Short communication

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New Record of Sagami Grenadier, *Ventrifossa garmani* (Gadiformes: Macrouridae) from Korea

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ABSTRACT

A single specimen (149.9 mm TL) of sagami grenadier, *Ventrifossa garmani* was collected from Korea waters. This species is similar to *Coelorinchus* spp. in body shape, but is distinguished by a short and rounded snout. It is characterized by having the serrated second dorsal spine in the first dorsal fin, a triangular spine on the scale, seven branchiostegal rays and six scales below middle of first dorsal fin. We describe this species as the first record to Korean fish fauna and propose the Korean name "Kkeo-kkeul-meo-ri-min-tae-sok" for this genus, and "Kkeo-kkeul-meo-ri-min-tae" for this species.

Keywords: first record, Sagami grenadier, Macrouridae, *Vetrifossa garmani*, Korea

INTRODUCTION

The macrourid fishes belonging to the order Gadiformes comprise four subfamiles, about 27 genera and about 350 species globally (Nelson, 2006) and two genera and seven species in Korea (Kim et al., 2005; Kim et al., 2009). These species distribute on continental shelves or continental slopes throughout the world, except in the Arctic waters (Cohen et al., 1990; Nelson, 2006).

There have been many studies concerning the morphology, ecology and phylogenetic relationships of macrourid fishes around the world (Iwamoto, 1979; Cohen et al., 1990). However, in Korea, only a brief description of three species (*Coelorinchus multispinulosus* Katayama, 1942, *Coelorinchus japonicas* (Temminck and Schlegel, 1842), *Coelorinchus longissimus* Mastubara, 1943) has been reported (Kim et al., 2005). Subsequently four unrecorded species (*Coryphaenoides marginatus* Steindachner and Döderlein, 1887, *Coryphaenoides microps* (Smith and Radcliffe, 1912), *Coelorinchus macrochir* (Günther, 1877), *Coelorinchus formosanus* Okamura, 1963) were reported in the southern East Sea of Korea (Kim et al., 2009).

During a bottom trawl survey on March 2006, we first collected a macrourid fish in southern East Sea of Korea. We herein described its morphological characteristics and compared it with other macrourid fishes. We identified the species according to Cohen et al. (1990) and Nakabo (2002). Measurements and counts followed Nakabo (2002) and those of Iwamoto (1978). The examined specimen is deposited in the Pukyong National University (PKU).

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SYSTEMATIC ACCOUNTS

Order Gadiformes
Family Macrouridae Gilbert and Hubbs, 1916
Genus *Ventrifossa* Gilbert and Hubbs, 1920

Ventrifossa Gilbert and Hubbs, 1920: 543 (type species: *Ventrifossa garmani*)

Genus *Ventrifossa* has seven branchiostegal rays and a moderately pointed to rounded snout. Mouth subterminal, upper jaw length more than 33% in head length. Mandibular teeth arranged in two rows or in a narrow band. Anus located separately from the origin of anal fin. Light organ small and circular, and segregated from anus. Branchiostegal scales absent, except in subgenus *Lucigadus*. No mesh structure on scales (Cohen et al., 1990; Nakabo, 2002). There are three subgenera, *Ventrifossa*, *Sokodara*, *Lucigadus*, in genus *Ventrifossa* (Cohen et al., 1990).

***Ventrifossa garmani* (Jordan and Gilbert, 1904) (Fig. 1, Table 1)**

Coryphaenoides garmani Jordan and Gilbert, 1904: 610 (type locality: Sagami Bay, Japan).
Lionurus garmani: Gilbert and Hubbs, 1916: 193.
Ventrifossa garmani: Okamura et al., 1984: 212; Cohen et al., 1990: 300, fig. 678; Nakabo in Nakabo, 2002: 423.

Material examined. PKU 3202, 1 specimen, 149.9 mm total length (TL), Ulsan, 23 Mar. 2006, bottom trawl.

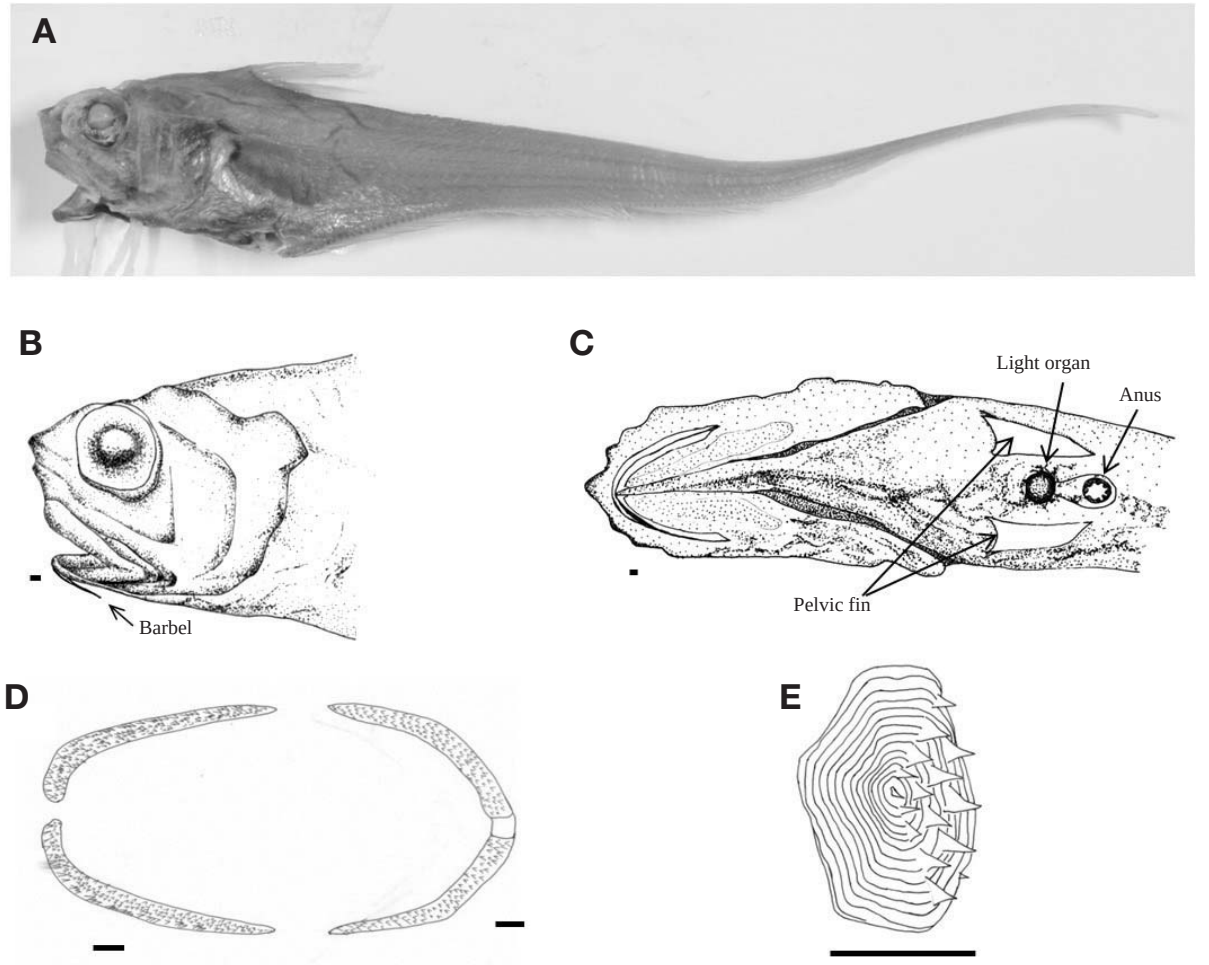

Fig. 1. A, *Ventrifossa garmani* (Jordan and Gilbert, 1904), PKU 3202, 149.9 mm TL, Ulsan, Korea; B, lateral view of head; C, ventral view of head and anterior portion of body; D, upper and lower jaw teeth; E, scale on dorsal body. Scale Bar=1 mm.

Description. D_1. II, 11; P_1. 20; P_2. 8; GR. 0+13; Trac. 6; BR. 7.

Measurements are shown in Table 1.

Body elongated and compressed, taper to the caudal fin and rapidly narrow behind anus (Fig. 1A); snout short, having small humps, forward stubby; upper jaw extended below to the posterior end of eye (Fig. 1B); membrane of hyoid arch no scales; mouth subteriminal; both jaws having fine teeth; outsider upper jaw teeth larger and wider band than those of insider; lower jaw teeth almost same and formed narrow band (Fig. 1D); one barbel on front of the lower jaw; one light organ between pelvic fins; anus oval, separated from origin of anal fin; origin of pectoral fin corresponded with origin of pelvic fin; second spine of first dorsal fin serrated; several flat triangular spines scattered on body scales; mesh structure absent on scales (Fig. 1E).

Color. Body generally lustrous dark silver grayish when fresh; pectoral fin base and posterior edge of operculum blackish; all fins transparent; after formalin fixation, body overall light brownish; dorsal fin base brownish; silver grayish in front of anal fins (Fig. 1A).

Distribution. Korea (present study), Japan (Jordan and Gilbert, 1904; Nakabo, 2002), East China Sea (Cohen et al., 1990) and Taiwan (Shen et al., 1993)

Remarks. Present specimen is easily identified genus *Ventrifossa* by chacracteristics of mesh structure absent on scales as well as upper jaw length more than 1/3 head length by Nakabo (2002). Measurements and counts of the present specimen were corresponded with the previous descriptions of *V. garmani* (Table 1). And present specimen was compared with other genus *Ventrifossa* in Japan (Table 2).

V. garmani was similar to *Ventrifossa macroptera* Okamura, 1982 in meristics and morphometrics and *Ventrifossa saikaiensis* Okamura, 1984 in morphology. But they were easily distinguished by position of pelvic fin and pectoral fin and mandibular teeth, respectively. First *V. garmani* differed

Table 1. Comparison of meristic and morphometric characters of *Ventrifossa garmani*

	Present study	Jordan and Gilbert (1902)	Gilbert and Hubbs (1916)	Okamura et al. (1984)
Number of specimens	1	1	30	3
Total length(mm)	149.9	292	113-340	210-292
Counts				
First dorsal fin rays	II, 11	II, 10	–	II, 10-11
Pectoral fin rays	20	20-21	–	20-21
Pelvic fin rays	8	–	–	8-9
Gill rakers	0+13	–	–	0+11-13
TRac	6	–	6	6
Branchiostegal rays	7	–	–	7
% in TL				
Head length	16.9	18.2	20-23.9	15.9-18.5
Body depth	15.7	15.4	14.8-16.5	13.5-15.6
Predorsal length	19.1	–	–	19.6-20.8
Preanal length	22.4	–	–	22.2-25.6
% in HL				
Snout length	25.4	26.3	25-27	25.1-29.0
Upper jaw length	43.1	44.4	–	41.7-45.5
Barbel length	24.3	27.3	23.8-26.3	23.8-30.6
Orbital diameter	30.5	30.8	30.7-35.7	30.6-38.5
Postorbital length	42.6	44.0	41.1-45.3	43.4-45.5
Interorbital length	29.8	27.8	32.2-32.9	26.3-29.4
Subopercle length	19.1	–	11.8-13.3	–
Prepectoral length	98.2	–	–	–
Prepelvic length	107.7	–	–	–
Pectoral fin length	55.8	–	58.8	62.5
Pelvic fin length	32.5	43.5	37-40	41.7-43.5
% in 1st dorsal fin base				
Interdorsal space	228.5	200-250	–	210-220

Tabel 2. Comparison of meristic and morphometric characters of genus *Ventrifossa* in Japan

Characters	*V. garmani*		*V. saikaiensis*	*V. misakia*	*V. rhipidodorsalis*	*V. longibarbata*	*V. fusca*	*V. macroptera*
	Present study	Okamura (1984)	Okamura (1984)	Okamura (1984)	Okamura (1984)	Okamura (1982)	Okamura (1982)	Okamura (1982)
Number of specimens	1	3	12	1	26	5	4	53
Total length (mm)	149.9	210-292	200-312	244	160-356	174-296	434-612	258-400
Counts								
First dorsal fin rays	II, 11	II, 9-12	II, 9-11	II, 10	II, 9-12	II, 10	II, 10-12	II, 9-10
Pectoral fin rays	20	20-21	19-22	19	20-24	23-25	20-23	21-26
Pelvic fin rays	8	8-9	8-9	8	9-10	8	8	9-10
Gill rakers	0+13	0+11-13	0+12-15	0+12	0+10-15	0+9-13	0+9-13	0+11-17
Tra*	6	5-6	7-7.5	9-9.5	5.5-6.5	9-10	9-9.5	6-8
Branchiostegal rays	7	7	7	7	7	7	7	7
% in TL								
Head length	16.9	15.9-18.5	16.8-18.3	19.6	17.3-19.0	16.3-17.7	18.5-19.0	17.2-19.8
Body depth	15.7	13.5-15.6	14.3-15.2	14.5	13.1-17.4	13.8-16.5	14.9-15.2	14.7-18.3
Predorsal length	19.1	19.6-20.8	19.0-21.4	21.3	19.3-21.6	18.5-20.5	19.6-21.3	18.0-20.9
Preanal length	22.4	22.2-25.6	22.4-24.2	18.9	22.4-27.0	21.6-25.0	25.9-25.7	
% in HL								
Snout length	25.4	25.1-29.0	27.6-30.3	26.3	26.9-29.3	26.6-28.8	26.9-28.0	25.1-31.4
Upper jaw length	43.1	41.7-45.5	45.8-51.9	37	41.4-46.4	41.9-46.9	39.8-40.4	44.9-50.0
Orbital diameter	30.5	30.6-38.5	29.0-30.7	33.3	27.7-34.1	31.2-38.0	28.0-29.2	25.1-31.3
Postorbital length	42.6	43.4-45.5	45.5-49.6	45.5	40.7-48.2	39.1-43.7	45.2-47.8	44.6-49.6
Interorbital length	29.8	26.3-29.4	28.5-31.3	25	20.7-25.6	23.0-25.0	30.1-30.7	28.2-33.2
% in orbital diameter								
Barbel length	79.7	77.9-100	115-133	37.0	64.3-100	102-127	24.5-26.1	78.0-100
% in 1st dorsal fin base								
Interdorsal space	209	210-220	170-210	–	170-250	190-260	180-190	140-230

*Nakabo (2002)

from *V. macroptera* by the following characters; mandibular teeth (narrow band and equal inner and outer teeth in *V. garmani* vs. 2 rows and longer inner teeth in *V. macroptera*); scale behind 1st dorsal fin (spines vs. spineless); spines on scales (widen triangular vs. thin triangular). Next *V. garmani* differed from *V. saikaiensis* by the following characters; Tra. (6 in *V. garmani* vs. 7 in *V. saikaiensis*), barbel (93.4% in orbital diameter vs. 115-133%), first dorsal fin (transparency vs. blackish), and distance between first and second dorsal fins (228.5% in first dorsal fin base vs. 170-210%). The new Korean name of this species reflected rough head.

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