

First Record of the Freckled Goatfish, *Upeneus tragula* (Mullidae, Perciformes) from Korea

by Byung Yeob Kim, Maeng Jin Kim¹ and Choon Bok Song*

College of Ocean Sciences, Jeju National University, Jeju 690-756, Korea

¹Subtropical Fisheries Research Center, National Fisheries Research and Development Institute, Jeju 690-192, Korea

ABSTRACT Two specimens of *Upeneus tragula* were firstly collected from Jeju Island, Korea. This species is characterized by having pectoral fin rays 13, lateral line 29, first gill rakers 5+14, both lobes of caudal fin with dark bands, ventral part of body with numerous blackish-brown dots, and upper part of first and second dorsal fin dark brown. It is easily distinguished from three other Korean *Upeneus* species in having both lobes of caudal fin with dark bands (vs. no band in *U. sulphureus*; only upper lobe with dark bands in both *U. moluccensis* and *U. japonicus*). We suggest the new Korean name "Keom-eun-jul-chok-su" for this species.

Key words : Mullidae, first record, Jeju Island, Korea

INTRODUCTION

The goatfishes (family Mullidae), which consist of sixty-two species in six genera, are one of the morphologically specialized fish groups. They are distinctive in having a pair of barbels under the jaw, two separated dorsal fins, and a forked caudal fin (Nelson, 2006). The genus *Upeneus* belonging to the family Mullidae is characterized by having small scales present basally on second dorsal and anal fins, lateral line scales 28~38 and teeth in both jaws, and on the vomer and palatines as well (Randall, 2001; Uiblein and Heemstra, 2010). Thirty-two species of the genus *Upeneus* have been known worldwide (Randall and Kulbicki, 2006; Uiblein and McGrouther, 2012; Froese and Pauly, 2013). The genus *Upeneus* was created by Cuvier (1829), and revised by many authors, e.g., Lachner (1954), Randall and Kulbicki (2006) and Uiblein and Heemstra (2010). Recently, several new species have been reported worldwide (Uiblein and Heemstra, 2011a, b; Yamashita *et al.*, 2011; Uiblein and McGrouther, 2012; Uiblein and Causse, 2013). In Korea, three species including *U. japonicus* (Houttuyn, 1782), *U. moluccensis* (Bleeker, 1855) and *U. sulphureus* (Cuvier, 1829) have been known so far (Kim *et al.*, 2005). This genus was distributed on the sea bottom in shallow to deep wa-

ters of the tropical and subtropical and caught mainly with bottom trawls or trap nets (Kühlmorgan-Hille, 1974). Recently, two specimens of *Upeneus tragula* were firstly collected by gill net from the coastal waters of Jeju Island, Korea. We described its morphological characteristics of this species and newly added it to the Korean fish fauna.

Classification system for species identification followed those of Hatooka (2002), while both counts and measurements of the specimen were followed by the method of Hubbs and Lagler (1964). The examined specimens were deposited at the Fish Genetics and Breeding Laboratory of Jeju National University (JNU), Korea.

***Upeneus tragula* Richardson, 1846**
(New Korean name: Keom-eun-jul-chok-su)

(Fig. 1; Table 1)

Upeneus tragula Richardson 1846: 220 (type locality, Guangzhou, China); Lachner, 1954: 522 (Indo-Pacific); Hatooka, 2002: 872 (Japan); Allen and Adrim, 2003: 41 (Indonesia) Randall and Kulbicki, 2006: 298-307 (Indo-Pacific).

Material examined. JNU 0005-1, one specimen, 169.4 mm SL, Daepo-dong, Seogwipo-si Island, Korea, with gill net, 18 October 2010. JNU 0005-2, one specimen, 144.2 mm standard length (SL), Daepo-dong, Seogwipo-si, Jeju Island, Korea, with gill net, 30 October 2009.

Description. Counts for the present specimens are shown in Table 1.

*Corresponding author: Choon Bok Song Tel: 82-64-754-3471
Fax: 82-64-756-3493, E-mail: cbsong@jejunu.ac.kr



Fig. 1. *Upeneus tragula* Richardson, JNU 0005-1, 169.4 mm SL, gill net, Jeju Island, Korea.

Table 1. Comparison of morphological characters of *Upeneus tragula*

Morphological characters	Present study	Lachner (1954)	Randall and Kulbichi (2006)	Uiblein and Heemstra (2010)
Standard length (mm)	144.2, 169.4 (n=2)	29~227 (n=188)	36~190 (n=155)	48~191 (n=16)
Counts				
Dorsal fin rays	VIII, 9	VIII-i, 8	VIII, 9	VIII, 9
Pectoral fin rays	13	12~14	13~14	13~14
Pelvic fin rays	I, 5	-	-	-
Anal fin rays	I, 7	-	I, 7~8	I, 7~8
Gill rakers	5+14	5~7+15~18 =21~25	5~6+15~18 =20~24	5~6+14~17 =19~23
Lateral line scales	29	-	28~29	28~30
In % of SL				
Head length	26.9~29.2	-	-	27~31
Body depth at first dorsal fin origin	22.4~24.0	-	-	22~26
Upper jaw length	9.6~10.2	-	-	11~14
Snout length	11.0~11.5	-	-	-
Interorbital width	7.4~8.7	-	-	-
Eye diameter	5.4~6.5	-	-	6.1~8.3
Barbel length	14.6~15.8	-	-	15~18
Predorsal fin length	33.5	-	-	-
Prepectoral fin length	28.3~29.3	-	-	-
Preanal fin length	63.2~63.6	-	-	-
Prepelvic fin length	24.4~28.4	-	-	-
Pectoral fin length	18.2	-	-	19~21

Dorsal fin rays VIII, 9; anal fin rays I, 7; pectoral fin rays 13; pelvic fin rays I, 5; caudal fin rays 21; lateral line 29; first gill rakers 5+14; Measurements are presented as a percentage against SL: body depth at first dorsal fin origin 22.4~24.0; head length 26.9~29.2; upper jaw length 9.6~10.2; snout length 11.0~11.5; interorbital width 7.4~8.7; eye diameter 5.4~6.5; barbel length 14.6~15.8; predorsal fin length 33.2; prepectoral fin length 28.3~29.3; preanal fin length 63.2~63.6; prepelvic fin length 24.4~28.4; first dorsal fin base length 16.6; second dorsal fin base length; 12.3~14.4; pectoral fin base length 4.2~4.4; anal fin base length 10.0~10.5; pelvic

fin base length 3.5~4.8; length between first and second dorsal fin 11.2~13.3; length of longest dorsal fin spine 18.7~19.4; length of longest pectoral fin ray 18.2; length of longest anal fin ray 14.3~15.7; length of longest pelvic fin ray 17.6 (damaged)~17.7; caudal peduncle length 22.3~23.2; caudal peduncle depth 10.3~10.4. Measurements are presented as a percentage against HL: snout length 40.7; upper jaw length 35.6; interorbital width 32.2; barbel length 54.1.

Body moderately elongated and slender; head profile curved gently above upper lip; body covered by ctenoid scales; preorbital scales present; eye small and located

at dorsal part of head; mouth small and terminal; posterior tip of maxilla not reaching to below anterior edge of eye; villiform teeth in both jaws and on vomer and palatines; barbels not reaching to below rear margin of preopercle; no spine on operculum; first dorsal spine extremely short; proximal part of anterior part of second dorsal fin covered with scales; second dorsal fin and anal fin formed symmetry; pelvic fins almost equal in length to pectoral fins; caudal peduncle deep, its depth about ten times in body length; caudal fin forked.

Color when fresh. Head and body reddish brown; scales of dorsal and upper side with dark brown spots forming irregular vertical lines; below head and body white, flecked with red and small dark brown spots; a dark red stripe from snout through eye to middle of caudal fin; barbels yellow; both dorsal fins red to dark reddish-brown with a few small yellow spots; pelvic and anal fins with reddish stripes against a light yellowish background; lobes of caudal fin with diagonal black and dark red band, five in upper lobe and six in lower.

Color after preservation. Dorsal part of body dark brown; ventral part with irregular dark brown spots; a dark brown stripe from snout through eye to middle of caudal fin; barbels brown; all fins dark brown; lobes of caudal fin with dark bands, five in upper lobe and six in lower.

Distribution. Known from Indo-Pacific: east Africa to Philippines included the Palau Island, Red Sea, Mozambique, Oman, Persian Gulf, Indonesia, Cambodia, Thailand, Singapore, Vietnam, from southern Japan and China to New Caledonia (Lachner, 1954; Randall and Kulbicki, 2006; Uiblein and Heemstra, 2010), and Korea (Jeju Island, present study).

Remarks. The present specimens belonged to the genus *Upeneus* by having teeth in both jaws, and on the vomer and palatines. The genus *Upeneus* possessing teeth is easily distinguished from the similar genera, *Mulloidichthys* and *Parupeneus*, having no teeth on the vomer and palatines (Randall, 2001). Subsequently, they were identified as *Upeneus tragula* based on some morphological characters; both lobes of caudal fin with dark bands, body with many blackish-brown dots and counts. Meristic characters of the observed specimens agreed well with previous descriptions given by Lachner (1954), Randall and Kulbicki (2006), Uiblein and Heemstra (2010) (Table 1). Although *U. tragula* is similar to *U. oligospilus* in external morphology, it is distinguishable from the latter in having caudal fin length (long vs. short in *U. oligospilus*) and the number of caudal fin bars in adult (10~12 vs. 6~9) and juveniles (7~10 vs. 6~7) (see Uiblein and Heemstra, 2010). This species differs from three Korean *Upeneus* spp. in having both lobes of caudal fin with dark bands (vs. no band in *U. sulphureus*; only upper lobe with dark bands in both *U. moluccensis* and *U. japonicus*) (Hatooka, 2002; Kim *et al.*, 2005). Additionally, *U. tra-*

Table 2. Comparison of number of pectoral fin rays, lateral-line scales and first gill rakers among *Upeneus* species based on Hatooka (2002)

	<i>U. tragula</i>	<i>U. vittatus</i>	<i>U. subvittatus</i>	<i>U. taeniopterus</i>
Pectoral fin rays	13	15~17	15~16	13~14
Lateral-line scales	29	32~38	38	36~41
First gill rakers	19	25~31	27	21~23

gula differ from *U. sulphureus* and *U. moluccensis* in having pectoral fin rays 12~14 (vs. 15~17 and 15~18 for *U. sulphureus* and *U. moluccensis*, respectively) and lateral line 28~33 (vs. 34~39 and 33~38) (Table 2). Also, This species is easily distinguishable from *U. japonicus* in having a longitudinal stripe on the body (vs. none for *U. japonicus*). We herein propose a new Korean name, “Keom-eun-jul-chok-su” for this species.

ACKNOWLEDGMENTS

This research was supported by the 2013 scientific promotion program funded by Jeju National University.

REFERENCES

- Allen, G.R. and M. Adrim. 2003. Coral reef fishes of Indonesia. Zoological Studies, 42: 1-72.
- Bleeker, P. 1855. Zesde bijdrage tot de kennis der ichthyologische fauna van Amboina. Natuurkundig Tijdschrift voor Nederlandsch Indië, 8: 391-434.
- Cuvier, G. 1829. Le règne animal, distribué d’après son organisation, pour servir de base à l’histoire naturelle des animaux et d’introduction à l’anatomie comparée, 2: i-xv+1-406.
- Froese, R. and D. Pauly. (Editors). 2013. FishBase. World Wide Web electronic publication. www.fishbase.org, version (10/2013).
- Hatooka, K. 2002. Mulliae. In: Nakabo, T. (ed.), Fishes of Japan with pictorial keys to the species, English edition. Tokai Univ. Press, Tokyo, pp. 791-808.
- Houttuyn, M. 1782. Beschryving van eenige Japanese visschen, en andere zee-schepzelen. Verhandelingen der Hollandsche Maatschappij der Wetenschappen, Haarlem, 20: 311-350.
- Hubbs, C.L. and K.F. Lagler. 1964. Fishes of the Great Lake Region. University of Michigan Press, Ann Arbor, xv+213pp.
- Kim, I.S., Y. Choi, C.L. Lee, Y.J. Lee, B.J. Kim and J.H. Kim. 2005. Illustrated book of Korean fishes. Kyohak Publishing Co Ltd, 613pp. (in Korean)

- Kühlmorgan-Hille, G. 1974. Mullidae. In: Fischer, W. and P.J.P. Whitehead (eds.), FAO species identification sheets for fishery purposes. Eastern India Ocean (fishing area 57) and Western Central Pacific (Fishing area 71). Rome, FAO.
- Lachner, E.A. 1954. A revision of the goatfish genus *Upeneus* with descriptions of two new species. Proceedings of the United States National Museum, 130: 497-532.
- Nelson, J.S. 2006. Fishes of the world. 4th edition. John Wiley and Sons Inc., Hoboken, New Jersey, 601pp.
- Randall, J.E. 2001. Mullidae. Goatfishes (surmullets). pp. 3175-3200. In: Carpenter, K.E. and V.H. Niem (eds.), FAO species identification guide for fishery purposes. The living marine resources of the Western Central Pacific. Vol. 5. Bony fishes part 3 (Menidae to Pomacentridae). Rome, FAO, pp. 2791-3380.
- Randall, J.E. and M. Kulbicki, 2006. A review of the goatfishes of the genus *Upeneus* (Perciformes: Mullidae) from New Caledonia and the Chesterfield Bank, with a new species and four new records. Zoological Studies, 45: 298-307.
- Richardson, J. 1846. Report on the ichthyology of the seas of China and Japan. Report of the British Association for the Advancement of Science 15th meeting, pp. 187-320.
- Uiblein, F. and M. McGrouther. 2012. A new deep-water goatfish of the genus *Upeneus* (Mullidae) from northern Australia and the Philippines, with a taxonomic account of *U. subvittatus* and remarks on *U. mascarensis*. Zootaxa, 3550: 60-70.
- Uiblein, F. and R. Causse. 2013. A new deep-water goatfish of the genus *Upeneus* (Mullidae) from Vanuatu, South Pacific. Zootaxa, 3666: 337-344.
- Uiblein, F. and P.C. Heemstra. 2010. A taxonomic review of the Western Indian Ocean goatfishes of the genus *Upeneus* (Family Mullidae), with descriptions of four new species. Smithiana, 11: 35-71.
- Uiblein, F. and P.C. Heemstra. 2011a. Description of a new goatfish species, *Upeneus randalli* (Mullidae), from the Persian Gulf, with remarks and identification keys for the genus *Upeneus*. Scientia Marina, 75: 585-594.
- Uiblein, F. and P.C. Heemstra. 2011b. A new goatfish, *Upeneus seychellensis* sp. nov. (Mullidae), from the Seychelles Bank, with remarks on *Upeneus guttatus* and a key to Western Indian Ocean *Upeneus* species. Marine Biology Research, 7: 637-650.
- Yamashita, M., D. Golani and H. Motomura. 2011. A new species of *Upeneus* (Perciformes: Mullidae) from southern Japan. Zootaxa, 3107: 47-58.

제주도에서 채집된 촉수과 어류 1미기록종, *Upeneus tragula*

김병엽 · 김맹진¹ · 송춘복

제주대학교 해양과학대학, ¹국립수산과학원 아열대수산연구센터

요 약 : 촉수과에 속하는 *Upeneus tragula* 2개체가 제주도에서 채집되어 한국 미기록종으로 기재한다. 이종은 가슴지느러미 연조 수 13개, 측선 비늘 수 29개, 새파수 19개를 갖고 있다. 그리고, 첫 번째와 두 번째 등지느러미에 다소 불규칙한 무늬가 있으며 몸의 측면에는 작은 크기의 점들이 비교적 넓게 분포하였고, 특히 꼬리지느러미의 상엽과 하엽에 여러 개의 짙은 줄무늬가 뚜렷하게 존재하여 우리나라에 현재 보고된 *Upeneus*속 3종과 형태적으로 쉽게 구분된다. 따라서, 이 종의 새로운 국명은 “검은줄촉수”로 제안한다.

찾아보기 낱말 : *Upeneus tragula*, 한국미기록종, 검은줄촉수