



## A newly recorded gobiid genus, *Discordipinna* (Teleostei: Gobiidae), from northeastern Taiwan

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### Abstract

A specimen of the newly recorded gobiid genus *Discordipinna* was recently collected from northeastern Taiwan via SCUBA diving. The newly recorded spikefin goby, *Discordipinna griessingeri* Hoese & Fourmanoir, 1978, is the type species of the genus. The sole specimen was collected from Longdong Bay, northeastern Taiwan, and it closely matches the original description of the species. The redescription of this extremely rare reef goby species found in Taiwanese waters is diagnosed and reported in this paper.

**Key words:** new record, *Discordipinna*, coral-reef goby, fish fauna, fish taxonomy

### Introduction

Fishes in the family Gobiidae belong to one of the largest groups of marine teleost fishes in the world (Miller, 1988; Wu *et al.*, 2009). The coral reef-associated gobiid genus, *Discordipinna* Hoese & Fourmanoir, 1978, is a very small-sized goby with a longitudinal infraorbital papilla pattern (Hagiwara *et al.*, 1996; Akihito *et al.*, 2002; Motomura & Matsuura, 2010). There are currently two recognized species in this genus (Chen *et al.*, 2012).

The type species of the genus is *Discordipinna griessingeri* Hoese & Fourmanoir, 1978. The holotype was collected in the Gulf of Aqaba, the Red Sea, and there are other type series and recent records from the West Pacific, including Indonesia, the Philippines, and Japan (Hagiwara *et al.*, 1996; Akihito *et al.*, 2002). The second, rare species in this genus, *Discordipinna filamentosa*, was found and described from Japanese waters by Chen *et al.* (2012) based on the holotype from the deep-water habitat of the Kume-jima of Ryukyus, Japan.

Although the type species of this genus has been recorded by SCUBA divers in Taiwan, no formal specimen has ever been brought to light in a museum or any research institution collection (Chen *et al.*, 2012).

Recently, an intensive fish fauna expedition was conducted in northeastern Taiwan. Our SCUBA diving team discovered a very unusual specimen, which we have identified as the type species of genus, *Discordipinna griessingeri* Hoese & Fourmanoir, 1978. Our collection from Taiwanese waters aligns well with the original description of this species. The redescription of the species newly found in Taiwanese waters will be diagnosed and reported in this paper.

### Materials and Methods

The gobiid fish specimens were collected by a hand-net during a SCUBA diving survey of benthic fish fauna. All counts and measurements were taken from specimens preserved in 70% ethanol after fixation with 10% formalin. Morphometric methods followed Miller (1988) except the additional measurement for the length of the first dorsal fin; meristic methods followed Akihito *et al.* (1984), Chen & Fang (2006), and Chen & Miller (2008). The

terminology used for the head sensory canals and free neuromast organs (sensory papillae) was from Wongrat & Miller (1991), based on Sanzo (1911).

Meristic abbreviations are as follows: A = anal fin; C = caudal fin; D1 = first dorsal fin; D2 = second dorsal fin; LR = longitudinal scale rows; TR = transverse scale rows from the second dorsal fin origin; V = pelvic fin; and VC = vertebral count. All fish lengths are expressed as standard length (SL).

All specimens from the current species are deposited at the Pisces collections of the National Taiwan Ocean University, Keelung (NTOUP).

## Systematics

### *Discordipinna griessingeri* Hoese & Fourmanoir, 1978

(New Chinese name: 葛來氏羽鰭鰕虎)

(Figs. 1–2)

*Discordipinna griessingeri* Hoese & Fourmanoir, 1978: 21 (El Himeira, Egypt, Gulf of Aqaba, Red Sea).

*Discordipinna griessingeri*, Hagiwara *et al.*, 1996:2.

*Discordipinna griessingeri*, Akihito *et al.*, 2002:1250.

*Discordipinna griessingeri*, Suzuki & Shibukawa, 2004: 443.

*Discordipinna griessingeri*, Motomura *et al.* in Motomura & Matsuura, 2010: 208.

*Discordipinna griessingeri*, Chen, Suzuki & Shao, 2012: 275.

**Materials examined.** **Taiwan.** NTOUP-2021-06-205, 1 specimen, 25.3 mm SL, 20 m depth, Longdong Bay, New Taipei City, Taiwan, ROC, coll. I-S. Chen *et al.*, 23 June, 2021. **The Philippines.** NTOUP-2011-01-001, 3 specimens, 13.3–13.7 mm SL, Mactan, Cebu Island, the Philippines, coll. A. Chen *et al.*, 8 Nov., 2009.

**Diagnosis.** This species can be well distinguished from congeners by the unique combination of the following features: (1) fins: first dorsal fin rays V; pectoral fin rays 17–20 (modally 18); and first dorsal fin with longest anterior two rays in male and fin membrane deeply indented between first two dorsal spines; (2) squamation: longitudinal scale rows 22–25; transverse scale rows usually 6–7 and predorsal naked; (3) dorsal pterygiophore formulae 3/41001/8; 10 + 16 = 26 vertebrae; (4) head lateral-line system: reduced, longitudinal pattern of infraorbital papilla and anterior oculoscapular canal present (with pore  $\lambda$  singular on middle of interorbital region, pore  $\kappa$  singular on posterior interorbital region and lateral section as pores  $\alpha$ ,  $\beta$ , and  $\rho$ ) but lacking both preopercular and posterior oculoscapular canals; and (5) coloration pattern: body creamy yellow with wide longitudinal brown band on ventral half; head with many round brownish black spots; first dorsal fin orange red; pectoral fin orange with an oblique translucent band; second dorsal and caudal fins with several deep brown blotches each having a central black spot.

**Redescription.** Body proportions are described in Table 1. Body subcylindrical anteriorly, compressed posteriorly. Head moderately large, snout somewhat pointed in lateral view. Eye rather large, dorsolateral. Mouth rather oblique, about 45 degrees to horizontal line, with rear margin extending to vertical of anterior margin of pupil in both sexes. Lower lip anteriormost. Both jaws with 2–4 rows of tapered, sharp teeth, and outer rows enlarged. Anterior nasal pore a short tube, and posterior nasal pore a round opening. Gill-opening restricted, extending forward ventrally somewhat beyond a vertical at upper edge of the opening. Dorsal pterygiophore formula: 3/122101/9. 10 + 16 = 26 vertebrae.

**Fins.**—First dorsal fin rays V; second dorsal fin rays I/8; anal fin rays I/8; pectoral fin rays 17–20 (modally 18). First dorsal fin with longest anterior two rays in male, and fin membrane deeply indented between first two dorsal spines; its rear tip at least reaching midline of second dorsal fin base or beyond rear base of second dorsal when adpressed. Origin of anal fin inserted just below origin of first branched ray of second dorsal fin. Rear tips of second dorsal and anal fins when adpressed, just reaching procurrent rays of caudal fin. Pectoral fin rather large and oblong, with rear margin extending beyond vertical of origin of anal fin. Pelvic fin long with large frenum and membrane around its spinous rays bilobed. Rear tip of pelvic fin extending beyond vertical through anus. Caudal fin large and elliptical, with its fin length longer than head length.

**Scales.**—Body with rather large ctenoid scales; belly scales cycloid; longitudinal scale rows 22–25; transverse scale rows 6–7; predorsal scale 0. Prepelvic and belly with cycloid scales. Head and predorsal region entirely naked.



**FIGURE 1.** *Discordipinna griessingeri* Hoese & Fourmanoir, 1978, NTOUP-2021-06-205, 25.3 mm SL, female, Longdong Bay, New Taipei City, ROC.



**FIGURE 2.** *Discordipinna griessingeri* Hoese & Fourmanoir, 1978, NTOUP-2011-01-001, 13.7 mm SL, male, Mactan, Cebu Island, the Philippines.

**Head lateral-line system. Canals:** Anterior oculoscapular canal extension with anteriorly paired terminal pores  $\sigma$  slightly behind posterior nasal pore. Pore  $\lambda$  singular in middle of interorbital region; pore  $\kappa$  singular in rear dorsal vertical of orbit beyond pore  $\lambda$ . Paired pores  $\omega$  behind eyes on nape. Lateral extension of anterior oculoscapular canal behind orbit as pore  $\alpha$ , followed by middle pore  $\beta$  and terminal pore  $\rho$ . Lacking both preopercular and posterior oculoscapular canals.

**Sensory Papillae:** Cheek with loosely arranged, longitudinal infraorbital papillae. Row a very short with four papillae, not extending vertically through middle of eye. Row b short, merely with three papillae. Rows c and d longer with more papillae in row c, and row c extending posteriorly to vertical through pore  $\alpha$ . Opercle with three main rows as rows os, ot, and oi, with both rows ot and oi slightly separated. Row f as paired papillae.

**Coloration in fresh.** Body creamy white to light yellow background with wide longitudinal bright orange-red to brown band on ventral half and upper half with 3–4 longitudinal rows of very thin orange stripes. Head with many round brownish black spots; eyes surrounded by seven round brownish black spots just radiating off pupil. Nape with several round brownish black spots on anterior half.

**TABLE 1.** The morphometry of *Discordipinna griessingeri* Hoese & Fourmanoir, 1978 from Taiwan

Standard length (mm)	25.3
% in SL	
Head length	20.9%
Predorsal length	26.1%
Snout to 2nd dorsal fin origin	61.2%
Snout to anal fin origin	63.4%
Snout to anus	59.0%
Prepelvic length	28.4%
Caudal peduncle length	20.1%
Caudal peduncle depth	11.9%
First dorsal fin base	19.4%
First dorsal fin length	51.1%
Second dorsal fin base	23.9%
Anal fin base	20.9%
Caudal fin length	41.0%
Pectoral fin length	43.3%
Pelvic fin length	31.3%
Body depth of pelvic fin origin	17.9%
Body depth of anal fin origin	15.3%
Body width of anal fin origin	15.7%
Pelvic fin origin to anus	33.6%
% in HL	
Snout length	33.9%
Eye diameter	39.3%
Postorbital length	44.6%
Cheek depth	35.7%
Head width in upper gill-opening	67.9%
Bony interorbital width	7.5%
Lower jaw length	47.9%

First dorsal fin bright orange-red with a thin brown rear margin. Pectoral fin bright orange with an oblique translucent band. Second dorsal and caudal fins with several deep brown blotches, including a central blackish brown spot.

Caudal fin bright orange background with middle wide longitudinal creamy white band. Anal fin translucent with distal narrow bright orange band. Pelvic fin pale white with anterior orange-red region.

**Distribution.** This species is widely distributed from the Red Sea and the Indian Ocean to the tropical West Pacific region. It is present in countries such as the Philippines, Malaysia, Indonesia, Japan, specifically from the Ryukyu Islands to the Wakayama Prefecture in the middle of the main island (Hagiwara *et al.*, 1996; Akihito *et al.*, 2002; Suzuki & Shibukawa, 2004). This study is the first formal record of its presence in Taiwanese waters.

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