

# First Record of the Gobiid fish, *Clariger chionomaculatus* (Perciformes: Gobiidae) from off Geojedo Island, Korea

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**ABSTRACT** A single specimen (40.5 mm in SL) of *Clariger chionomaculatus* was collected at 4 m depth on mud bottom from off Geojedo Island, Korea. This species is characterized by having an elongated body without scales, several barbels below eyes, I, 12~15 second dorsal fin rays, I, 12~14 anal fin rays; 19~20 pectoral fin rays with one free soft ray on upper part, and a unique color pattern with numerous white blotches on dorsal part of body. Because it has been known from Japan only to date, we describe in detail *C. chionomaculatus* as the first record from Korea. A new Korean name, "Huin-jeom-wae-mang-dug", is proposed for the species.

**Key words:** Gobiidae, *Clariger chionomaculatus*, first record, Geojedo Island, Korea

## INTRODUCTION

The gobiid genus *Clariger* Jordan and Snyder, 1901, is characterized by the following combination of characters: an elongated body; broad and flattened head; three slender spines on the first dorsal fin; one or two free filamentous rays on the upper part of pectoral fin; a few barbels below the eyes except for *C. sirahamaensis* (Jordan and Snyder, 1901; Shiogaki, 1988; Jang-Liaw *et al.*, 2012). The genus comprises currently six valid species, i.e., *C. cosmurus* Jordan and Snyder 1901, *C. exilis* Snyder, 1911, *C. sirahamaensis* Sakamoto, 1932, *C. papillosus* Ebina, 1935, *C. chionomaculatus* Shiogaki, 1988, *C. taiwanensis* Jang-Liaw, Gong and Chen, 2012, and most of them usually inhabit in the rocky intertidal or subtidal zones with gravels and stones of the Northwest Pacific including Japan, Korea, and Taiwan (Jang-Liaw *et al.*, 2012; Akihito *et al.*, 2013; Choi and Cho, 2013). In Korean waters, no additional *Clariger* species has been discovered to date, since *C. cosmurus* was recorded from the Southern coast of Korea (Choi and Cho, 2013).

Surveying on the benthic fauna of subtidal zone in the

Hallyeohaesang National Park of Korea, a single specimen of *Clariger chionomaculatus* was accidentally caught on the gravelly mud bottom off Southern coasts of Korea. So far, the species has been known from the rocky subtidal zone of Japanese waters only (Shiogaki, 1988; Akihito *et al.*, 2013). Therefore, we report *C. chionomaculatus* as the first record and the second species of *Clariger* from Korea in this study.

## MATERIALS AND METHODS

The specimen was collected by a Van Veen grab (0.025 m<sup>2</sup>) sampling from operating *Kuklipgongwon-yeongu 1* (R/V) on 11 October 2016, and deposited in Marine Research Center, Korea National Park Service (KNPS). Morphometric and meristic methods generally followed Akihito *et al.* (1984) and Hubbs and Lagler (2004) except for body depth was taken vertically at the origin of the pelvic fin and, body width was measured at the origin of both pectoral fins. Counts of the dorsal and anal fin rays, and vertebrae were determined from radiograph (Softex VIX-100, Japan). The formula for the relation between the pterygiophores of the dorsal fin and vertebrae followed those of Akihito *et al.* (1984). The cephalic sensory canal sys-

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Fig. 1. Dorsal (A), lateral (B), and ventral (C) views of *Clariger chionomaculatus*, KNPS-P766, 40.5 mm SL, from Geojedo Island, Korea.

tem was observed by stained cyanine blue (Akihito *et al.*, 2013). Terminology of cephalic sensory papillae followed Wongrat and Miller (1991).

## SYSTEMATIC ACCOUNTS

### *Clariger chionomaculatus* Shiogaki, 1988

(New Korean name: Huin-jeom-wae-mang-dug)

(Figs. 1~2; Table 1)

*Clariger chionomaculatus* Shiogaki, 1988: 127 (type locality: Mutsu Bay of Japan); Akihito *et al.*, 2013: 1380 (Japan).

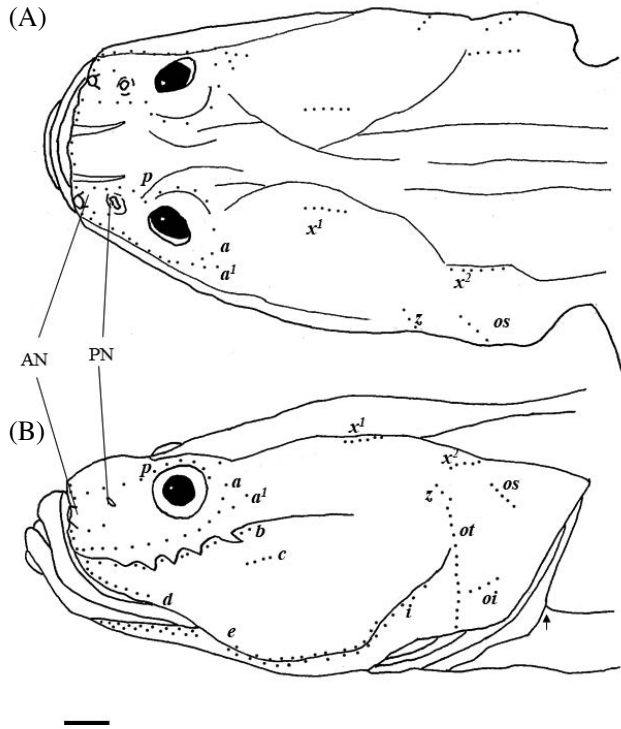
**Material examined.** KNPS-P766, 40.5 mm in standard length (SL), 11 October 2016, Nambu-myeon, Geoje-si, Gyeongsangnam-do, Korea (34°44'41.68"N, 128°40'0.73"E), Van Veen grab sampler (0.025 m<sup>2</sup>), 4 m depth, collected by Sang-Ho Shin.

**Diagnosis.** Body naked; several well developed barbels below eyes; numerous broad white blotches on dorsal part of body; I, 12~15 second dorsal fin rays; I, 12~14 anal fin rays; 19~20 pectoral fin rays with only one filament ray on its upper part.

**Description.** Comparison of meristic counts are given in Table 1. Dorsal fin rays III-I, 15; anal fin rays I, 14; pectoral fin rays 20 with one free ray, respectively on upper and lower parts; pelvic fin rays, I, 5, forming sucking disk; dorsal pterygiophore formula, P-V 7/111000/13; vertebrae (AV + CV) 15 + 20 = 35. Measurements in % SL: head length (HL) 26.7; body depth 11.6; body width 10.4; predorsal length 43.2; preanal length 56.5; second dorsal fin base 28.6; anal fin base 26.2; longest pectoral fin ray (ninth) 16.0; longest second dorsal fin ray (ninth) 4.9; longest anal fin ray (11th) 4.2; length of caudal peduncle 13.6; depth of caudal peduncle 9.9. Measurements in % HL: snout length 21.3; eye diameter 12.0; interorbital width 18.5.

Body elongate; cylindrical anteriorly and somewhat compressed posteriorly. Head moderately large and depressed; its width wider than body width. Eyes small, located on dorso-lateral part of head. Interorbital region flat, its width 1.5 in eye diameter. Snout relatively short. Mouth superior and oblique; posterior tip of upper jaw extending to vertical at posterior margin of eye. Teeth on both jaws with one outer row and three to four rows conical teeth arranged irregularly; outer row teeth on both jaws larger than those of inner rows. Tongue deeply notched. Anterior nostril short tube and posterior nostril simple opening.

Gill opening narrow, vertically extending to lower edge of pectoral fin. Infraorbital dermal ridge running from tip of snout to cheek with four short barbels (Fig. 2). Dorsal fin two, not united by membrane; first dorsal fin spines extremely short. Origin of second dorsal fin inserted slightly anterior to that of anal fin. Pectoral fin rounded; its hind



**Fig. 2.** Dorsal (A) and lateral (B) views of the cephalic sensory system in *Clariger chionomaculatus*, KNPS-P766, 40.5 mm SL. AN and PN, anterior and posterior nasal pores, respectively; *a*, *a'*, *b*, *c*, *d*, *e*, *p*, *i*, *x*<sup>1</sup>, *x*<sup>2</sup>, *z*, *oi*, *os*, and *ot* sensory papillae rows. The arrow shows position where the gill membranes are attached to the isthmus and bar indicates 1 mm.

margin extending to vertically anterior origin of first dorsal fin; one free ray, respectively on upper and lower margins. Pelvic fin sucking disk with connection membrane. Caudal fin slightly oblong and posterior margin rounded. No scales on head and body.

**Cephalic sensory system.** Sensory canal and pore absent. Sensory papillae present on head (Fig. 2); row *a* long, longitudinally extending from snout to posterior orbit; row *a'* short, anteriorly reaching row *a*; row *b* long, longitudinally extending from snout along the base of dermal ridge under eye; row *c* short and below row *b*; row *d* extending from snout along upper lip to vertically anterior orbit; longitudinal row *e* and *i*, extending along the cheek to the ventro-lateral surface of lower jaw; transverse row *oi* and longitudinal *ot* on anterior part of opercle slightly separated; longitudinal row *os* short and well separated from row *ot*; row *p* surrounding orbit on interorbital region; two longitudinal row (*x*<sup>1</sup>, *x*<sup>2</sup>) and transversal row *z* on oculoscapular.

**Coloration in preservative.** Ground color of head and body dark brown dorsally; yellowish-white ventrally and irregularly scattered small dark brown spots laterally. Dorsal side of head with yellowish-white marking; six yellowish-white saddle-like blotches on dorsal part of body extending from nape to posterior part of second dorsal fin base; anteriorly three and posteriormost blotches broad and distinct; middle two blotches irregularly-shaped. All fins yellowish-white; first dorsal fin with dark brownish band on anterior part; pectoral fin with narrow, dark brown band basally; dark brown dots scattered on second dorsal fin and middle of caudal fin; distinct and broad dark brown blotch on caudal fin base.

**Ecological notes.** The present specimen was collected on mud substrate with numerous gravels, small rocks, and shells about 4 m depth from the subtidal zone at high tide.

**Table 1.** Comparison of diagnostic characters between *Clariger chionomaculatus* and *C. cosmurus*

	<i>Clariger chionomaculatus</i>		<i>Clariger cosmurus</i>	
	Present study	Shiogaki (1988)*	Jordan and Snyder (1901)*	Choi and Cho (2013)
Standard length (mm)	40.5 (n = 1)	27.3~46.3 (n = 32)	37 (n = 1)	24.6~37.3 (n = 4)
Dorsal fin rays	III-I, 15	III-I, 12~14	III, 12	III-I, 12
Anal fin rays	I, 14	I, 12~14	12	I, 10~11
Pectoral fin rays	20	19~20	18	18
Free rays on pectoral fin	1(upper)	1(upper)	–	2(upper)
Pelvic fin rays	I, 5	I, 5	–	I, 5
Vertebrae	15 + 20 = 35	15 + 19~20 = 34~35	–	14~15 + 19~20 = 33~34
Color pattern on dorsal part of body	White blotches	White blotches	White band	White band

\*original description

**Distribution.** Known from Geojedo Island southern coastal waters of Korea; Mutsu Bay of Amori Pref., Otsuchi Bay of Iwate Pref., Miyazaki Pref., Hiroshima Pref., Japan (Shiogaki, 1988; Akihito *et al.*, 2013; Yoshigou and Yoshigou, 2016).

**Remarks.** The present specimen collected from Geojedo Island belongs to the genus *Clariger* in having its cylindrical and elongated body, three spined first dorsal fin, and one free ray on upper margin of pectoral fin, and the first dorsal pterygiophore inserted between the neural spines of seventh and eighth vertebrae (Akihito *et al.*, 1984, 2013; Shiogaki, 1988; Jordan and Snyder, 1901). In addition, it agrees well with the diagnostic characters of *Clariger chionomaculatus* presented by Shiogaki (1988), and was identified as this species, especially in having six saddle-like white blotches on dorsal part of body, four barbels below eye, III-I, 15 dorsal fin rays, I, 14 anal fin rays, and 20 pectoral fin rays with one free ray on its upper part (Table 1). There is a slight difference with the number of second dorsal fin rays between the original description given by Shiogaki (1988) and present specimen (12~14 in original description vs. 15 in Korean specimen). It may be regarded as a geographical or intraspecific variation, because there could not be found out the remarkable difference between them in the other characters. The further examination is needed as to number of dorsal fin.

In Korean waters, *Clariger chionomaculatus* is similar to *C. cosmurus* in having an infraorbital dermal ridge with several barbels on cheek, arrangement of cephalic sensory papillae, and overall coloration pattern on lateral and ventral body (Akihito *et al.*, 1984). However, the former can be easily distinguished from the latter by higher second dorsal and anal fin rays (12~15, 12~14, respectively, in former vs. 10~11, 10 in latter), lower free rays on upper part of pectoral fin (1 vs. 2), and coloration pattern on the back of body (numerous white blotched vs. white banded) (Fig. 1; Table 1).

A new Korean name, “Huin-jeom-wae-mang-dug”, meaning the having “white spot” (= huin-jeom) in the genus *Clariger* (= wae-mang-dug) is proposed for *C. chionomaculatus*.

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# 우리나라 거제도 연안에서 채집된 망둑어과 첫기록종, *Clariger chionomaculatus*

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**요 약** : 우리나라 거제도 연안 수심 4m 진흙바닥에서 *Clariger chionomaculatus* 1개체(체장 40.5 mm)를 채집하였다. 본 종의 특징은 가늘고 긴 체형에 비늘이 없고, 눈 아래에 수염이 있으며, 제2등지느러미 기조수가 I, 12~15, 뒷지느러미 기조수는 I, 12~14, 가슴지느러미 상부에 1개의 유리연조, 등 쪽에 다수의 흰색 반점들이 있는 채색패턴을 갖는 점이다. 본 종은 지금까지 일본에서만 보고된 종으로 우리나라에서는 거제도 연안에서 처음 출현하였다. 본종의 신한국명으로 '흰점왜망둑'을 제안한다.

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**찾아보기 낱말** : 망둑어과, 흰점왜망둑, 첫기록, 거제도, 한국