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New Record of a Bothid, *Kamoharaia megastoma* (Pleuronectiformes), in Southern Jejudo Island, Korea

*By Seo-Ha Jang, Jin-Koo Kim[1], Yusim Heo[2], Hyo Jae Yu[1] and Jeong-Ho Park**

Fisheries Resource Research Division, National Institute of Fisheries Science (NIFS), Busan 46083, Republic of Korea
[1]Department of Marine Biology, Pukyong National University, Busan 48513, Republic of Korea
[2]Fisheries Resources Research Center, National Institute of Fisheries Science (NIFS), Tongyeong 53064, Republic of Korea

ABSTRACT A single bothid specimen (113.9 mm in standard length) was collected by bottom trawl from southern Jejudo Island, Korea. It was easily identified as *Kamoharaia megastoma* (Kamohara, 1936), based on extremely large mouth. The species is characterized by maxillary extending beyond eyes, three pairs of long curved canines on lower jaw, tip of vomer projecting into mouth cavity, blackish pectoral fin, and blind side without lateral line. We described it as the first record to Korean fish fauna, and proposed the new Korean name, "Keun-ip-dung-geul-neop-chi" for this species.

Key words: Bothidae, *Kamoharaia*, *Kamoharaia megastoma*, new Korean record, Jejudo Island

INTRODUCTION

The bothid fishes comprise approximately 163 species in 22 genera worldwide (Nelson *et al*., 2016). Among them, 37 species in 15 genera occur in Japan (Nakabo and Doiuchi, 2013) and 11 species in 9 genera distribute in Korea (Kim, 2011; Han *et al*., 2012).

Bothids are morphologically characterized by having pelvic fin base on ocular side longer than it on blind side (Amoaka, 1969; Hensley and Amaoka, 2001). Among genera of this family, the genus *Kamoharaia* comprises a single species, *Kamoharaia megastoma* (Kamohara, 1936), which is distributed in the Indo-West Pacific, including Japan, Taiwan, East and South China Seas, Philippines and north-western Australia (Amaoka, 1982; Hutchins, 2001; Nakabo and Doiuchi, 2013). *K. megastoma* was originally described by Kamohara (1936) as *Chascanopsetta megastoma* on the basis of a single specimen collected from Tosa Bay, Japan. Subsequently, Kuronuma (1940) placed the species in his new mono-typic genus *Kamoharaia*, which differed from *Chascanopsetta* Alcock, 1894 in lacking a lateral line on the blind side (vs. present in *Chascanopsetta*) and having several pairs of enlarged teeth on the anterior tip of the lower jaw (vs. absent in *Chascanopsetta*) (Amaoka, 1969; Nakabo and Doiuchi, 2013).

Recently, we collected a rare bothid specimen during offshore bottom trawl survey in the southern Jejudo Island in Korea. It was identified as *Kamoharaia megastoma* (Kamohara, 1936), based on extremely large mouth. We describe its morphological characteristics and newly added it to the Korean fish fauna.

MATERIALS AND METHODS

A single specimen of *K. megastoma* was collected by bottom trawl survey conducted by the National Institute of Fisheries Science (NIFS) in the southern Jejudo Island, Korea in 19 October 2016. This specimen was fixed in 10% formalin and preserved in 70% ethanol. Counts and measurements followed Hubbs and Lagler (2004) with a vernier caliper to the nearest 0.1 mm. The bottom temperature and salinity at the sampling location were measured with CTD (SBE 9, Seabird, USA). This specimen was deposited in the Fisheries Resources Management Division in NIFS, Busan, Korea.

*Corresponding author: Jeong-Ho Park Tel: 82-51-720-2292, Fax: 82-51-720-2277, E-mail: marinebio@korea.kr

RESULTS AND DISCISSION

Genus *Kamoharaia* Kuronuma, 1940

(New Korean name: keun-ip-dung-geul-neop-chi-sok)

Kamoharaia Kuronuma, 1940: 45 (type species: *Chascanopsetta megastoma*)

Description. Body strongly compressed; mouth very large, oblique and front tip of upper jaw strongly protruding beyond tip of snout; large canine teeth on anterior area of lower jaw; short gill rakers present; lateral line on ocular side curved at origin of pectoral fin; no lateral line on blind side.

Remarks. Kamohara (1936) was firstly described *Chascanopsetta megastoma*, subsequently, Kuronuma (1940) placed this species in new genus *Kamoharaia* based on lateral line on blind side and shape of teeth on the lower jaw.

Kamoharaia megastoma (Kamohara, 1936)

(Figs. 1, 2, Table 1)

(New Korean name: Keun-ip-dung-geul-neop-chi)

Chascanopsetta megastoma Kamohara, 1936: 308, fig. 1 (Type locality: Mimase, Kochi Prefecture, Japan).

Kamoharaia megastoma: Kuronuma, 1940: 36, fig. 2 (Japan); Amaoka, 1969: 152, fig. 92 (Japan); Amaoka in Okamura *et al*., 1982: 299, 406 (Japan); Shen *et al*., 1993: 570, fig. 192-2 (Taiwan); Li and Wang, 1995: 221 (China); Hensley and Amaoka, 2001: 3801 (Western Central Pacific); Hoese and Bray, 2006: 1820 (Australia); Ho *et al*., 2009: 11 (Taiwan); Nakabo and Doiuchi in Nakabo, 2013 (Japan); Matsunuma, 2016: 30, fig. 2 (East China Sea).

Material examined. NIFS00003, one specimen, 113.9 mm in standard length (SL), 32°49.16′N, 126°45.11′N →

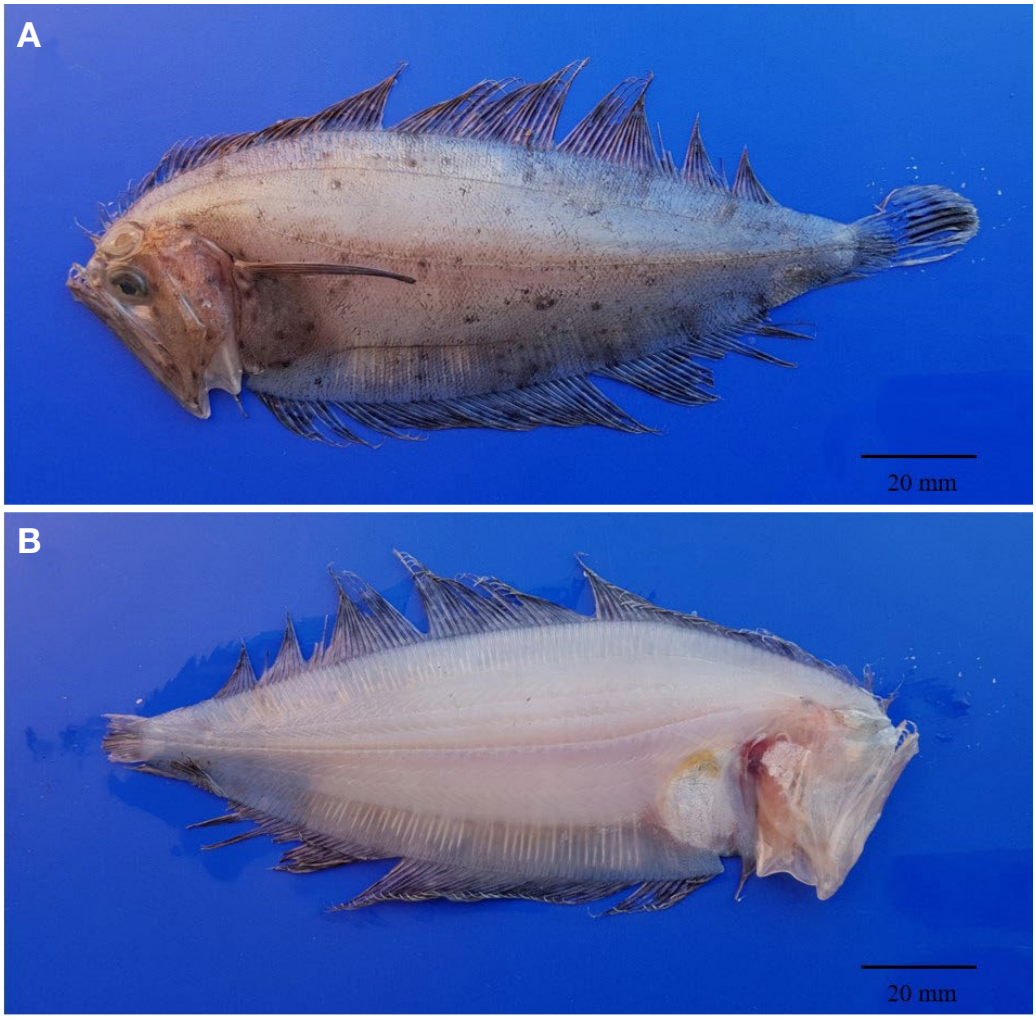

Fig. 1. Fresh specimen of *Kamoharaia megastoma* (Kamohara, 1936), NIFS00003, 113.9 mm SL, southwestern Jejudo Island, Korea (A: ocular, B: blind side). Caudal fin damaged. Bar indicates 20 mm.

Fig. 2. Shape of teeth on both jaws.

32°48.02′N, 126°43.33′N, 16.24°C, 34.37 psu, southern Jejudo Island, 111 m depth, 19 October 2016, R/V Tamgu 21, bottom trawl, collected by Y.S. Heo and H.J. Yu.

Description. Meristic and morphometric characters are shown in Table 1. Body oblong, strongly compressed, and slightly elongated. Body depth highest at posterior end of pectoral fin, more than 1/3 of standard length. Caudal peduncle very narrow, about 1/6 of body depth. Head small, anterior profile with a deep concavity in front of interorbital space. Snout short, pointed. Mouth extremely large; both jaws elongated, anterior tips of jaws projected from dorsal edge of snout. Eyes moderate, close to each other. Nostrils on ocular side closely set in front of interorbital area; anterior nostril tubular, posterior one simple. Nostrils on blind side close to origin of dorsal fin; anterior nostril short and tubular, posterior nostril smaller than anterior one. Small, sharp, and pointed conical teeth in both jaws; three pairs of enlarged teeth on anterior tip of lower jaw, longer than about four times that of adjacent small teeth; three pairs of enlarged teeth on anterior tip of upper jaw, shorter than lower enlarged teeth. Tip of vomer projecting into mouth cavity (Fig. 2). Gill rakers short, not serrate on posterior margin. Scales small and cycloid, covering surface of body and head with the exception of interorbital space and snout. A single lateral line on ocular side, beginning from upper origin of gill opening, curved dorsally above pectoral fin base, and extending onto caudal fin; no lateral line on blind side. Dorsal fin origin above posterior edge of snout; first ray longer than those of anterior portion. Anal fin origin below pectoral fin origin; all rays not branched. Pectoral fins unequal; that on blind side about equal to half that on ocular side, all rays not branched. Pelvic fin small on both sides; its origin on ocular side above posterior end of lower jaw; that on blind side at level of 3rd ray base of ocular side pelvic fin. Caudal fin small, rounded posteriorly.

Coloration of specimen. Ocular side uniformly brown with small dark blotches, as large as eye (Fig. 1); free margin of dorsal and anal fins blackish; pectoral fin dark

Table 1. Comparison of meristic and morphometric characters of *Kamoharaia megastoma* (O, ocular; B, blind side)

	Present study	Kuronuma (1940)*	Matsunuma (2016)
Number of specimens	1	1	2
Standard length (mm)	113.9	214	141.1~155.9
Counts			
Dorsal fin rays	109	110	106~108
Anal fin rays	84	85	83~87
Pectoral fin rays (O)	broken	12	11
Pectoral fin rays (B)	11	11	10~11
Pelvic fin rays (O)	6	–	6
Pelvic fin rays (B)	6	–	6
Lateral line scales (O)	127	133	121~127
Gill rakers	7+9	–	7+8~9
In % of Standard length			
Body depth	36.2	39.7	34.7~37.6
Head length	21.6	18.1	19.7~20.1
Predorsal length	2.0	–	–
Prepectoral length	22.9	–	–
Preanal length	26.3	–	–
Prepelvic length	23.2	–	–
Preanus length	26.9	–	–
Pectoral fin length (O)	23.4	–	–
Pectoral fin length (B)	9.1	–	–
Pelvic fin length (O)	10.1	–	–
Pelvic fin length (B)	9.9	–	–
Dorsal fin length	14.1	–	–
Anal fin length	14.7	–	–
Caudal peduncle depth	5.6	5.8	–
Lateral line curve width	8.6	9.8	–
In % of Head length			
Snout length	14.5	–	–
Upper eye diameter	28.5	–	28.7~31.5
Lower eye diameter	29.3	–	27.5~28.0
Postorbital length	49.6	–	–
Upper jaw length (O)	96.3	–	94.4~96.2
Upper jaw length (B)	97.6	–	96.1~97.4
Lower jaw length (O)	120.3	–	121.7~122.2
Lower jaw length (B)	121.1	–	122.3~122.5
Interorbital width	3.3	–	3.3~3.6

*re-examination of holotype

brown, its posterior half blackish; caudal fin dark brown, its middle portion blackish; blind side pinkish white except dorsal, anal, and caudal fins; pectoral fin on blind side transparent. After fixation, ocular side uniformly pale brown with small dark blotches; pectoral fin black, other fins dusky; middle part of caudal fin blackish; blind side uniformly whitish except dorsal, anal, and caudal fins; pectoral fin on blind side transparent.

Distribution. Jejudo Island, Korea (present study); Japan (Kamohara, 1936; Amaoka, 1969; Amaoka, 1982; Amaoka, 2016); East China Sea (Matsunuma, 2016); Taiwan (Ho *et al*., 2009); South China Sea (Randall and Lim, 2000); Australia (Sainsbury *et al*., 1985, Hoese *et al*., 2006); Western Central Pacific (Hensley and Amaoka, 2001).

Remarks. The present lefteye flounder specimen was easily identified as *K. megastoma* based on extremely large mouth with projecting jaws, three pairs of long curved canines on anterior tip of the lower jaw, tip of vomer projecting, and blind side without lateral line (Kamohara, 1936, 1961; Kuronuma, 1940; Amaoka, 1969, 1982; Matsunuma, 2016). As shown in Table 1, most of the morphological characters of the specimen correspond well with those of the previous studies (Kuronuma, 1940; Matsunuma, 2016). The species is easily distinguished from the other Korean bothids by maxillary extending far beyond posterior edge of lower eye and three pairs of long canines on lower jaw (Nakabo and Doiuchi, 2013). Although *K. megastoma* has been recorded from Japan, Taiwan, East and South China Seas, and the Indo-Australian Archipelago (Kamohara, 1936; Sainsbury *et al*., 1985; Randall and Lim, 2000; Matsunuma, 2016), the species has not been recorded from Korean waters. Therefore, the present specimen represents the first record of the species from Korea, and indicated a widespread distribution of the species, ranging from northwestern Pacific to northern Australia. We propose a new Korean name, "Keun-ip-dung-geul-neop-chi-sok" for the genus *Kamoharaia* and "Keun-ip-dung-geul-neop-chi" for *K. megastoma*.

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한국산 둥글넙치과 1미기록종, *Kamoharaia megastoma*

*장서하 · 김진구[1] · 허유심[2] · 유효재[1] · 박정호**

국립수산과학원 연근해자원과, [1]국립부경대학교 자원생물학과, [2]국립수산과학원 수산자원연구센터

요 약 : 가자미목 둥글넙치과에 속하는 1개체(표준체장 113.9 mm)가 제주도 남방 해역에서 저층트롤로 채집되었다. 매우 큰 입을 가지는 본 종은 주상악골의 후단이 눈보다 후방에 위치, 아래턱 전단에는 돌출된 3쌍의 날카로운 송곳니, 구강으로 돌출된 서골 말단부, 검은 가슴지느러미 그리고 무안측에 측선이 없는 특징들로 *Kamoharaia megastoma*와 잘 일치한다. 따라서 이종은 한국 미기록종으로 국명은 “큰입둥글넙치”로 제안한다.

찾아보기 낱말 : 둥글넙치과, 큰입둥글넙치속, 큰입둥글넙치, 한국 미기록종, 제주도