



## A new species of dwarf goby of *Trimma* (Teleostei: Gobiidae) from Taiping Island, South China Sea

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### Abstract

A rare coral-reef dwarf goby was collected recently from Taiping Island, South China Sea. The new species, *Trimma taipinensis*, can be well distinguished from other congeners by the following unique combination of features: (1) fin ray counts D2 I/7, A I/7, P 17, V with complete sucking disc; (2) squamation including LR 29–30, TR 9, SDP 9, PreD 7, opercle with large scales; (3) no any canal pores; and (4) distinctive colouration: body pale white background with lower half entirely orange yellow. Three cross bands in front of first dorsal fin origin; seven major vertical crossing bands after origin of first dorsal fin. Head with one red bar crossing snout to both jaws, another one vertical red stripe below eye, a vertical red band crossing the edge of preopercle. Nape with two orange red bands. Pectoral fin pinkish to orange, its basal region with two rounded snow white marks. Caudal fin entirely pinkish orange. No any black blotch on caudal fin base. A brief comparison with related species will also be provided.

**Key words:** *Trimma*, dwarf goby, Taiping Island, Gobiidae, fish taxonomy

### Introduction

Taiping Island is the important island managed by Taiwan in the tropical climate of the South China Sea. The benthic, marine gobiid fishes are an important dominant family group on this island (Chen unpublished data).

At present, the genus contains huge species diversity, with at least 113 recognized valid species, and constitutes the second largest marine genus in the family Gobiidae (Winterbottom & Chen 2004; Hoese & Reader 2011; Winterbottom 2014, 2019; Winterbottom *et al.* 2014, 2015, 2024; Hoese *et al.* 2015; Wada *et al.* 2023; Chen & Harefa 2024).

During our recent survey of fish fauna in the island, several undescribed gobiid fish turned to light. An unusual, tiny *Trimma* species was obtained from the 2023 summer; the current species has not yet been seen in Taiwanese waters. We report the new marine dwarf goby based on the very rare type found in the island, South China Sea. A comparison of the new species with other congeneric species will also be briefly addressed.

### Materials and methods

The marine goby was collected by hand-net during SCUBA diving, while fish collection was done in the South China Sea in 2023. Fish samples were preserved in 10% seawater-based formalin and later transferred to 70% ethanol for long-term storage. Measurements were taken using digital calipers, following Miller (1988) and are

expressed as percentage of standard length (SL) or head length (HL). Meristic counts generally follow Chen & Shao (1996) and Chen & Harefa (2024).

The terminology of the cephalic sensory canals and free neuromast organs (sensory papillae) follows Wongrat & Miller (1991), based on Sanzo (1911). Voucher specimens are deposited in the Pisces collections of National Taiwan Ocean University, Keelung (NTOUP). The following abbreviations are used herein: A = anal fin; C = caudal fin; D1 = first dorsal fin; D2 = second dorsal fin; P = pectoral fin; PreD = predorsal scale rows; V = pelvic fin; LR = number of longitudinal scale rows; TR = number of transverse scale rows; SDP = scale rows between first dorsal fin origin to upper tip of pectoral fin base.

## Systematics

### *Trimma taipinensis* new species

(太平島磨鰨虎)

(Figs. 1–2)

### Material examined

#### Holotype

NTOUP-TPI-20230624-2, 12.4 mm SL, Taiping Island, South China Sea, June 24, 2023 coll. Harefa *et al.*



FIGURE 1. *Trimma taipinensis*, holotype, 12.4 mm SL, Taiping Island, South China Sea.

### Diagnosis

The new species of *Trimma taipinensis* can be well distinguished from other congeners by following unique combination of features: (1) fin ray counts D2 I/7, A I/7, P 17, V with complete sucking disc; (2) squamation including LR 29–30, TR 9, SDP 9, PreD 7, opercle with large scales; (3) no any canal pores; and (4) distinctive colouration: body pale white background with lower half entirely orange yellow. Three cross bands in front of first dorsal fin origin; seven major vertical crossing bands after origin of first dorsal fin. Head with one red bar crossing snout to both jaws, another one vertical red stripe below eye, a vertical red band crossing the edge of preopercle. Nape with two orange red bands. Pectoral fin pinkish to orange, its basal region with two rounded snow white marks. Caudal fin entirely pinkish orange. No any black blotch on caudal fin base.

### Description

Body proportion in Table 1. Body moderately elongated, slightly compressed posteriorly. Head slightly depressed anteriorly. Mouth oblique, maxilla extending posteriorly to midline vertical of orbit. Lower jaw protruding slightly

beyond tip upper jaw. Anterior nasal with a short tapering tube reaching anteriorly to above anterior margin of upper lip, posterior one as opening pore. Eyes large, dorsolateral. Interorbital rather narrow, with shallow trench and postorbital trench with slightly groove. Cheek slightly fleshy. Gill-opening on each side large, extending anteroventrally to vertical drawn through posterior edge of mid-pupil. VC =26.

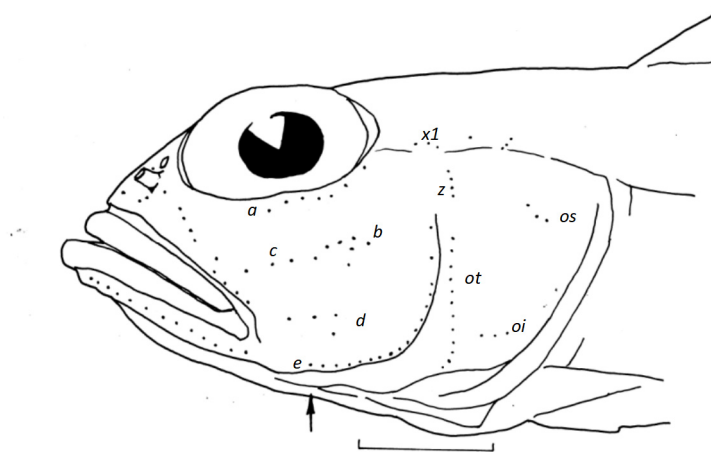
**Fins.**—D1 VI, D2 I/7, A I/7, V I/5, P 17. First dorsal fin with no filamentous rays, all spinous rays about equal except sixth spinous ray shorter and rather distance from others, its rear tip extending to origin of second dorsal fin when depressed. 1<sup>st</sup> segmented ray of second dorsal-fin usually unbranched, remaining rays branched, most posterior element with two rays. 1<sup>st</sup> segmented ray of anal-fin usually unbranched, 2<sup>nd</sup> segmented ray branched except in two specimens, remaining rays all branched, most posterior element with two rays. Rear margins of second dorsal fin and anal fin not reaching the procurrent rays of caudal fin when depressed. Pectoral fin rays not branched. Pelvic fin united with frenum and basal membrane, forming an oblong sucking disc. Caudal fin distal margin truncate.

**Scales.**—LR 29–30, TR 9, SDP 9, PreD 7. No scales on cheek but covered scales on operculum. Predorsal scale extension to full covered on nape, then terminating just behind eye.

**Head lateral-line system.**—(Figure 2)

**Canals:** No canal pore on head.

**Sensory papillae:** Sensory papillae or free neuromast distributed as follows:; row *a* long, extending to beyond midline of orbit; rows *b* and *d* short;; row *c* present longitudinally; single *cp* papilla; rows *ot* and *oi* well separated.



**FIGURE 2.** Head lateral-line system of *Trimma taipinensis*, holotype, 12.4 mm SL. Bar = 1 mm. The arrow indicates the terminal of gill-opening.

**Colouration in fresh**

Body pale white background with lower half entirely orange yellow, dorsal region with snow white crossing bands. Three bands in front of first dorsal fin origin; seven major vertical crossing bands after origin of first dorsal fin. Among them, 1, 2, 4, 5, 7 bands longer, extending to ventral half.

Head pale gray background with one red bar crossing snout to both jaws, and one vertical red stripe below eye, a vertical red band crossing the edge of preopercle. Nape with two orange red bands. First dorsal fin translucent with pinkish rays and its distal margin as narrow black band. Second dorsal fin translucent with pinkish rays and its distal grayish black band which wider posteriorly. Pectoral fin pinkish to orange, its basal region with two rounded snow white marks. Caudal fin entirely pinkish orange. No any black blotch on caudal fin base. Anal fin translucent with pinkish red rays and somewhat dusky black membrane. Pelvic fin pinkish orange.

**Etymology**

The specific name, *taipinensis*, is referred to the type locality “Taiping Island”, South China Sea.

**TABLE 1.** Morphometry of *Trimma taipinensis* from South China Sea.

Type status	Holotype
Size (mm SL)	12.4
% in SL	
Head length	34.0
Predorsal length	39.6
Snout to 2nd dorsal origin	59.6
Snout to anal fin origin	63.4
Prepelvic length	34.6
Caudal peduncle length	20.7
Caudal peduncle depth	10.6
First dorsal fin base	16.7
Second dorsal fin base	18.6
Anal fin base	18.5
Caudal fin length	23.9
Pectoral fin length	26.4
Body depth of pelvic fin origin	27.7
Body depth of anal fin origin	21.1
% in HL	
Snout length	17.7
Eye diameter	41.2
Postorbital length	40.3
Cheek depth	27.2
Lower jaw length	44.7
% in caudal peduncle length	
Caudal peduncle depth	51.1

### Distribution

So far, the current new species is merely discovered from Taiping Island, South China Sea although the *Trimma unisquamae* species complex actually can be found in West Pacific to Hawaiian Islands.

It is still very necessary to explore more localities to gather full pictures of current species complex with how many cryptic species together need to be analyzed by both morphological and molecular mitogenomic survey.

### Remarks

The new species is rather similar to Hawaiian endemic species, *Trimma unisquamae* (Gosline, 1959) than any other congeneric, nominal species. However, the new species *Trimma taipinensis* can be well distinguished from *Trimma unisquamae* by the following several features: (1) smaller body scales with longitudinal scale rows 29–30 vs. larger scales with longitudinal scale rows 25–26; (2) rather robust body with high body depth (27.6%) vs. very slender body (about 21.4–21.7%); (3) Caudal fin base no black blotch vs. large, widely vertical black band; and (4) 7 light bands on lateral body vs. 4 major light bands.

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## References

- Chen, I-S. & Harefa, T. (2024) A new species of marine goby *Trimma* (Teleostei:Gobiidae) from Taiwan. *Zootaxa*, 5550 (1), 46–65.  
<https://doi.org/10.11646/zootaxa.5550.1.8>
- Chen, I-S. & Shao, K.T. (1996) A taxonomic review of the gobiid fish genus, *Rhinogobius* Gill, 1859 from Taiwan, with description of three new species. *Zoological Studies*, 35, 200–214.
- Gosline, W.A. (1959) Four new species, a new genus, and a new suborder of Hawaiian fishes. *Pacific Science*, 13(1), 67–77.
- Hoese, D.F., Bogorodsky, S.V. & Mal, A.O. (2015) Description of a new species of *Trimma* (Perciformes: Gobiidae) from the Red Sea, with a discussion of the generic separation of *Trimma* and *Priolepis*, with discussion of sensory papillae terminology. *Zootaxa*, 4027 (4), 538–550.  
<https://doi.org/10.11646/zootaxa.4027.4.4>
- Hoese, D.F., Winterbottom, R. & Reader, R. (2011) *Trimma maiandros*, a new species of pygmy goby (Gobiidae) from the Indo-west Pacific. *aqua, Journal of Ichthyology and Aquatic Biology*, 17 (2), 103–110.
- Miller, P.J. (1988) New species of *Coryrogobius*, *Throrogobius*, and *Wheelerigobius* from West Africa. *Journal of Natural History*, 22, 1245–1262.  
<https://doi.org/10.1080/00222938800770761>
- Sanzo, L. (1911) Distribuzione delle papille cutanee (organi ciatiformi) e suo valore sistematico nei gobi. *Mitteilungen aus der Zoologischen Station zu Neapel*, 20, 249–328.
- Wada, H., Takase, W. & Senou, H. (2023) *Trimma albicaudatum*, a new species of pygmygoby from Sagami Bay, Honshu, Japan (Teleostei: Gobiidae: Gobiinae). *Ichthyological Research*, 70, 359–367.  
<https://doi.org/10.1007/s10228-022-00897-8>
- Winterbottom, R. (1984) A review of the gobiid fish genus *Trimma* from the Chagos Archipelago, central Indian Ocean, with the description of seven new species. *Canadian Journal of Zoology*, 62, 695–715.  
<https://doi.org/10.1139/z84-101>
- Winterbottom, R. (2019) An illustrated key to the described valid species of *Trimma* (Teleostei: Gobiidae). *Journal of the Ocean Science Foundation*, 34, 1–61. <https://doi.org/10.5281/zenodo.3525430>
- Winterbottom, R. & Chen, I-S. (2004) Two new species of *Trimma* (Teleostei: Gobiidae) from the western Pacific Ocean. *Raffles Bulletin of Zoology*, 11, 103–106
- Winterbottom, R., Brighton, E. & Mason-Parker, C. (2024) A new species of *Trimma* (Teleostei: Gobiidae) from the Seychelles, Indian Ocean. *Journal of the Ocean Science Foundation*, 41, 37–45.  
<https://doi.org/10.5281/zenodo.12594852>
- Winterbottom, R., Erdmann, M.V. & Cahyani, N.K.D. (2015). New species of *Trimma* (Actinopterygii, Gobiidae) from Indonesia, with comments on head papillae nomenclature. *Zootaxa*, 3973 (2), 201–226.  
<https://doi.org/10.11646/zootaxa.3973.2.1>
- Winterbottom, R., Hanner, R.H., BurrIDGE, M. & Zur, M. (2014) A cornucopia of cryptic species—a DNA barcode analysis of the gobiid fish genus *Trimma* (Percomorpha, Gobiiformes). *ZooKeys*, 381, 79–111.  
<https://doi.org/10.3897/zookeys.381.6445>
- Wongrat, P. & Miller, P.J. (1991) The innervation of head neuromast rows in Eleotridine gobies (Teleostei: Gobiidae). *Journal of Zoology*, 225, 27–42.  
<https://doi.org/10.1111/j.1469-7998.1991.tb03799.x>