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A new species of *Luciogobius* Gill (Teleostei: Gobiidae) from northern Taiwan

CHIH-WEI CHANG[1,2,5*], KANG-NING SHEN[1,6#] & I-SHIUNG CHEN[3,4,7*]
[1]*Marine Ecology and Conservation Research Center, National Academy of Marine Research, Kaohsiung, 806614, Taiwan, R.O.C.*
[2]*National Museum of Marine Biology and Aquarium, Pingtung, 944401, Taiwan, R.O.C.*
[3]*Institute of Marine Biology, National Taiwan Ocean University, Keelung, 202301, Taiwan, R.O.C.*
[4]*Center of Excellence for the Oceans, National Taiwan Ocean University, Keelung, 202301, Taiwan, R.O.C.*
[5] *changcw@namr.gov.tw; https://orcid.org/0000-0002-0659-9582*
[6] *knshen@namr.gov.tw; https://orcid.org/0000-0002-6338-6049*
[7] *iscfish@gmail.com; https://orcid.org/0000-0002-4190-7720*
[#]*The author shares equal contribution to the first author*
**Corresponding authors*

Abstract

A new gobiid fish of *Luciogobius* Gill, 1859 had recently been collected from the intertidal waters of northern Taiwan. The new species, *Luciogobius delicatus* **sp. nov.**, is characterized by the following unique combination of features: (1) second dorsal fin rays: I/10 and anal fin rays I/12; (2) pectoral fin rays 14 and with one upper, short free soft ray; (3) vertebral count: 22 + 22 = 44; and (4) specific coloration: body and head rather light, creamy yellow. Pectoral fin base with several tiny black spots. Caudal fin pale brown. Second dorsal fin translucent with tiny black dots. A brief discussion of their own related species would also be addressed.

Key words: new goby, *Luciogobius*, fish taxonomy, New Taipei City, Taiwan

Introduction

The gobiid fishes comprise the most diverse group among teleosts in both freshwater and marine habitats (Miller 1998, Chen & Kottelat 2005).

The great diversity of gobioid fauna as longitudinal infraorbital papilla patterns with a higher vertebral count is mostly endemic to the West Pacific and northwestern Pacific. For example, the genus *Luciogobius* Gill, 1859 and other related genera typically reside in freshwater to marine habitats in eastern Asia, where they are endemic to Japan, Taiwan, China, and Korea (Chen 1932, Akihito *et al.* 1984, Chen & Fang 1999, Suzuki & Shibukawa 2004). In Japanese waters, there are more than 16 nominal species that have been revised as valid (Regan 1940, Dôtu 1957, Arai 1970, Shiogaki & Dotsu 1976, Okiyama 2001, Akihito *et al.* 2002, Chen *et al*. 2008, Kanagawa *et al*. 2011), and there are still over 20 undescribed species of the genus (Suzuki & Shibukawa 2004).

In 2024, more diversity of *Luciogobius* had been discovered, including the following six species: *L. matsuensis* Chen *et al.*, 2024a from Matsu Islands; L. dongyinensis Chen *et al.*, 2024a from Dongyin Island; *L. opisthoprotus* Chen & Liao, 2024 from eastern Taiwan; *L. chaojinensis* Chen *et al.*, 2024b from Keelung, northeastern Taiwan; *L. newtaipeiensis* Chen *et al.*, 2024b from New Taipei City; *L. huangtungensis* Chen *et al.*, 2024b from eastern Taiwan. Totally, there are eight nominal species, including both Matsu and Taiwan. Herein we describe a very slender, rare *Luciogobius* specimen as a new species from northern Taiwan. A brief comparison with the related species would also be addressed.

Materials & methods

The type specimen of the new species was collected by a hand-net in the inter-tidal waters. All counts and measurements were taken from specimens preserved in 70% ethanol. Morphometric methods generally follow

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Miller (1988), and meristic methods follow Akihito *et al.* (1984) and Chen & Shao (1996). The terminology of cephalic sensory canals and free neuromast organs (sensory papillae) is from Wongrat & Miller (1991), based on Sanzo (1911).

The type specimens are deposited in the Pisces collection at the National Taiwan Ocean University, Keelung (NTOUP). Meristic abbreviations: A, anal fin; C, caudal fin; D1, and D2, 1st and 2nd dorsal fins, respectively; P, pectoral fin; V, pelvic fin; and VC, vertebral count. All fish lengths are standard length (SL).

Systematics

***Luciogobius delicatus* sp. nov.**
[New English name: delicate earthworm goby]
(細點竿鯊)
(Figs 1–2)

Materials examined

Holotype. NTOUP-2006-06-310, 38.2 mm SL, Londong, New Taipei City, Taiwan, ROC, coll. I-S. Chen, June 12, 2006.

Diagnosis

Luciogobius delicatus **sp. nov.** can be well distinguished from the other congeneric species by the following unique combination of features: (1) second dorsal fin rays: I/10 asnd anal fin rays I/12; (2) pectoral fin rays 14 and with one upper, short free soft ray; (3) vertebral count: 22 + 22 = 44; and (4) specific coloration: body and head rather light, creamy yellow. Pectoral fin base with several tiny black spots. Caudal fin pale brown. Second dorsal fin translucent with tiny black dots.

Description

Body proportions listed in Table 1. Body very slender, cylindrical anteriorly and somewhat compressed posteriorly. Head flat and depressed. Cheek rather fleshy. Eye very small. A horizontal dermal fold with papillae row on upper part of cheek and below orbit. Snout flat and short. Anterior nasal opening as a protruded, horizontal short tube and posterior nasal opening as a round hole. Interorbital region wide. Mouth very oblique and rather large, maxillary extending beyond rear vertical of orbit in male. lower jaw rather prominent compared to upper jaw. Teeth rather minute, with 4–5 rows of tiny conical teeth where outer rows larger in both jaws. Tongue somewhat pointed, but anterior tip bilobed. Gill opening rather restricted, extending merely slightly below lower margin of pectoral base. Anus located in posterior half of body. Vertebral count 22 + 22 = 44.

***Fins*.** D2 I/10, A I/12, P 14. V I/3+I/3. D1 absent. D2 with middle one third portion of rays longest. A shape similar to D2. Both first spines in D2 and A relatively short. A origin in front of D2 origin. D2 origin inserted vertically between 3rd and 4th branched rays of A. Both rear tip of D2 and A far from procurrent rays of C when depressed. P rounded and its length much shorter than postorbital length. P with one tiny free soft ray on upper margin near upper basal region. V very small with reduced total rays. C elliptical. V as a very reduced, round sucking disc with complete frenum.

***Scales*.** Both body and head entirely naked without any scales.

Head lateral-line system

Head canals: head lacking any canal and head pores entirely.

Sensory papillae: a series of infraorbital sensory papillae, typically representing a longitudinal pattern. Row *a* long and extending to snout which upward to surrounding eye diameter in interorbital region. Row *b* rather long starting slightly behind middle vertical of eye, its length about two times eye diameter. Row *c* mainly below dermal fold and long. A single *cp* located below rear Row *c*. Row *d* shorter than row *c*. Row *f* paired only as two papillae. Opercle with three rows *ot*, *os*, and *oi*. Rows *oi* and *ot* well separated. Rows *z* as a single vertical row.

FIGURE 1. *Luciogobius delicatus* **sp. nov.**, holotype, 38.2 mm SL, Longdong, New Taipei City, Taiwan.

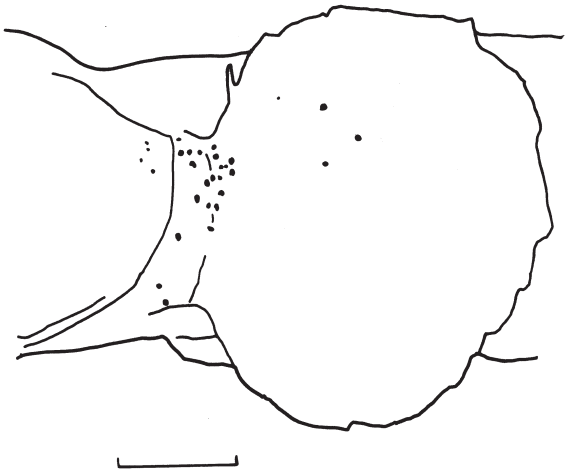

FIGURE 2. Pectoral fin pigmentation of *Luciogobius delicatus* **sp. nov.**, holotype, 38.2 mm SL, Longdong, New Taipei City, Taiwan (bar = 1 mm).

Coloration when fresh

Body and head rather light, creamy yellow entirely. Pectoral fin base with several tiny black spots.

Caudal fin pale brown. Second dorsal fin translucent with tiny black dots.Anal fin translucent and unmarked.

Distribution

Till present, this species has merely been found in the coastal region of New Taipei City in Taiwan. It is an intertidal species on the island. There is a high possibility that it is a species endemic to Taiwan.

Etymology

The specific name, *delicatus* refers to the specific feature of current new species with 'delicate' tiny black spots.

Remarks

The current species is rather similar to *L. chaojinensis* rather than any other species in having extremely slender body and pectoral fin with one upper free ray. However, the new species, *L. delicatus* can be well distinguished from *L. chaojinensis* by the following features: (1) body color in alive: creamy yellow vs. reddish brown; (2) pectoral fin rays: 14 vs. 12–13; (3) vertebral count: 44 vs. 41. The current species is very rare even the type is only one found in northern Taiwan. The further exploration of current new species is very essential.

TABLE 1. Morphometry of *Luciogobius delicatus* from Taiwan.

Type status	Holotype
Size (mm SL)	38.2
% in SL	
Head length	20.0
Snout to 2nd dorsal origin	87.7
Snout to anal fin origin	82.1
Prepelvic length	21.2
Caudal peduncle length	22.1
Caudal peduncle depth	10.2
Second dorsal fin base	15.3
Anal fin base	17.5
Caudal fin length	14.1
Pectoral fin length	9.4
Pelvic length	2.8
Body depth of pelvic fin origin	9.8
Body depth of anal fin origin	10.0
% in HL	
Snout length	21.9
Eye diameter	9.9
Postorbital length	71.4
Cheek depth	37.1
Lower jaw length	34.2
% in caudal peduncle length	
Caudal peduncle depth	46.1

Diagnostic key for 7 nominal species of *Luciogobius* from Taiwan and the Matsu Islands, ROC

1a Vertebral count 36 . . . . . *L. newtaipeiensis* Chen *et al.* 2024b
1b Vertebral count more than 36 2
2a Pectoral fin with 1 or more upper free ray(s) 3
2b Pectoral fin without any upper free rays . . . . . *L. opisthoprotus* Chen & Liao 2024
3a Pectoral fin with 1 upper free ray 4
3b Pectoral fin with more than 1 upper free ray 5
4a Pectoral fin modally 16; vertebral count 37–38 . . . . . *L. matsuensis* Chen *et al.* 2024a
4b Pectoral fin ray less than 16 6
5a Second dorsal fin modally I/15; pectoral fin with 4 upper free rays; vertebral count 39 . . . . *L. huatungensis* Chen *et al.* 2024b
5b Second dorsal fin I/16; pectoral fin with 3 upper free rays; vertebral count 41 . . . . . *L. dongyinensis* Chen *et al.* 2024a
6a Pectoral fin modally 13; vertebral count 41 . . . . . *L. chaojinensis* Chen *et al.* 2024b
6b Pectoral fin 14, vertebral count 44 . . . . . ***L. delicatus* sp. nov.**

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