=34	15+20=35	15+19=34	15+20=35	15+19=34	15+19=34	15+20=35	15+19-20 =34-35
Barbels below eye (left/right)	4/4	7/6	6/7	7/5	4/5	3/6	5/6	0-7

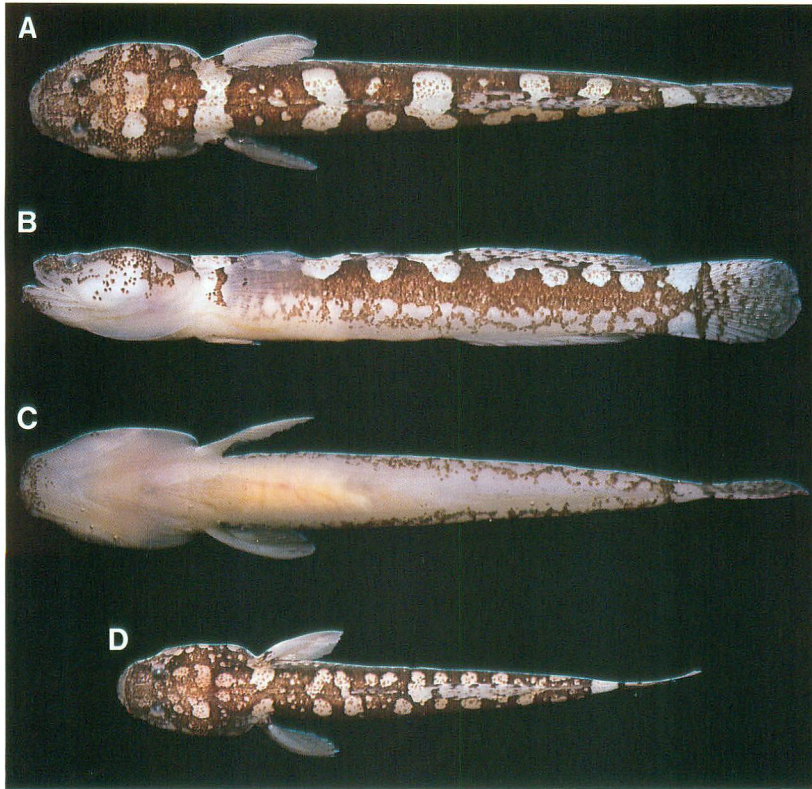


Fig. 3. Coloration of fresh specimens of *Clariger chionomaculatus* sp. nov. A-C, holotype, NSMT-P 44537, 42.6 mm SL, female; D, paratype, NSMT-P 44539, 34.3 mm SL, female.

dorsal fins short, 1.3–2.1 in body depth at anal origin.

Description. D III-I, 13 (12–14); A I, 13 (12–14); P₁ 1+18+1=20 (0–1+17–19+0–1=19–20); P₂ I, 5; V 15+19=34 (15+19–20=34–35).

Proportional measurements and counts are shown in Tables 1 and 2. Other morphological characters are as follows. Body naked. Body cylindrical anteriorly, compressed posteriorly. Head large and moderately depressed, broad at cheeks, wider than the body. Eyes small, situating dorso-laterally. Below the eye, a prominent infraorbital dermal ridge, with 4 (0–7) slender barbels. Nostrils two on each side, anterior one tube-like, posterior one with low dermal rim. On dorsal snout, a pair of longitudinal dermal ridges. At the symphysis, a pair of short and broad dermal processes. Below nostrils, a small dermal process with an ill-developed posterior dermal ridge. Mouth cleft large, posterior end of upper jaw extending up to posterior margin of iris. Lower jaw a little longer than the upper. Teeth on both

jaws conical, in narrow bands anteriorly, outer ones larger. Tongue deeply notched. Gill slit restricted laterally and its lower end exceeding lower pectoral fin base. Interorbital flat, wider than eye diameter. Pectoral fin moderate in size, fan-like, uppermost and lowest rays short and free filamentous with very minute setae. Pelvic rays forming a circular sucker with well developed velum. Posterior part of rays, somewhat disformed in the holotype. Distance between the base of the last spine of the 1st dorsal fin and the base of the spine of the 2nd dorsal fin subequal to body depth, 1.1 (0.9–1.3) in body depth at anal origin; interval of dorsal fins short, 1.7 (1.3–2.1) in body depth at anal origin. The origin of the 2nd dorsal fin a little before the anal fin origin and its base longer than the anal fin base. Pterygiophore of the 1st spine of the 1st dorsal fin overlaying 8th (8–9) neural spine of vertebra, and that of the 2nd dorsal fin, 14th (14–15). Anal fin origin located far behind the midpoint of body, preanal length 1.6 (1.6–1.7) in SL. Caudal peduncle

slender, its length 1.7 (1.3–1.8) in HL. Caudal fin rounded. Numerous pit organs on head, its arrangement similar to that of *C. cosmurus* and *C. papillosus* (Akihito et al., 1984: 269, figs. 194, 195).

Color of fresh specimens. Body ground color chocolate brown, with numerous white bands and patches on the back; 6 bands in the holotype, varying from 5 to 10 in the paratypes, arranged irregularly. The first band on nape forming complete band and rarely interrupted on the back, penetrating into the base of pectoral fin base and axil part. Other bands and patches only extending down dorsal edge of body. Numerous white patches less than eye diameter or larger than twice of eye diameter, scattered densely on the back of head and abdominal trunk. The tone of the back ground color, same as that of dorso-lateral body color, rarely lighter. Pectoral fin base a little margined. Upper and lower parts of posterior caudal peduncle adorned with large and equal sized white bands. On lower part of body, numerous small white patches arranging in cloud; cloudy area high anteriorly but gradually decreasing posteriorly. Ventral side largely colorless, but chin vaguely spotted. Pectoral fin colorless; dorsal fins irregularly crossbarred; caudal fin also crossbarred, but sparsely in posterior; base of caudal fin thick brown; ventral and anal fins colorless. No bars below eye. Latero-ventral side of head, largely colorless. Cheek and part below infraorbital dermal ridge spotted or forming several rounded white spots.

Locality. Only two localities along the rounded

pebble and rock deposit coast at Moura, Hiranai-machi, Mutsu Bay. This species does not intrude into the intertidal zone and is collected only from the shallow subtidal zone, 0.5 to 1.5 meter deep. It inhabits under stones.

Etymology. The species is named *chionomaculatus* (Greek *chion* meaning snow, Latin *maculatus* mottled) with reference to the white patches on the back.

Remarks. The holotype of *Clariger sirahamaensis* deposited in the Zoological Laboratory, Imperial Fisheries Institute, Tokyo is now missing due to the confusion after the 2nd World War. No additional specimens have been collected.

Key to the species of the genus *Clariger*

- 1a. Well developed barbels below eye..... 2
- 1b. No barbels below eye; body naked; D III-I, 8, A I, 8.....*C. sirahamaensis*
- 2a. Only one slender filamentous ray on upper lobe of pectoral fin; body naked; distance in two dorsal fins (C) fairly less than body depth at anal origin; D III-I, 12–14, A I, 12–14.....*C. chionomaculatus* sp. nov.
- 2b. Two well developed filamentous rays on upper lobe of pectoral fin; body partly scaled or naked 3
- 3a. Scales in many rows on caudal peduncle, extending over the anus; distance in two dorsals (C) a little longer than body depth at anal origin; D III-I, 9–11, A I, 10–11*C. exilis*
- 3b. A series of few scales in one row or absent

Table 2. Fin rays, vertebrae and some meristic counts of type specimens of *Clariger chionomaculatus* sp. nov.

Second dorsal fin rays			Anal fin rays			Pectoral fin rays		Filamentous free rays of pectoral fin				Vertebrae		
12	13	14	12	13	14	19	20	Upper		Lower		AV	CV	
2	27	3	5	23	4	8	24	0	1	0	1	15	19	20
								2	31	10	22	32	19	13
Pterygiophore overlaying neural process of vertebra				Barbels below eye										
1st spine of 1st dorsal fin		Spine of 2nd dorsal fin		0	1	2	3	4	5	6	7			
8th	9th	14th	15th	1	0	0	6	13	22	19	3			
28	1	28	1											

in midline of caudal peduncle; distance in two dorsal fins (C) a little shorter than body depth at anal origin; D III-I, 10-12, A I, 10-12.....*C. cosmurus*

- 3c. A row of small scales along midline of body, beginning from just behind pectoral fin base to in front of the anus; distance in two dorsal fins (C) very short, shorter than one half of body depth at anal origin; several barbels on snout and chin; D III-I, 12-14, A I, 10-12 *C. papillosus*

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Literature cited

Akihito, Prince, M. Hayashi, T. Yoshino, K. Shimada, H. Senou and T. Yamamoto. 1984. Suborder Gobioidi. Pages 236-289, pls. 235-258, 353-355 in H. Masuda, K. Amaoka, C. Araga, T. Uyeno and T. Yoshino, eds. The fishes of Japanese Archipelago. English text and plates. Tokai Univ. Press, Tokyo, xx+448 pp., 370 pls.

Hubbs, C. L. and K. F. Lagler. 1949. Fishes of the Great Lakes region. Bull. Cranbrook Inst. Sci., 26, xi+186 pp.

Jordan, D. S. and J. O. Snyder. 1901. A review of the gobioid fishes of Japan with descriptions of twenty-one new species. Proc. U. S. Natn. Mus., 24(1244): 33-132.

Matsubara, K. 1955. Fish morphology and hierarchy, pt. 2. Ishizaki Shoten, Tokyo, pp. i-v+791-1605. (In Japanese.)

Snyder, J. O. 1911. Descriptions of new genera and species of fishes from Japan and the Riu Kiu Islands. Proc. U. S. Natn. Mus., 40 (1836): 525-549.

Tomiyama, I. 1936. Gobiidae of Japan. Japan. J. Zool., 7(1): 37-112.

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陸奥湾から得られたセジロハゼ属魚類の1新種

塩垣 優

青森県陸奥湾に面する平内町茂浦の潮下帯(水深0.5-1.5 m)の石下より採集された32個体の標本に基づき、新種アワユキセジロハゼ *Clariger chionomaculatus* を記載した。本種は同属の他種とは以下の点で容易に識別される: 体背面に多くの幅広い白色鞍状斑を有しており、このうち項部のは胸鱗基底および同腹部の白色斑と連なり、目立った斑紋をなす; 体背面の地色は体側背部と同色調のチョコレート色を呈する; 胸鱗上部の遊離条は1本; 体は無鱗; 第2背鱗、臀鱗の条数はそれぞれ1, 12-14と多い; 両背鱗間隔長(押し倒した第1背鱗第3棘条後端と第2背鱗棘条基部間)は短かく、臀鱗起部の体高よりもかなり短い。さらに、セジロハゼ属魚類に対する新たな検索表を提示した。

(039-34 青森県東津軽郡平内町茂浦 青森県水産増殖センター)