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A new species of freshwater goby (Teleostei: Gobiidae: *Rhinogobius*) from Xijiang, Pearl River basin, Guangxi Province, China

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Abstract

A new species of freshwater gobiid fish of the genus *Rhinogobius* Gill, 1859, was collected from the hill stream of Xijang, Pearl River basin, Gangxi Province, China. *Rhinogobius lingjiangensis* can be well distinguished from all other congeners by the unique combination of the following features: (1) fin rays: second dorsal fin rays I/7–8 (usually I/8); anal fin rays I/6–7 (usually I/6); pectoral fin rays 16–17 (modally 16); (2) squamation: longitudinal scale series 31–32 (modally 31); perdorsal scales 5–6 (modally 6); (3) vertebral count 28; and (4) specific colouration: cheek with 7 rather wide reddish orange parallel bands in male; caudal fin base with a central blackish brown spot in male; pectoral fin base greyish with brown vertical bar in male, anterior basal 1/4 region of pectoral fin with semicircular creamy yellow region in male. A brief comparison of current species with related species will be addressed.

Key words: *Rhinogobius lingjiangensis*, new species, Xijiang, Guanxi province, fish taxonomy

Introduction

The gobioid fishes are rather important benthic fish fauna in the Asiatic region. In mainland China, there are many river drainages awaiting to be discovered that the species diversity has been estimated to be more than 90 nominal gobiid species (Chen & Kottelat 2003, 2005; Chen & Fang 2006; Chen *et al.* 2008; Yang *et al.* 2008; Chen & Miller 2013). The highest species diversity of the current genus is predicted to be found within the freshwater basins of mainland China (Chu & Wu 1965; Wu & Ni 1985; Zheng & Wu 1985; Chen & Miller 1998; Chen *et al.* 1999a–c; Chen *et al.* 2002; Chen & Fang 2006; Huang & Chen 2007; Li *et al.* 2007; Chen *et al.* 2008; Chen & Miller 2008, 2013; Yang *et al.* 2008; Wu *et al.* 2009; Wang & Chen 2022; Chen *et al.* 2022, 2024; Chen & Wei 2024; Chen unpublished data).

In the Pearl River basins, the more subtropical weather for the whole aquatic zone has yielded the rather great variety of habitats for freshwater fish communities. However, it is still far from well-known for its own fish fauna; some of them are still waiting for the freshwater ichthyologists to explore deeply.

In the largest southern Pearl River basin of mainland China, two major groups of typically fluvial *Rhinogobius* species would belong to the *Rhinogobius douspilus* (Herre, 1935) complex and the *Rhinogobius wui* (Liu, 1940) complex by well-differentiated patterns of branchiostegal membrane in males (Chen unpublished data). During our continuous field survey for fish biodiversity in basins of mainland China, it seems more diverse in freshwater gobies from our several collections of Chinese running waters.

Herein the author will report the new discovery of a miniature species of fluvial Rhinogoby species, which was found in the small hill-stream of Guangxi Province, Xijiang, Pearl River basin, P.R. China. The paper will formally document the new fluvial, non-diadromous species, and a morphological comparison with closely related species will also be addressed.

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Materials & Methods

Type specimens of the new Rhinogoby were collected by hand-net and casting-net.

All counts and measurements were made from specimens finally preserved in 70% ethanol. Morphometric methods generally follow Miller (1988) and meristic methods follow Akihito *et al.* (1984) and Chen & Shao (1996) and Chen *et al.* (1999b–c).

All terminology of cephalic sensory canals and free neuromast organs (sensory papillae) is from Wongrat & Miller (1979), generally based on Sanzo (1911). All abbreviations are the meristic terms of morphological features as follows: A = anal fin; C = caudal fin; D1 = first dorsal fin; D2 = second dorsal fin; LR = longitudinal scale rows; P = pectoral fin; PreD = predorsal scales; SDP = scale series from origin of first dorsal fin to upper pectoral fin origin; TR = transverse scale series from second dorsal to anal fins; V = pelvic fin; VC = vertebral count. All fish lengths are expressed by standard length (SL).

The types of current new species are deposited in the Pisces collection of National Taiwan Ocean University, Keelung (NTOUP).

Systematics

***Rhinogobius lingjiangensis* sp. nov.**
(靈江吻鰕虎)
(Figs.1–3)

Material examined

Holotype. NTOUP-2009-08-255, 26.2 mm SL, Lingjiang, the small hillstream of Xijiang, Guelin, Pearl River basin, Guangxi Province, P.R. China; coll. I-S. Chen, Aug. 06, 2009.

Paratypes. NTOUP-2009-08-256, 2 specimens, 22.9–25.6 mm SL, other data same as holotype.

Diagnosis

Rhinogobius lingjiangensis can be well distinguished from all other congeners by the unique combination of the following features: (1) fin rays: second dorsal fin rays I/7–8 (usually I/8); anal fin rays I/6–7 (usually I/6); pectoral fin rays 16–17 (modally 16); (2) squamation: longitudinal scale series 31–32 (modally 31); perdorsal scales 5–6 (modally 6); (3) vertebral count 28; and (4) specific colouration: cheek with 7 rather wide reddish orange parallel bands in male; caudal fin base with a central blackish brown spot in male; pectoral fin base greyish with brown vertical bar in male, anterior basal 1/4 region of pectoral fin with semicircular creamy yellow region in male.

Description

Body proportions in Table 1. Body cylindrical anteriorly, compressed posteriorly. Head rather large, somewhat depressed in male. Eye large, dorsolateral. Snout pointed. Cheek fleshy in male. Lips thick. Mouth oblique, large, rear edge reaching to midline of orbit in male, but just reaching vertical of anterior margin of eye in female. Both jaws with 3–4 rows of conical teeth, outer jaws enlarged. Tongue margin rounded. Anterior nostril in short tube and posterior nostril round. Gill opening rather large, extending ventrally far forward beyond vertical midline of opercle. Vertebral count 11 + 17 = 28 (in all 3 specimens).

Fins. D1 VI, D2 I/7–8 (usually I/8); A I/6–7 (usually I/6); P 16–17 (modally 16); V I/5+I/5 (distribution frequency in Table 2). D1 rounded, 3rd rays slightly longest, with rear tip while depressed extending just to D2 origin in male, but not reaching the point in female. Origin of A inserted below third branched rays of D2.

The rear tips of D2 and A rays when depressed far from of procurrent rays of C.

P moderate large and oblong, its rear tip near reaching vertical line through anus. V rounded, spinous rays with somewhat pointed membrane lobe. C elliptical, rear edge rounded.

Scales. Body with rather large ctenoid scales, anterior region of predorsal area naked; posterior dorsal area and belly cycloid. LR 31–32 (modally 31); TR 8; PreD 5–6 (modally 6); and SDP 7. Head and prepelvic region naked. Anterior edge of midpredorsal squamation extending near the midline of upper end of gellopening.

TABLE 1. Morphometry of *Rhinogobius lingjiangensis.*

Type	Holotype	Paratype	Paratype
No. of samples	1	1	1
Sex	Male	Male	Female
standard length (mm)	26.2	25.6	22.9
% in SL			
Head length	31.6	33.5	29.3
Predorsal length	40.1	39.8	35.4
Snout to 2nd dorsal fin origin	62.6	58.1	55.8
Snout to anal fin origin	66.4	63.1	64
Snout to anus	61.1	59.3	56.6
Prepelvic length	32.2	30.0	29.3
Caudel peduncle length	19.0	20.6	20.5
Caudal peduncle depth	10.3	11.7	10.8
First dorsal fin base	18.9	18.9	19.2
Second dorsal fin base	25.2	26.6	20.8
Anal fin base	18.2	18.9	17.2
Caudal fin length	28.1	28.7	24.6
Pectoral fin length	28.8	28.0	24.3
Pelvic fin length	17.1	19.3	17.6
Body depth of pelvic fin origin	14.4	15.1	14.3
Body depth of anal fin origin	13.8	15.8	14.1
Body width of anal fin origin	10.2	10.0	9.8
Pelvic fin origin to anus	30.7	25.7	30.3
% in HL			
Snout length	23.3	24.7	25.6
Eye diameter	20.6	22.1	23.1
Postorbital length	50.3	48.4	54.5
Cheek depth	28.7	26.8	17.6
Head width in upper gill-opening	51.6	45.0	46.5
Head width in maximum	58.0	63.5	55.9
Fleshy interorbital width	17.5	19.5	20.4
Bony interorbital width	6.7	6.1	9.3
Lower jaw length	39.4	40.3	33.1
% in Caudel peduncle length			
Caudal peduncle depth	54.3	57.0	52.8

Values in parenthese are the average.

Head lateral-line system

Canals: Nasal extension of anterior oculoscapular canal with terminal pore σ located in between anterior and posterior nostrils. Anterior interorbital sections of oculoscapular canal with paired pore λ. A single pore κ in near rear of interorbital region. The gap between two oculoscapular canals is about equal to the length of posterior oculoscapular canal. Pore ω present near posterior, dorsal margin of eye. Lateral section of anterior oculoscapular canal with pore α and terminal pore ρ. Posterior oculoscapular canal with two terminal pores θ and τ.Preopercular canal with three pores γ, δ and ε.

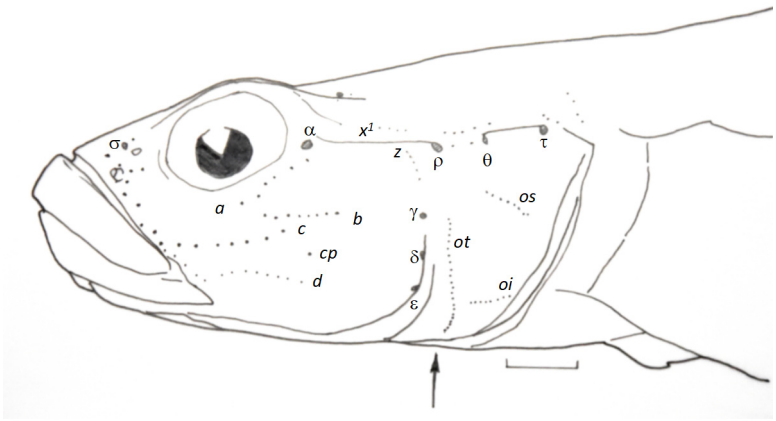

FIGURE 1. Head lateral-line system of *Rhinogobius lingjiangensis*, holotype, 26.2 mm SL, Lingjing, Xijiang, Guangxi, China.

Sensory papillae

Row *a* extending to vertical midline of orbit. Row *b* length about equal to eye diameter. Rows *c*, *d* longer, extending to the vertical of rear margin of eye. A single *cp* papilla. Row *f* paired. Anterior edge of row *oi* somewhat separated to lower region of row *ot*.

Coloration in fresh. (Figs. 2–3)

Body light brown with six brown and greyish brown blotches. Many orange spots scattered on lateral body. Caudal fin base with a central blackish brown spot in male and a short vertical bar in female. Head greyish brown or light greyish brown. A pair of V-shape red mark on dorsal snout. Infraorbital region with the pale gray mark. Cheek with three parallel blackish brown stripes in male. Cheek with merely one oblique black stripe in female. Opercle with gray median region. Branchiostegal membrane pale greyish background with 7 rather wide reddish orange parallel bands in male. The interspace merely about 1/3 width of orange bands. Brachiostegal memebrane unmarked in female.

First dorsal fin entirely translucent with median wide, black band and distal region pinkish orange in male. First dorsal fin translucent with about three longitudinal rows of brown spots in female. Second dorsal fin pale brown with 3 longitudinal rows of brown spots and a distal orange margin in male. Second dorsal fin translucent with 3 longitudinal rows of brown spots in female. Pectoral fin base greyish with brown vertical bar in male. The anterior basal 1/4 region with semicircular creamy yellow region in male. Pectoral fin base creamy yellow with a semicircular brown curve in female. Anal fin entirely bright orange and a narrowly distal black margin in male. Anal fin entirely translucent in female. Caudal fin greyish with 5 vertical rows of pale brown spots in male. Caudal fin translucent with 5 rows of brown spots in female.

Etymology

The specific name, *lingjiangensis*, is referred to the type locality of current new species inhabiting in Lingjiang, the smaller tributary of Xijiang, Guanxi Province, China.

Distribution

This new species, *Rhinogobius lingjiangensis*, is so far merely found in the small tributary of Xijiang, Guangxi Province, China. It occurs in shallow-water riffles and front region of pools (depth 15–60 cm depth) with substratum of large pebbles with moderate flowing water.

FIGURE 2. *Rhinogobius lingjiangensis,* A. male, holotype, 26.2 mm SL, B. female, papatype, 22.9 mm SL, Lingjiang, Xijiang, Pearl River basin, Guangxi, China.

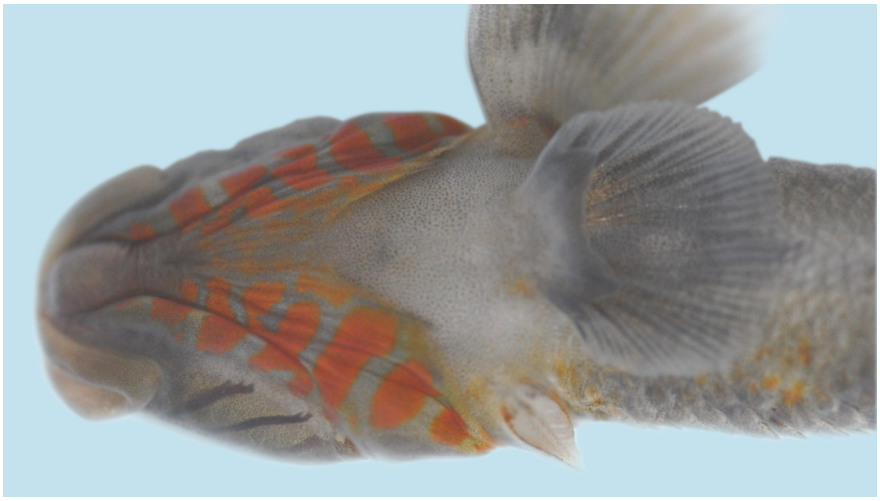

FIGURE 3. Branchiostegal membrane pattern of male *Rhinogobius lingjiangensis*, holotype, 26.2 mm SL.

Remarks

This new species, *Rhinogobius lingjiangensis*, is rather similar to similar to the *R. duospilus* (Herre, 1935) described from the Hong Kong river basins than any other valid congeneric species nearby.

However, the new species, *Rhinogobius lingjiangensis* can be well distinguished from *R. duospilus* by the following combination of features: (1) vertebral count 28 vs. 27; (2) pectoral fin pigmentation pattern: a vertical brown line in male vs. two deep brown spots; (3) first dorsal fin pattern: a wide, horizontal deep black band in male vs. about two vertical marks in front of first dorsal fin membrane in male; and (4) branchiostegal membrane: wide, bloody red orange crossing marks in male vs. narrow orange red stripes in male. It seems that *Rhinogobius lingjiangensis* with rather miniature body size as dwarf species which is usually smaller than that of *Rhinogobius duospilus*.

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