

First Record of *Icelus toyamensis* (Scorpaeniformes: Cottidae) from the East Sea, Korea

Young Sun Song¹, Jin-Koo Kim^{1,*}, Jung-Hwa Ryu², Hyeon-Ju Kim³,
Seon-Man Kweon⁴, Seung-Ho Choi⁴

¹Department of Marine Biology, Pukyong National University, Busan 608-737, Korea

²Ryu Jung Hwa Marine Research Institute, Busan 614-811, Korea

³Korea Ocean Research and Development Institute, Goseong 219-822, Korea

⁴National Institute of Biological Resources, Incheon 404-170, Korea

ABSTRACT

A three specimen of *Icelus toyamensis*, belonging to Cottidae, Scorpaeniformes, was firstly collected from the East Sea, Korea during 2007–2009. We herein described the species as the first record from Korea on the basis of these specimens. *Icelus toyamensis* is characterized by the following morphological combinations: spinous scales absent on the base of dorsal fin; small ctenoid scales scattered on body sides; gill rakers are short, tubular, and relatively broad; the uppermost preopercular spine is sharp and simple; dorsal fin rays VIII–IX, 20–21; anal fin soft rays 18–19; pectoral fin rays 18, and vertebrae 40–41. New Korean name of *I. toyamensis* is proposed as “Min-jul-ga-si-hoet-dae.”

Keywords: first record, *Icelus toyamensis*, Cottidae, East Sea

INTRODUCTION

A total of approximately 275 species in about 70 genera are recognized in the family Cottidae, order Scorpaeniformes (Nelson, 2006); of those, 33 species in 18 genera have been recognized in Korea (Kim et al., 2005). The genus *Icelus* Krøyer, 1845, is distinguished by the presence of a pelvic fin with one spine and three soft rays, small conical teeth on both jaws, vomer, and palatines. Four preopercular spines are present. Lateral line scales are tubular and flattened on lateral and medial surfaces (Nelson, 1984). *Icelus* comprises 17 species worldwide, with three species previously recorded in Korea (Kim et al., 2005): *Icelus cataphractus* Pavlenko, 1910, *Icelus ochotensis* Schmidt, 1927, and *Icelus stenosomus* Andriashev, 1937.

In this study, three specimens of *Icelus toyamensis* Matsubara and Iwai, 1951, were collected from Korea for the first time; we here describe the species on the basis of these specimens. Methods for counts and measurements follow those of Hubbs and Lagler (2004); the numbers of fin rays and ver-

tebrae were counted by soft X-ray (Hitex HA-100; Hitex Co., Tokyo, Japan). The specimens are deposited in the National Institute of Biological Resources (NIBR), Korea.

SYSTEMATIC ACCOUNTS

Order Scorpaeniformes

Family Cottidae Bonaparte, 1832

Genus *Icelus* Krøyer, 1845

¹**Icelus toyamensis* (Matsubara and Iwai, 1951)

(Table 1, Fig. 1)

Ricuzenius toyamensis Matsubara and Iwai, 1951: 87, figs. 1–3 (type locality: Off Uozu, Japan); Masuda et al., 1984: 324.

Icelus toyamensis: Nakabo, 2002: 633; Tsuruoka et al., 2006: 51; Shinohara et al., 2011: 44.

Material examined. 2 specimens, 77.7–117.7 mm standard

Korean name: ¹*민줄가시횃대

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*To whom correspondence should be addressed

Tel: 82-51-629-5927, Fax: 82-51-629-5931

E-mail: taengko@pknu.ac.kr

Table 1. Comparison of counts and measurement of *Icelus toyamensis*

	Present study	Matsubara and Iwai (1951)	Watanabe (1981)	Nakabo (2002)
No. of specimens	3	8	2	–
Standard length (SL, mm)	80.2–118.2 (96.8)	74.8–124.8 (99.8)	91–101 (96)	–
Counts				
Dorsal fin rays	VIII–IX, 20–21	VII–IIX, 19–20	–	VIII–IX, 20–22
Anal fin rays	18–19	16–18	19	16–18
Caudal fin rays	11	10	–	–
Pectoral fin rays	18	18–19	19	18–19
Pelvic fin rays	I, 3	I, 3	–	I, 3
Vertebrae	40–41	41–43	–	–
Scales in lateral line	42	42–45	–	44–45
Gill rakers	2+9	2–3+11–13	–	–
Measurements (% SL)				
Body depth	17.4–20.6 (19.0)	–	–	–
Head length	30.5–33.1 (32.1)	25.0–44.6	34.48–37.04 (35.76)	–
Eye diameter	10.9–12.2 (11.8)	7.9–16.0	10.78–11.95 (11.37)	–
Caudal peduncle length	13.4–18.6 (16.3)	–	–	–
Caudal peduncle depth	1.8–4.2 (3.3)	3.2–6.8	–	–

Parenthesis indicate average



Fig. 1. *Icelus toyamensis*, NIBR-P4791, 118.2 mm standard length, collected from Hupo fishing ports.



Fig. 2. *Icelus cataphractus*, PKU 5044, 141.18 mm standard length, collected from Yangyang.

length (SL), Gyeongsanbuk-do, Uljin-gun, Hupo-myeon, Hupo-ri, Hupo fishing ports, 18 Mar 2009, NIBR-P 4791. 1 specimen, 90.1 mm SL, Gangwon-do, Goseong-gun, Jukwang-myeon, Oho-ri, 18 Mar 2007, Kim AR, NIBR-P 0000016324, from a deep sea water pump at 300 m water depth.

Comparative material examined. *Icelus cataphractus*, 1

specimen, 141.18 mm SL, Gangwon-do, Yangyang, 2 Dec 2010, PKU 5044 (Fig. 2).

Description. Counts and measurements are shown in Table 1. Body slightly compressed; head large and slightly depressed. Snout short and blunt. Mouth terminal; anterior tip of lower jaw projecting further than anterior tip of upper jaw.

Conical teeth on both jaws; small teeth on vomer and palatines. Eyes large; interorbital space very narrow and flat. Pair of small sharp nasal spines directed posterodorsally on anterior nostril. Pair of strong spines in occipital region. Four preopercular spines; uppermost spine simple, sharp, slightly curved upward, and longer than the other three spines, which are short. Gill rakers 2+9; those on the lower limb short, rounded or tubular in shape, and with spiny processes on upper surface. Small spines scattered on suborbital, cheek, and nuchal regions. Origin of dorsal fin vertically above upper end of gill opening; dorsal fin extends until above 32nd–33rd lateral line scale; dorsal spine rays and soft rays smoothly separated. Pectoral fin relatively long, extending posteriorly to below 5th–6th dorsal fin ray. Pelvic fin small; begins under lower base of pectoral fin and extends to anus. Caudal fin slightly rounded and truncate. Small scattered ctenoids; rare on dorsal and ventral sides. Lateral line scales tubular and sparse, extending from opercular flap to base of caudal fin.

Coloration. After fixation in formalin: body and head uniformly blackish brown; snout and circumorbital regions black; posterior margin of dorsal fin spines blackish, with

several irregular dark brown bars on dorsal fin soft rays, pectoral fin rays, and caudal fin rays (Fig. 1).

Distribution. *Icelus toyamensis* was collected from Korea, in Goseong, Gangwon-do and Hupo, Gyeongsangbuk-do. The species also occurs in the Niigata and Ishikawa prefectures, Japan (Nakabo, 2002).

Remarks. The specimens collected in Goseong, Gangwon-do and Hupo, Gyeongsangbuk-do, belong to the genus *Icelus*, based on the presence of teeth on the vomer and palatine, the presence of small spines on occipital, cheek, and nuchal regions (Krøyer, 1845; Matsubara and Iwai, 1951; Nakabo, 2002), and the presence of small scattered ctenoids on the dorsal and ventral sides of the body (Matsubara and Iwai, 1951; Nakabo, 2002). When compared with the original description (Matsubara and Iwai, 1951) and other references (Watanabe, 1981; Nakabo, 2002), most of the meristic characters correspond to those described by other authors, except for the number of caudal fin rays and the number of lower limbs of the gill rakers. These differences are thought to be related to geographic variations, but the correspondence of variations to geographic provinces requires further clarification.

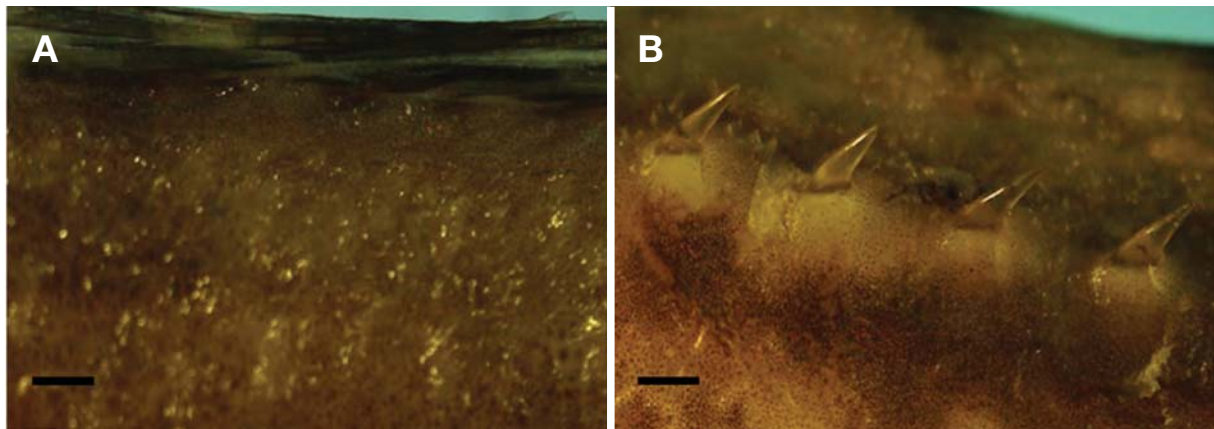


Fig. 3. A base of dorsal fin. A, *Icelus toyamensis*, NIBR-P4791; B, *Icelus cataphractus*, PKU 5044. Scale bars: A, B=1 mm.

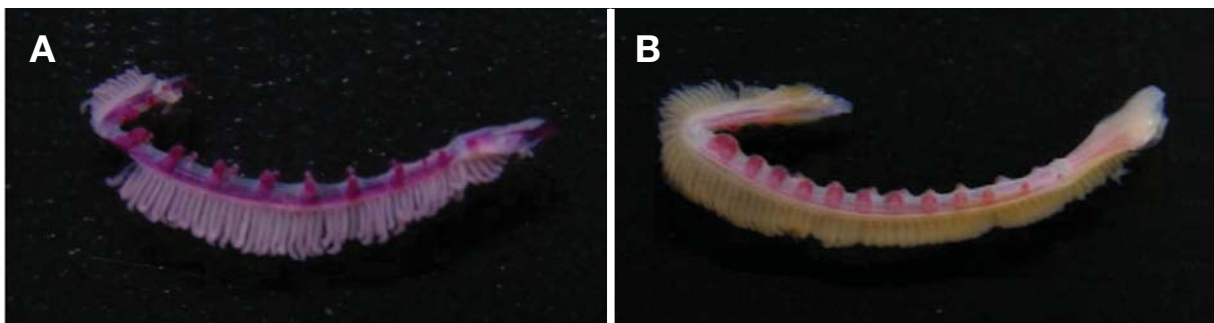


Fig. 4. Gill-rakers on the first arch. A, *Icelus toyamensis*, NIBR-P4791; B, *Icelus cataphractus*, PKU 5044.

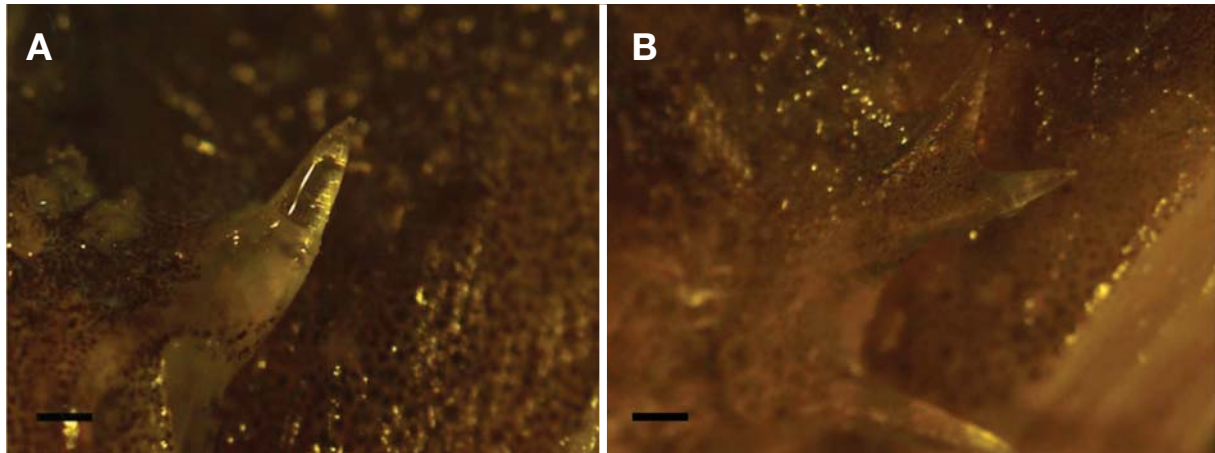


Fig. 5. Uppermost preopercular spine. A, *Icelus toyamensis*, NIBR-P4791, sharp and simple; B, *Icelus cataphractus*, PKU 5044, bifurcated. Scale bars: A, B=0.5 mm.

When compared with the congeneric species *I. cataphractus*, our specimens of *I. toyamensis* are similar in terms of counts and measurements, but differ in terms of morphological characteristics. These are distinguished by the absence of spinous scales on the base of the dorsal fin in *I. toyamensis* vs. their presence in *I. cataphractus* (Fig. 3). Also, the gill rakers in *I. toyamensis* are short, tubular, and relatively broad, whereas those in *I. cataphractus* are large, circular, and relatively narrow (Fig. 4). Lastly, the uppermost preopercular spine in *I. toyamensis* is sharp and simple, whereas the preopercular spine in *I. cataphractus* is bifurcate (Fig. 5). *Icelus ochotensis* and *I. stenosomus* are distinguished from *I. toyamensis* by the distributions of body scales (scattered in *I. toyamensis* vs. arranged in rows in *I. ochotensis* and *I. stenosomus*) (Nelson, 1984; Nakabo, 2002; Kim et al., 2005). We propose a new Korean name for *I. toyamensis*, “Min-jul-ga-shi-hoet-dae.”

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