

# First Record of the Oilfish, *Ruvettus pretiosus* (Perciformes: Gempylidae) from Korea

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**ABSTRACT** Two specimens of *Ruvettus pretiosus* (227.0 and 238.3 mm in standard length), belonging to the family Gempylidae, was firstly collected by using a gill net from the eastern coastal waters of Jeju Island, Korea in November 2013. This species is characterized by having the following morphological traits: XV, 17~19+2 dorsal fin rays; II, 15~16+2 anal fin rays; belly keeled between pelvic fin and anus; body covered with cycloid scales, interspaced with rows of sharp bony tubercles. *R. pretiosus* can be easily distinguished from three Korean Snake mackerels (*Thyrsitoides marleyi*, *Rexea prometheoides* and *Gempylus serpens*) by having belly keeled between pelvic fin and anus, and cycloid scales covered the body and interspaced with rows of sharp bony tubercles. Based on morphological and molecular approaches, the specimens were identified as *R. pretiosus*. We propose new Korean names, “Gi-reum-chi-sok” and “Gi-reum-chi” for the genus and species, respectively.

**Key words:** First record, *Ruvettus pretiosus*, Gempylidae, Jeju Island

## INTRODUCTION

The snake mackerels (family Gempylidae), comprising 16 genera with about 24 species, are widely distributed in tropical and temperate seas of the world. This family is characterized by having very compressed body, strong teeth, and rudimentary or no pelvic fin (Nelson, 2006). Within the family three species including *Thyrsitoides marleyi* (Fowler, 1929), *Rexea prometheoides* (Bleeker, 1856) and *Gempylus serpens* Cuvier, 1829 have been reported in Korea so far (Kim *et al.*, 2012; Myoung *et al.*, 2013). The genus *Ruvettus* Cocco, 1833, comprises single species, *Ruvettus pretiosus* worldwide (Froese and Pauly, 2016). This species was usually caught as bycatch in the tuna longline fishery at depths from 200 to 400 m (Nakamura and Parin, 1993).

In the present study, two specimens of *R. pretiosus* collected from the northern coast of Jeju Island, Korea. The morphological features of this species have not been

reported in Korea until now. Therefore, the morphological characters of *R. pretiosus* were described based on the collected specimens, and nucleotide sequencing of the mitochondrial cytochrome c oxidase subunit I (COI) gene were carried out to confirm the correctness of species identification of the specimens. This species was then added to the list of Korean fish fauna.

## MATERIALS AND METHODS

Identification procedure was basically followed by the method of Nakabo *et al.* (2002). After a partial tissue was isolated from two specimens of *R. pretiosus* to extract genomic DNA, the specimens were fixed in 10% formalin and the preserved in 70% ethanol. Counts and measurements followed the method of Hubbs and Laglar (2004). The examined specimen is deposited at the Fish Genetics and Breeding Laboratory of Jeju National University (JNU), Korea.

Molecular identification of the specimens was conducted by using the DNA sequences (552 bp) of COI gene.

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Fig. 1. *Ruvettus pretiosus*, JNU-1128, 238.3 mm standard length (SL), gill net, Hallim-eup, Jeju-do, Korea, 28 November, 2013.

Table 1. Morphological traits compared between present and previous studies on *Ruvettus pretiosus*

Morphological characters	Present study (N = 2)	Machida (1985) (N = 3)	Nakabo (2002)
Total length (mm)	267.1~280.1	—	—
Standard length (mm)	227.0~238.3	226~398	—
<b>In % of standard length</b>			
Head length	29.4~30.5	29.5	—
Body depth at ventral	20.7~21.5	21.5~22.5	—
Body width	9.6~9.7	9.6~10.6	—
<b>In % of head length</b>			
Snout length	31.2~34.1	33.6~35.7	—
Orbital diameter	18.1~18.4	19.8~20.7	—
Interorbital length	22.1~26.0	23.9~29.1	—
Upper jaw length	55.2~53.0	53.2~54.6	—
<b>Counts</b>			
Dorsal fin rays	XV, 17~18+2	XIV~I, 17+2	XIII~XV, 16~20+2
Pectoral fin rays	15~16	15~16	13~15
Pelvic fin rays	I, 5	I, 5	I, 5
Anal fin rays	II, 15~16+2	I, 17+2	II, 15~17+2

Genomic DNA extraction and PCR were performed according to Chang *et al.* (2016). The DNA sequence (Accession no.: MF959466 and MF959467) of the COI gene obtained from the present specimens were compared with those of *R. pretiosus* (Mediterranean sea, LN907525; South Africa, JF494392; Turkey, KY176596; Germany, KY018767; Taiwan, KU945002) deposited at the National Center for Biological Information (NCBI) database.

#### Genus *Ruvettus* Cocco, 1833

(New Korean genus name: Gi-reum-chi-sok)

*Ruvettus* Cocco, 1833: 18 (type species: *Rvettus pretiosus* Cocco, 1833).

The genus is characterized by having skin very rough, interspersed with spinous bony tubercles, mid-ventral keel on belly and single obscure lateral line (Nakamura and Parin, 1993).

#### *Ruvettus pretiosus* Cocco, 1833

(New Korean name: Gi-reum-chi)

(Fig. 1; Table 1)

*Ruvettus pretiosus* Cocco, 1833: 19 (type locality: Strait of Messina, Sicily, Italy, Mediterranean Sea); Eschmeyer and Herald, 1983: 269 (North America); Paulin *et al.*, 1989: 227 (New Zealand); McAllister, 1990: 178 (Canada); Pakhorukov, 1999: 658 (Atlantic Ocean); Nakabo, 2002: 1338 (Japan); Bilecenoglu *et al.*, 2002: 139 (Turkey); Moore *et al.*, 2003: 230 (New England); Mundy, 2005: 501 (Hawaii).

**Material examined.** JNU-1128 and JNU-1129, 227.0 and 238.3 mm in standard length (SL), gill net, Hallim-eup, Jeju-do, Korea, 28 November, 2013.

**Description.** Measurements of morphological traits for the present specimen are shown in Table 1. Measurements are revealed as a percentage against SL: Body

depth, 20.7~21.5; body width, 9.6~9.7; head length, 29.4~30.5; upper jaw, 15.6~15.9; snout length, 9.5~10.0; eye diameter, 5.3~5.6; interorbital width, 6.7~7.6; predorsal fin, 23.9~27.3; prepectoral fin length, 28.6~29.5; preanal fin length, 68.3~69.8; length of longest dorsal fin ray, 10.0~11.1; pectoral fin length, 14.9~16.7; length of longest anal fin ray, 9.4~10.6; caudal peduncle length, 6.3~6.8; caudal peduncle depth, 4.5~5.0; caudal peduncle width, 3.4~3.9; length of dorsal fin base, 62.9~64.1; length of pectoral fin base, 3.4~3.5; length of anal fin base, 18.4~19.1.

Body fusiform, slightly compressed; body covered with cycloid scales, interspaced with rows of sharp bony tubercles; lateral line single, nearly straight; dorsal profile of head sloping gently; head large, 3.3~3.5 in body length, interorbital space slightly concave; parietal region semi-transparent; mouth large, posterior of upper jaw extending backward slightly beyond posterior margin of eye; eye large, circular; a single series of canine-like teeth on both jaws and four fangs on front of upper jaw; teeth on palatine conical, uniserial; two dorsal, dorsal spinous fin started above at upper preopercle; pectoral fin moderately, reached at seventh dorsal spines; pelvic fin short; dorsal and anal soft rays opposite each, anal origin slightly behind a vertical from origin of soft dorsal fin; last two dorsal and anal fin is separated as finlets, respectively; belly-keeled between pelvic fin and anus; no keels on caudal peduncle; caudal fin widely forked.

**Color when fresh.** Body and head entirely dark brown; pelvic fin white; soft dorsal fin black with posterior margin white; caudal fin black with tip of forked fin white.

**Color after preservation.** Body entirely pale brown; pectoral fin black; soft dorsal fin brown with posterior margin white; caudal fin dark brown with tip of forked fin white.

**Distribution.** Widely distributed in tropical and temperate waters of the world (Nakamura and Parin, 1993). In Korea, it occurs around Jeju Island (present study).

**Remarks.** The present specimens belonging to the family Gemphylidae are characterized by having caudal peduncle without keel, a single line obscure, belly keeled between pelvic fin and anus, scales cycloid with bony tubercles. After the morphological characteristics of present specimen were compared with those in the previous report on *R. pretiosus* (Nakamura and Parin, 1993; Table 1), our specimens were identified as *R. pretiosus* base on the morphological characters. Although we could not compare our measured meristic counts with original description lacking the data on counts, meristic characters of the present specimens corresponded well with the pre-

vious reports shown in Table 1, except for the number of anal fin spines (II in present study and Nakabo, 2002 vs. I in Machida, 1985). This difference seems to be intraspecific variation, but it needs further studies on geographic variation of the species with more specimens. In addition, we adopted molecular identification method based on COI DNA sequences to make sure of the accurate species identification. The result indicated that COI sequences of present specimens were almost identical (99.6~100.0%) to those of *R. pretiosus* from NCBI (data not shown).

In Korea, *R. pretiosus* can be easily distinguished from the other three species (*Thyrsoitoides marleyi*, *Rexea prometheoides* and *Gempylus serpens*) by having belly keeled between pelvic fin and anus (vs. none for three species) and scales cycloid with bony tubercles (vs. none) (Nakabo, 2002). Also, *R. pretiosus* is morphologically very similar to *Lepidocybium flavobrunneum*, but the former is distinguishable from the latter by the shape of keel (a prominent keel for *R. pretiosus* vs. two small supplemental keels for *L. flavobrunneum*), dorsal fin spines (more than XII vs. VIII~IX) and lateral line (obscure vs. sinuous) (Nakamura and Parin, 1993). When the Korean name for *R. pretiosus* was given, we used "Gi-reum-chi" which was previously suggested by Yamada *et al.* (2009).

## ACKNOWLEDGMENTS

This research was supported by the 2017 scientific promotion program (to C.B. Song) by Jeju National University.

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## 한국산 갈치꼬치과 어류 1미기록종, *Ruvettus pretiosus*

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**요 약** : 갈치꼬치과에 속하는 *Ruvettus pretiosus* 2개체 (표준 체장 227.0 mm와 238.3 mm)가 2013년 11월에 제주도 연안에서 자망으로 처음 채집되었다. 이 종의 특징은 등지느러미 기조수 XV, 17~19+2개를 갖는 점, 뒷지느러미 기조수 II, 15~16+2개를 갖는 점, 거의 직선인 한 개의 측선을 갖는 점, 그리고 배지느러미와 항문 사이에 융기선이 있다는 점이다. 이 종은 우리나라에서 서식하는 갈치꼬치과 어류 3종 (갈치꼬치, 통치 및 세장갈치꼬치)과 배지느러미와 항문 사이에 융기선이 있는 점 (3종은 융기선 없음)과 등근 비늘이 날카로운 관 사이에 널리 퍼져 있는 점 (3종은 피부가 매끈함)으로 쉽게 구분할 수 있다. 이 미기록종의 속명과 국명은 각각 “기름치속”과 “기름치”로 제안한다.

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**찾아보기 낱말** : 갈치꼬치과, 기름치, 미기록종, 제주도