New Record of a Rare Hypogean Gobiid, *Luciogobius pallidus* from Jeju Island, Korea

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**ABSTRACT** A hypogean gobiid, *Luciogobius pallidus* was described as the first record from Korea and also as the westernmost record of the species from the world, based on four specimens (31.2~53.6 mm SL) collected from Jeju Island, Korea. The species is characterized by having yellowish orange body color with I, 10~11 second dorsal fin rays, I, 10~12 anal fin rays, 13~15 pectoral fin rays, and 36 vertebrae as well as small embedded eyes beneath the skin. A new Korean name, “Ju-hong-mi-ggeun-mang-dug” was proposed for the species.

**Key words:** Gobiidae, *Luciogobius pallidus*, new Korean record, hypogean fish, Jeju Island

**INTRODUCTION**

The small gobiid genus *Luciogobius* Gill, 1859, is mainly characterized by having the following characters: elongated, worm-like body with a depressed small head; small eyes, or degenerated and embedded beneath skin, located dorsally; absence of the first dorsal fin (and even the second dorsal fin in *L. adapel*); and absence, or reduced coverage of scales on body (Kanagawa et al., 2011). In this genus, 16 species have been recognized as valid and most of them are occurred in interstitial habitats of gravel beaches or river mouth from the East Asia. From the Korean waters, only four species have been reported as follow to date: *L. grandis* Arai, 1970, *L. guttatus* Gill, 1859, *L. kona* (Snyder, 1909), and *L. saikaiensis* Dōtu, 1957 (Kim et al., 2005), although two unrecorded *Luciogobius* fishes (i.e., *L. elongatus* and *L. placecephalus*) were already found from the southeastern coast of the Korean Peninsula (pers. comm. S.H. Choi).

During a recent ichthyofaunal survey of Jeju Island, Korea, I obtained an unique *Luciogobius* species with yellowish orange coloration from the upper rocky intertidal zone close to springwaters located at the southern coast of the island. It was readily identified as a rare hypogean gobiid, *Luciogobius pallidus* which has been recorded from only the Japanese waters to date by its unique body coloration (Akihito et al., 2002; Proudlove, 2006), representing as the first record from Korea and also as the westernmost record of the world. In this study, I describe *Luciogobius pallidus* as the first hypogean fish from Korea.

**MATERIALS AND METHODS**

All specimens of *Luciogobius pallidus* were collected from the rocky intertidal zone close to springwaters with bare hands or small hand nets at low tide during a survey on excavating project of Korean indigenous fish species in Jeju Island. They were fixed in 5~7% formalin after taking photographs and transfered into 75% ethanol for long-term preservation. Vouchers are deposited at the National Institute of Biological Resources (NIBR-P), Korea. Counts and measurements follow those of Hubbs and Lagler (1958). The cephalic sensory canal system was observed by stained specimens with cyanine blue, following those of Akihito et al. (2002).

**Luciogobius pallidus** Regan, 1940

(New Korean name: Ju-hong-mi-ggeun-mang-dug)

(Figs. 1~2; Table 1)


Materials examined. NIBR-P13719, 4 specimens, 31.2~53.6 mm in standard length (SL), Haye-dong, Seog
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**Description.** Second dorsal fin rays I, 10~11; anal fin rays I, 10~12; pectoral fin rays 13~15 (mainly 15); pelvic fin rays I, 5; principal caudal rays 17; vertebrae 36. First dorsal and anal pterygiophores inserted between 18th and 19th vertebrae; last dorsal and anal pterygiophores inserted between 25th and 26th vertebrae; total dorsal and anal pterygiophores 12 and 11, respectively. Body proportion as % SL: head length 19.4~22.8 (mean 21.2) head depth 12.5~15.0 (13.9); upper jaw length 7.7~10.2 (8.7); snout length 5.1~5.8 (5.4); interorbital width 3.4~5.4 (4.0); body depth 9.6~10.8 (10.1); length of longest pectoral fin ray 11.8~13.6 (12.9); predorsal length 60.0~69.9 (67.3); length of second dorsal fin base 14.6~17.7 (16.4); length of longest second dorsal fin rays 9.9~12.9 (11.8); preanal length 67.5~69.9 (68.6); length of anal fin base 17.0~17.9 (17.5); length of longest anal fin ray 8.8~11.7 (10.7); caudal peduncle depth 9.3~10.8 (10.3); caudal peduncle depth 14.8~17.4 (16.0).

Body cylindrical and elongate, gradually compressed posteriorly. Head relatively large, its length about one fifth of SL and depressed. Mouth terminal; maxilla extending posterior to a vertical at posterior margin of orbit. Both jaws with 3 to 4 rows of conical teeth arranged irregularly; those on outer row larger, weakly curved inwardly. Gill opening narrow, extending ventrally to lower end of pectoral fin. Nares two and well separated; anterior one a short tube, its tip reaching to upper lip and posterior simple pore close to eye. Eye small and degenerated, embedded beneath skin; clearly visible when fresh, and obscured by bleaching after fixation. Interorbital region relatively wide and flat. A longitudinal thin dermal ridge running from snout to cheek below eye. Occipital region slightly bulged dorso-laterally. First dorsal fin absent. Second dorsal fin origin nearly at a same vertical of anal fin origin; 7th rays longest in both second dorsal and anal fins. Posterior margin of second dorsal and anal fins relatively round. Pectoral fin round, lacking any free soft rays on upper and lower ends. Pelvic fins fused, forming a small sucker with thin membranous frenum. Caudal fin relatively large and round. No scales on head and body.

Cephalic sensory system as shown in Fig. 1. Sensory canal and pore absent. Pit organs arranged sparsely, forming some longitudinal rows on occipital region, cheek, and mandible; two transverse short rows present on opercle.

**Color when fresh** (Fig. 2). Head and body yellowish orange with distal margin of all fins translucent and ventral sides of body slightly paler.

**Color after preservation:** Yellowish orange on head and body completely faded; ground color of head and body pale brownish with small brownish dots scattered restrict to upper region of head and body. Ventral region of head and body anterior to anal fin without any brownish dots. Lower half of second dorsal and basal region of caudal fins with minute brownish dots. Anal and pelvic fins transparent without any brownish dots.

**Ecological notes.** All specimens were collected at the upper rocky intertidal zone close to springwaters. It was found beneath gravel substrates composed of coarse sand and small pebbles where freshwater springs flow from gaps between the pebbles. Three gobiid fishes, Chasmichthys dolichognathus, Mugilogobius abei, and Luciogobius guttatus were coexisted around the collection site of L. pallidus.

**Distribution.** From Korea, it is known only from the southern coast of Jeju Island (present study). The species shows relatively wide distribution (Shizuoka Pref., Mie Pref., Wakayama Pref., Kochi Pref., Ehime Pref., Shikoku Pref., Kumanamto Pref., Yamauchi Pref., Nagasaki Pref.;
Yoshida and Akihito, 1997; Akihito et al., 2002).

**Remarks.** Up to date, it has been known that only five species of *Luciogobius* have small eyes embedded beneath the skin as follows: *L. albus* Regan, 1940, *L. pallidus* Regan, 1940, *L. dormitoris* Shigaki and Dotu, 1976, *L. fenticola* Kanagawa, Itai and Senou, 2011, and *L. fluvialis* Kanagawa, Itai and Senou, 2011 (Romero and Paulson, 2001; Kanagawa et al., 2011).

*Luciogobius* specimens collected from the Jeju Island, Korea is readily differentiated from *L. albus* and *L. fenticola* by having the larger number of second dorsal fin rays (I, 10 ~ 11 vs. I, 7 ~ 9), and from *L. fluvialis* by having the larger number of vertebrae (36 vs. 31 ~ 33). Although it is most similar to *L. dormitoris* in having common diagnostic characters, *L. pallidus* differs from the latter by having the thinner the body depth (15.6 ~ 26.8 vs. 7.6 in SL). Thus, the present specimens were finally identified as *Luciogobius pallidus* which have been known from the western Japan only to date and also well coincided with the result of the previous works as well as the diagnostics of syntypes of the species (Table 1).

**Comparative materials.** *Luciogobius pallidus*: ZUMT
11607, 36.5 mm SL, ZUMT 16147, 53.8 mm SL, ZUMT 26342, 29.4 mm SL, syntypes of \textit{L. pallidus} Regan, artesian well, Japan.

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REFERENCES


제주도에서 처음 발견된 지하수계 서식 흰귀 망둑어류
한국미기록종, *Luciogobius pallidus*

김병식

국립생물자원관 동물자원과

요 약 : 제주도 남부지방에서 처음으로 체집된 4개체(체장 31.2~53.6 mm)를 근거로 국내 최초의 지하수계 서식 흰귀 망둑어류인 *Luciogobius pallidus*를 한국미기록종으로 보고한다. 본 종은 체색이 주홍색이며 높이 높은 뒷부 아래에 배포되어 있고 제 2등지느리미 기조수는 1극조 10~11일기, 뒷지느리미 기조수는 1극조 10~12일기, 가슴지느리미 기조수는 13~15일기, 척추골수는 36개인 특징이 있다. 본 종의 신한국명은 ‘주홍미곤망둑’이라 제안한다.

찾아보기 날짜 : *Luciogobius pallidus*, 한국미기록종, 지하수계 어류, 제주도