

# First Record of a Shrimp Goby, *Amblyeleotris japonica* (Gobiiformes: Gobiidae) from Korea

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**ABSTRACT** A shrimp goby, *Amblyeleotris japonica* is reported firstly from Korea, based on a single specimen (70.3 mm in SL) collected at a depth of 14 m in the southern Jeju Island. The species is characterized by having a lower number of scales in longitudinal series, a rather compressed body, anterior limit of opercular opening located below between posterior margin of eye and preopercle, second dorsal fin with a single spine and 13 soft rays, anal fin with a single spine and 14 soft rays, and five brownish vertical bands on lateral body between head and caudal peduncle when fresh. New Korean names, “Se-u-but-i-mang-dug-sog” and “Bulg-eun-dong-gal-se-u-but-i-mang-dug”, are proposed for the genus and the species, respectively.

**Key words:** Gobiidae, *Amblyeleotris japonica*, first record, Jeju Island, symbiosis

## INTRODUCTION

An interesting goby was noted firstly from the Saek-kiseom which has been known as a famous diving point of Korea located in the southern coastal waters of Jeju Island, Korea by Choi *et al.* (2013) in their underwater survey results showing ichthyofauna with about 90 fishes observed around the island from 2009 to 2010. In their results, a goby was observed in front of a shelter on coarse sandy bottom, and a single underwater photograph of the goby was presented and featured by having separated pelvic fins and five dark reddish vertical bands from head to caudal peduncle on lateral body. They identified the goby as *Amblyeleotris* sp. A symbiosis goby genus *Amblyeleotris* Bleeker, 1874 is the most speciose genus comprising more than 36 species in the world (Jaafar and Randall, 2009). However, there was no report on the occurrence of *Amblyeleotris* species from the Korean waters to date, except for that of Choi *et al.* (2013).

The authors are conducting an underwater survey to un-

derstand characteristics of the fishfauna in the southern coastal waters of Jeju Island, especially around three islands comprising Beomseom, Munseom, and Seopseom islands since 2015. During the recent survey a single specimen belongs to the genus *Amblyeleotris* showing symbiotic association with a snapping shrimp, *Alpheus* sp. on the sandy bottom of the Seopseom Island was observed and collected by a plastic trap handmade. The goby was subsequently identified as *A. japonica* Takagi, 1957 which represents the first record from Korea as well as the same species observed by Cho *et al.* (2013). We, therefore, describe the species for providing detailed morphological features to understand further symbiotic characteristics between the goby and a snapping shrimp as well as its biological information from Korea. Counts and measurements follow those of Hoese and Steene (1978), and specimen examined is deposited in the fish collection of the National Institute of Biological Resources, Korea (NIBR-P). The numbers of vertical fin rays and vertebrae were counted from radiograph (Softex CMB-2, Japan). The dorsal pterygiophore formula (DPF) and designation of the sensory canal pores follow those of Akihito *et al.* (1984).

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## TAXONOMIC ACCOUNTS

### Genus *Amblyeleotris* Bleeker, 1874

(New Korean name: Se-u-but-i-mang-dug-sog)

*Amblyeleotris* Bleeker, 1874: 373 (type species: *Eleotris periophtalmus* Bleeker, 1853, by original designation and monotypy).

Cheek with transverse and longitudinal papillae rows; two longitudinal rows, uppermost extends posteriorly from fifth or sixth transverse rows; mandibular papillae reduced to a single enlarged papilla on each side of chin, set in a depression; gill opening broad, extending from upper opercular attachment below to well before posterior margin of preoperculum; body scales ctenoid posteriorly, cycloid anteriorly; second dorsal and anal fin rays I, 12 to 20; head compressed, with eyes placed high on sides of head; interorbital much narrower than eye; head pores present, 2 median unpaired interorbital pores; pelvic fins connected or separate (Hoese and Steene, 1978).

**Remarks.** The genus is the most speciose group among gobiid genera showing symbiotic association with shrimps and distributed widely in the Indo-West Pacific Ocean. From the northern West Pacific, totally 13 species have been recognized to date, *i.e.*, all species from Japan (Akihito *et al.*, 2013), seven species from Taiwan (Chen *et al.*,

1998), a single species (*A. japonica*) from Korea at present (this study).

### *Amblyeleotris japonica* Takagi, 1957

(New Korean name: Bulg-eun-dong-gal-se-u-but-i-mang-dug) (Figs. 1~2; Table 1)

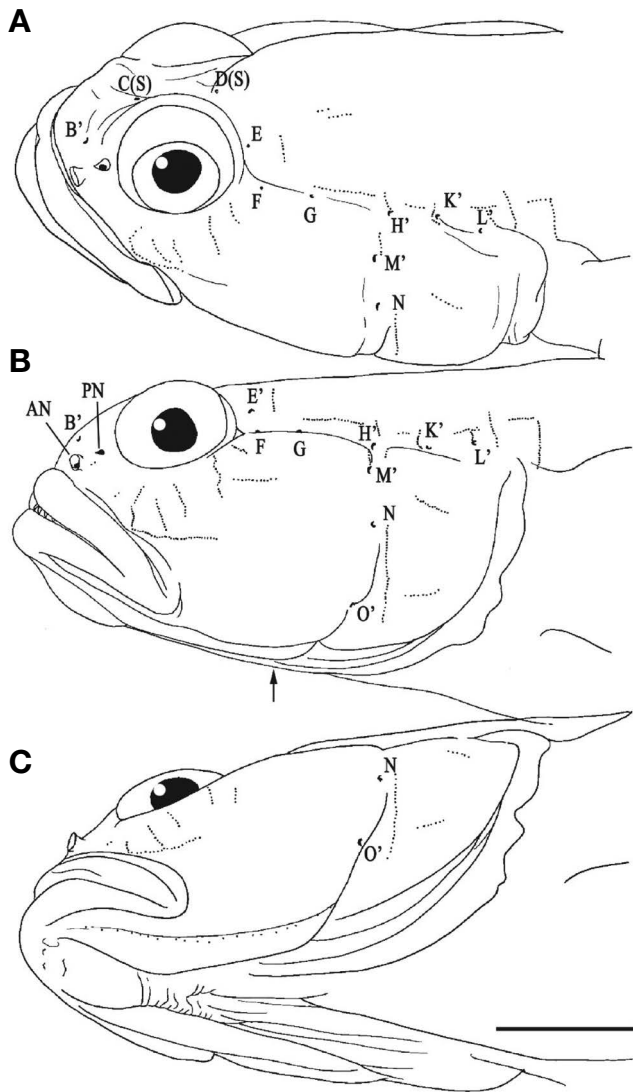
*Amblyeleotris japonicus* Takagi, 1957: 105, pl. 5 (figs. a~b), fig. 2 (type locality: tide pool at Kan-no-se, Kagoshima Bay, Kagoshima Pref., Japan); Hoese and Steene, 1978: 387 (Japan); Mohlmann and Randall, 2002: 219 (Japan); Wu *et al.*, 2009: 66 (Taiwan); Kohda *et al.*, 2017: 22, fig. 1 (Japan).

*Amblyeleotris japonica*: Akihito, 1984: 255, fig. 95, Pl. 242-C (Wakayama Pref., Ogasawara Islands to Ishigakijima, Japan); Suzuki and Senou, 1993: 602, photo (Chiba Pref., Tsushima to Kagoshima Pref., Japan); Chen *et al.*, 1998: 113, figs. 4~5 (northern Taiwan and Penghu); Hayashi and Shiratori, 2003: 137 (south of Chiba Pref., Tsushima to Kagoshima Pref., Japan); Senou *et al.*, 2004: 335, photos (Izu Islands, Chiba Pref. and Tsushima to Kagoshima Pref., Japan); Motomura *et al.*, 2010: 203, fig. 483 (Yudomari, Kagoshima Pref., Japan); Akihito *et al.*, 2013: 1502 (Izu Islands, Chiba Pref., Hakoyama Bay to Yakushima Islands, Simane Pref., Nagasaki Pref., Japan); To and Shea, 2016: 11, fig. 2 (Hong Kong).

*Amblyeleotris* sp.: Choi *et al.*, 2013: 49, fig. 2 (Jeju Island)



**Fig. 1.** Fresh specimen (above) and its X-ray radiograph (below, reverse image) of *Amblyeleotris japonica*, NIBR-P0000080204, 70.5 mm SL, collected from southern Jeju Island, Korea.



**Fig. 2.** Dorsolateral (A), lateral (B), and ventrolateral (C) aspects of head in *Amblyeleotris japonica* (NIBR-P0000080204, 70.5 mm SL). AN and PN, anterior and posterior nostrils, respectively; B' to H', anterior oculoscapular canal pores; K' to L', posterior oculoscapular canal pores; M' to O', preopercular canal pores. Apostrophes, terminal pores of canals and S, single pore. The arrow shows an attachment position of gill membrane to isthmus and bar indicates 5 mm.

land, Korea).

**Material examined.** One specimen, NIBR-P0000080204, 70.5 mm SL, 14 m depth, off Bomok-dong, Seogwipo-si, Jeju-do, Korea, 13 November 2021, B. J. Kim, S. K. Kim, and S. H. Lee, homemade trap.

**Description.** Comparison of meristic counts are provided in Table 1. Dorsal fin rays VI-I, 13; anal fin rays I, 14; pectoral fin rays 17, uppermost ray unbranched; pelvic fin rays I, 5, joined basally by a membrane, pelvic frenum present; longitudinal scale rows 84; transverse scale rows

ca. 28; segmented caudal fin rays 9+8; branched caudal fin rays 7+7; predorsal scales absent; DPF, 3/II II I I / 0 / 9; vertebrae 26. Measurements in % SL: head length (HL) 24.4; predorsal length 29.8; prepelvic length 30.1; preanal length 53.5; basal length of first dorsal fin 20.4; basal length of second dorsal fin 35.3; basal length of anal fin 33.2; length of caudal peduncle 15.6; depth of caudal peduncle 10.9; length of pectoral fin 24.8; length of pelvic fin 27.1; length of caudal fin 38.7; body depth at anus 16.5; body width posterior to gill opening 10.5; first spine length of first dorsal fin (FDF) 22.8; second spine length of FDF 25.4; third spine length of FDF 26.3; fourth spine length of FDF 22.4; spine length of second dorsal fin 13.5; first ray length of second dorsal fin 13.0; spine length of anal fin 8.7; first ray length of anal fin 9.5; spine length of pelvic fin 8.5. Measurements in % HL: head width 65.7; head depth 52.9; snout length 23.3; orbital diameter 25.6; interorbital distance 5.8; upper jaw length 42.4.

Head and body elongate and moderately compressed. Snout short and dorsal profile of head steep. Anterior nostril a short conical tube; posterior one simple tube touching margin of orbit. Eyes large, its upper lim projected dorsally and interorbital space narrow. Mouth large and oblique; its posterior edge extending to a vertical at center of pupil; lower jaw slightly projected; tongue rounded free from mouth floor. Gill opening extending forward to a vertical about one half orbit diameter behind eye.

**Cephalic sensory system** (Fig. 2). Anterior oculoscapular canal with B', C, D, E, F, G, and H'. C and D singular, between interorbitals; posterior oculoscapular canal with K', and L', preopercular canal with M', N, and O', sensory papillae in a transverse pattern.

**Color when fresh.** Head and body pale beige with five pale brownish bands from posterior part of head to base of caudal fin. Antero-dorsal part of head, between tip of snout to eye, dusky. Among bands five dusky spots along dorsal midline, anterior three spots continued a thin line ventrally. Dorsal fin nearly transparent. Pectoral fin transparent without any dark marking. Pelvic fin dusky at inner rays. Anal fin with a thin dusky line and dusky marginally. Caudal fin transparent with a pale dusky C-shaped marking.

**Color after preservation.** Ground colors of head and body light beige. Pale brownish four vertical bands from first dorsal fin to caudal peduncle on lateral body. Five dark spots on dorsal midline from origin of first dorsal fin to base of caudal fin; first spot on origin of first dorsal fin, second one on origin of second dorsal fin, third one on mid-portion of second dorsal fin, fourth one posterior-most base of second dorsal fin.

**Table 1.** Comparison of diagnostic characters of *Amblyeleotris japonica* between the present study and previous works

	<i>Amblyeleotris japonica</i>			
	Present study	Takagi (1957)	Akihito (1984)	Chen <i>et al.</i> (1998)
Standard length (mm)	70.5 (n = 1)	83.8 (n = 1)	–	55.8 (n = 1)
Dorsal fin rays	VI~I, 13	VI~I, 13	VI~I, 13	VI~I, 14
Anal fin rays	I, 14	I, 13	I, 14	I, 14
Pectoral fin rays	17	18	19	20
Pelvic fin rays	I, 5	–	I, 5	I, 5
Longitudinal scales	84	82	74	76
Transverse scales	28	32	26	25
Predorsal scales	–	–	2	3
DPF	3/II III / 0 / 9	–	3/II III / 0 / 9	–
Vertebrate (AV + CV)	26 (10 + 16)	–	26 (10 + 16)	–

**Ecological notes.** *Amblyeleotris japonica* was firstly noticed at the depths of about 10~15 meters of Seopseom Island, Jeju-do, Korea on 28 May 2019 (pers. obs.). The species has been generally observed in the same locality of the island with one or two snapping shrimps belong to the genus *Alpheus*.

**Distribution.** Known from Indo-West Pacific: Taiwan (Chen *et al.*, 1998; Wu *et al.*, 2009), Hong Kong (To and Shea, 2016), Japan (Takagi, 1957; Suzuki and Senou, 1993; Hayashi and Shiratori, 2003; Motomura *et al.*, 2010) and Korea (Choi *et al.*, 2003; present study). In Korea, only from southern coastal waters of Jeju Island, Korea at present.

**Remarks.** Thirty-eight species have been known as valid in the genus *Amblyeleotris*, distributed in the Indo-Pacific (Froese and Pauly, 2023). Particularly, lots of species reported from the adjacent country of Korea, that is, 13 species were known from the Japanese waters (Akihito *et al.*, 2002) and 11 species from the South China Sea (Chen *et al.*, 1998). From Korea, however, only a single species of *Amblyeleotris* sp. was seem to be inhabited in the southern coastal waters of Jeju Island (Choi *et al.*, 2013), although its entity was unclear. In the present study, we were able to collect a single specimen belongs to *Amblyeleotris* from the sandy bottom at a depth of 14 m near rocky reef of the Seopseom Island, Jeju-do, Korea. It was characterized by having a prominent ventral frenum, a lower number of scales in longitudinal series, a rather compressed body, anterior limit of opercular opening located below between posterior margins of eye and preopercle, second dorsal fin with a single spine and 13 soft rays, and anal fin with a single spine and 14 soft rays, and five dusky vertical bands on lateral body from head to caudal peduncle

when fresh. These morphological characters were well accordance with those of the previous reports as well as the diagnostics of the original description of *A. japonica* by Takagi (1957) as show in Table 1. We finally the specimen collected from the southern coastal waters of Jeju Island, Korea in the present study identified as *A. japonica*, representing the first record of the species from Korea.

*A. japonica* is most similar to *A. rubrimarginata* Mohlmann and Randall, 2002 in having similar dorsal and anal fin ray counts as well as pelvic fin structure. The former species, however, can be easily differentiated from the latter by a lower number of longitudinal scale rows (69~78 vs. 81~86) and a dark spot behind eye (absence vs. presence) as mention by Mohlmann and Randall (2002).

It is September 2019 that the first occurrence of *A. japonica* in the southern coastal waters of Jeju Island, Korea. Since then, we can observing the species continuously at the same locality of the island and several pairs of the species were also observed for five years. It is needed to conduct additional long-term study for clarify their symbiotic association with a *Alpheus* shrimp as well as its sound settlement in the areas of Jeju Island, Korea in the near future. New Korean names, “Se-u-but-i-mang-dug-sog”, and “Bulg-eun-dong-gal-se-u-but-i-mang-dug” are proposed for the generic and specific names of *A. japonica*, respectively, derived from its unique symbiotic association with shrimps and its reddish color of vertical bands of lateral body.

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## 딱총새우류와 공생하는 망둑어과 한국 첫기록종, *Amblyeleotris japonica*

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**요 약** : 우리나라 제주도 남부 연안의 수심 14 m에서 채집된 1개체 (표준체장 70.5 mm)의 표본을 근거로 딱총새우류와 공생하는 망둑어과 어류 *Amblyeleotris japonica*를 한국 첫기록종으로 보고한다. 이 종은 몸이 다소 측면하고 새공 하단이 눈의 후연과 전새개골 하단의 중앙 아래에 위치하며, 제2등지느러미 기조수가 1극 12연조, 뒷지느러미 기조수가 1극 14연조, 종렬비늘수가 28개, 머리에서 꼬리자루까지의 몸 측면에 5개의 폭넓은 적갈색 횡대가 있는 점이 특징이다. 이 종의 속명과 국명에 대해 '새우불이망둑속'과 '붉은동갈새우불이망둑'을 신한국명으로 제안한다.

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**찾아보기 낱말** : 망둑어과, *Amblyeleotris japonica*, 첫기록종, 새우공생, 제주도