

# Journal of the Ocean Science Foundation

2017, Volume 28



## *Tomiyamichthys reticulatus*, a new species of shrimpgoby from Fiji (Teleostei: Gobiidae)

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### Abstract

A new species of shrimpgoby, *Tomiyamichthys reticulatus*, is described on the basis of a single specimen taken at 16 m from a fine, silty-sand bottom at Rabi Island, Fiji. It differs from the other 12 valid described species in the genus on the basis of high fin-ray counts a combination of 12 dorsal and 13 anal-fin soft rays and 21 pectoral-fin rays, as well as a lanceolate caudal fin.

**Key words:** taxonomy, systematics, ichthyology, coral-reef fishes, gobies, Rabi Island, Pacific Ocean.

**Citation:** Greenfield, D.W. (2017) *Tomiyamichthys reticulatus*, a new species of shrimpgoby from Fiji (Teleostei: Gobiidae). *Journal of the Ocean Science Foundation*, 28, 47–51.

**doi:** <http://dx.doi.org/10.5281/zenodo.996850>

**urn:** [lsid:zoobank.org::pub:821D56D3-22CE-41E7-B2F4-615BE8C828A7](http://lsid:zoobank.org::pub:821D56D3-22CE-41E7-B2F4-615BE8C828A7)

**Date of publication of this version of record:** 2 October 2017

### Introduction

Between 1999 and 2003, an extensive survey of the marine fishes of Fiji was undertaken (Greenfield & Randall 2016). In 2003, 8 collections were made at Rabi Island, located about 6 km off the northeast coast of Vanua Levu Island. One station was made on the northwest shore in 16 m of water on a fine silty-sand bottom where the research vessel was anchored. This station yielded several interesting goby species, one of which was the undescribed species of *Tomiyamichthys* described here. The recently described *Amblygobius cheraphilus* Allen & Erdmann, 2016, described from Papua New Guinea, also was taken at this station in Fiji.

The genus *Tomiyamichthys* has 12 valid described species until now; the most recently described were *Tomiyamichthys gomezi* and *T. nudus*, from the Philippines and Indonesia respectively, by Allen & Erdman (2012),



and *Tomiyamichthys dorsostigma* Bogorodsky, Kovačić & Randall, 2011 from the Red Sea. The species in this genus are associated with shrimp, living in their burrows, and the new species described here was also taken from a shared burrow with shrimp.

## Materials and Methods

Counts and measurements follow the methods of Randall & Chen (2007) and are quoted here to make them more available: “Lengths of specimens are given as standard length (SL), measured from the median anterior point of the upper lip to the base of the caudal fin (posterior end of the hypural plate); body depth was measured at both the origin of the pelvic fins and origin of the anal fin, and maximum body width at the origin of the pectoral fins; head length was taken from the upper lip to the posterior end of the opercular membrane, and head width over the posterior margin of the preopercle; orbital diameter is the greatest fleshy diameter; cheek depth is the shortest distance between the fleshy edge of the orbit and the edge of the upper lip; interorbital width is the least fleshy width; snout length was measured from the median anterior point of the upper lip to the nearest fleshy edge of the orbit; upper-jaw length is from the same anterior point to the posterior end of the maxilla; caudal-peduncle depth is the least depth, and caudal-peduncle length the horizontal distance between verticals at the rear base of the anal fin and the caudal-fin base; lengths of spines and rays were measured to their extreme bases (not where they emerge from the dorsal profile of the body); caudal- and pectoral-fin lengths are the length of the longest ray; pelvic-fin length was measured from the base of the pelvic spine to the tip of the longest pelvic soft ray ..... The count of scales in the longitudinal series was made from above the base of the pectoral fin, where the most-anterior scales are found, to the base of the caudal fin; scales in transverse series were counted from the origin of the anal fin anterodorsally to the base of the 1st dorsal fin.”

The terminology of the cephalic-sensory-canal pores follows Lachner & Karnella (1980). Length given for holotype is standard length (SL) and some measurements as proportion of head length (HL) or other body parts; proportions as % SL are in parentheses after measures in the description paragraphs.

## *Tomiyamichthys reticulatus*, n. sp.

### Reticulated Shrimpgoby

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Figures 1–3.

**Holotype.** CAS 243882, 54.6 mm SL, male, Fiji, Rabi Island, NW shore, 16° 26.701' S, 179° 56.261' W, 16 m, fine silty sand, rotenone, field no. G03-43, D.W. Greenfield, T.A. Greenfield, R. Langston & J. Philippoff, 19 May 2003.

**Diagnosis.** Dorsal-fin elements VI+I,12; anal-fin rays I,13; pectoral-fin rays 21; both ctenoid and cycloid scales present; caudal fin lanceolate and longer than head, 2.2 in SL; first 5 dorsal-fin spines filamentous, 2<sup>nd</sup> longest; gill opening extending forward to middle of operculum, without a free fold across isthmus; a mid-lateral row of 6 orange-brown spots, first at pectoral-fin base, last at caudal-fin base; first dorsal fin with many oblong orange spots encircled with white lines; second dorsal fin with wavy white lines running its length with orange in between; pelvic fins orange, crossed by several narrow curved white lines.

**Description.** Dorsal-fin elements VI+I,12, all rays branched except for first, last to base, first 5 spines filamentous, second spine longest, 2.9 in SL (35), first spine 3.5 in SL (28.4); anal-fin rays I,13, all soft rays branched, last ray branched to base; pectoral-fin rays 21, uppermost and lowermost unbranched; pelvic-fin rays I,5, branched, united as a disk, with a well-developed frenum; segmented caudal-fin rays 17, 14 branched, upper unsegmented rays 3, lower rays 5; longitudinal scale series about 57, larger near caudal peduncle (some missing and skin wrinkled); transverse scale rows about 13; no scales on head, nape, pectoral-fin base, prepelvic area, or



**Figure 1.** *Tomiyamichthys reticulatus*, fresh holotype, CAS243882, 54.6 mm SL, male, Rabi Island, Fiji (D.W. Greenfield).

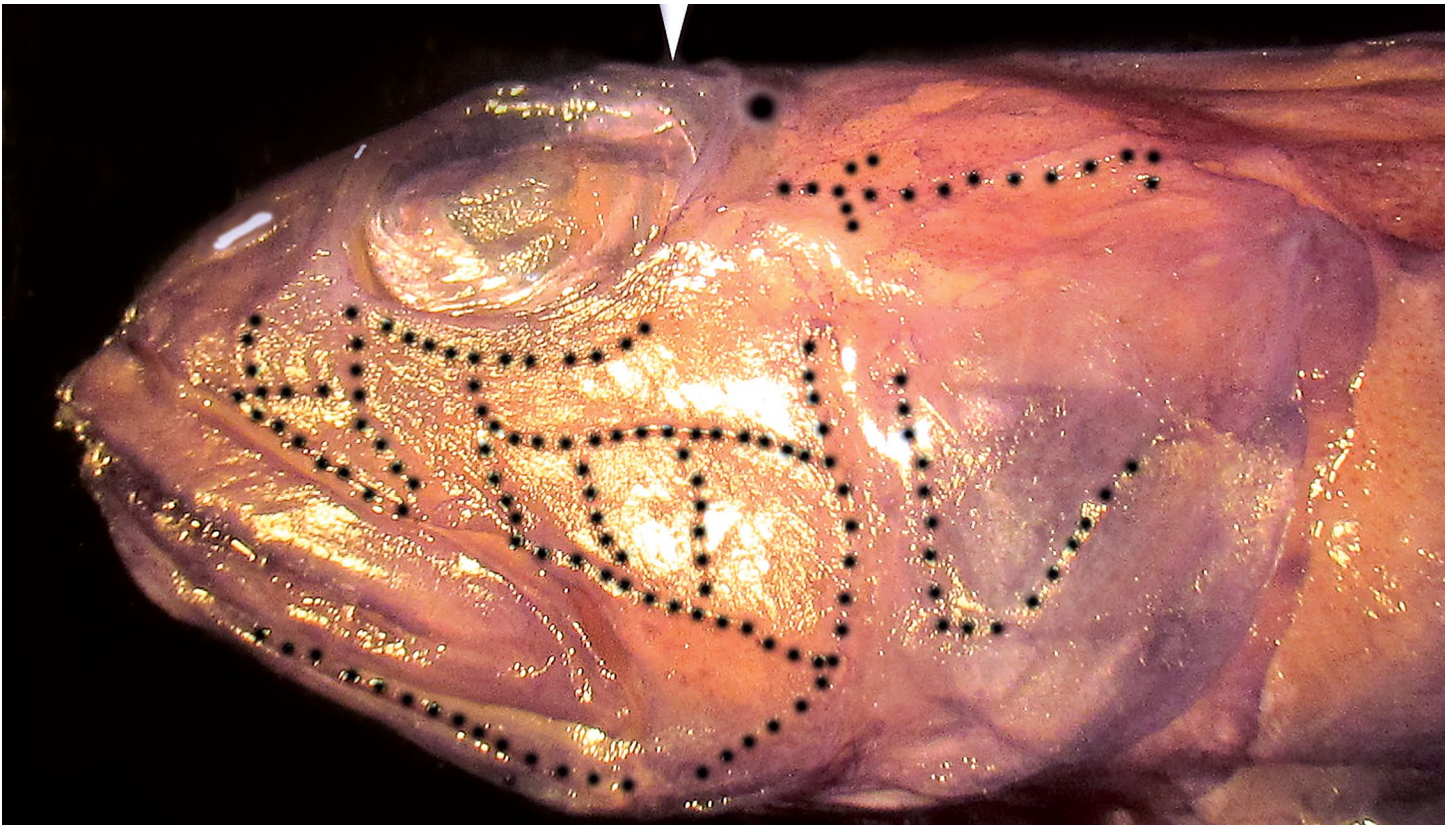
belly; circumpeduncular scales about 14; ctenoid scales on body, becoming cycloid and larger from near front of second dorsal fin posteriorly; gill opening extending forward to middle of operculum without a free fold, not reaching posteroventral edge of vertical limb of preoperculum.

Body elongate, depth at pelvic-fin origin 6.3 in SL (15.7); depth at anal-fin origin 6.6 in SL (12.1); body compressed, width at pectoral-fin origin 1.3 in body depth (9.0); head length 3.7 in SL (27.1); head width greater than head depth (13.4); eye 3.2 in HL (8.3), upper edge of eye extending slightly above dorsal profile of head; snout 4.2 in HL (6.4); interorbital space narrow, 11.2 in eye diameter (0.7); cheek depth 3.3% SL; caudal-peduncle depth 3.8 in HL (7.1); caudal-peduncle length 2.7 in HL (10.1); origin of first dorsal fin just posterior to pelvic-fin base, predorsal length 3.3 in SL (30.2); last membrane of first dorsal fin nearly reaching origin of second dorsal fin (pre-second dorsal 51.6); base of first dorsal fin 18.3% SL; base of second dorsal fin 38.5% SL; spine of second dorsal fin 2.4 in HL (11.3); penultimate dorsal-fin soft ray longest, 5.0 in SL (20.1); anal-fin origin under spine of second dorsal fin; preanal length 2.0 in SL (50.7); base of anal fin 41.6% SL; anal-fin spine 3.3 in HL (8.2); longest anal-fin soft ray 5.6 in SL (17.9); caudal fin lanceolate and longer than head, 2.2 in SL (45.2); pectoral fins pointed, 11<sup>th</sup> ray longest, 4.2 in SL (23.8), reaching to just before base of second dorsal fin; prepelvic length 4.8 in SL (20.9); pelvic-fin spine 6.6% SL, pelvic fins just reaching anus, fifth pelvic-fin soft ray longest, 4.0 in SL (24.7).

Mouth oblique, forming an angle of about 55° to horizontal axis of body, upper jaw slightly longer than lower jaw; maxilla reaching a vertical just posterior to pupil, upper-jaw length 2.1 in HL (12.8); upper jaw with an outer row of 12 well-spaced, incurved, canine teeth on each side, all about same size; lower jaw with about 25 smaller, incurved, canine teeth on each side; front of lower jaw with an inside row of six larger, incurved, canine teeth; tongue rounded; posterior naris adjacent to upper part of front of orbit, a small slit; anterior naris longer than wide with no raised edges, about midway between orbit and upper jaw.



**Figure 2.** *Tomiyamichthys reticulatus*, preserved holotype, CAS243882, 54.6 mm SL, male, Rabi Island, Fiji (D.W. Greenfield).



**Figure 3.** *Tomiyamichthys reticulatus*, holotype, lateral view of head stained with acid blue 113 to show sensory-canal papillae and pores: papillae indicated by rows of small black dots, pores by a large black dot or an arrow indicating position, and narial openings white.

Cephalic-lateralis system shown in Figure 3. Only supraotic (SOT) and posterior interorbital (PITO) pores present.

**Color in life.** (Fig. 1) Background color of body from front of dorsal and anal fins posteriorly gray with purplish tinge, abdomen white with yellow blotches, lower half of head gray with purplish tinge. Six orange-brown oblong blotches extending down lateral midline of body beginning at top of pectoral-fin base and ending at caudal-fin base. Top of head and nape orange-brown with scattered small melanophores. Orange-brown blotch about size of pupil of eye under eye at 4 o'clock position. Pupil black surrounded with yellow ring, iris yellow-white, with black area on lower portion. Several bluish-white spots located above pectoral-fin base and behind fin, below first dorsal fin. Dorsal surface of body mottled with orange and yellow with small black spots scattered along dorsal-fin bases. First dorsal fin with orange and black along spines, membranes with many oblong orange spots encircled with white lines forming a reticulated pattern. Second dorsal fin with lines of orange and white extending its length on inner two-thirds, outer one-third orange. Anal fin gray-green with orange distal margin. Caudal fin peppered with small melanophores, orange on ventral margin, and orange area extending onto center of fin from last body blotch. Pelvic fins with white spine and base, membranes with orange tinge and crossed by distinctive curved white lines. Color pattern on dorsal fins very similar to pattern of *T. tanyspilus* male (Randall & Chen 2007; Fig. 2).

**Color of holotype in preservative.** (Fig. 2) Background color of head and body light yellow. Most distinctive feature comprises 5 oblong brown blotches extending down lateral midline of body, one above and one below pectoral-fin base. Smaller brown blotch on lower half of operculum. Caudal peduncle lighter than rest of body, probably due to fading after 14 years in preservative because there is a brown blotch on caudal peduncle when fresh. Nape, top of head, and snout darker than rest of body. Several small brown blotches spread along bases of both dorsal fins. Belly dark from black peritoneum showing through body. All fins finely peppered with melanophores. Spine and first few rays of anal fin darker than rest of fins. Pelvic fins darker with scattered white spots on membranes.

**Etymology.** The specific epithet, *reticulatus* (Latin: netlike), referring to the many oblong orange spots encircled with white lines forming a reticulated pattern on the first dorsal fin, treated as a masculine adjective.

**Distribution.** Currently known only from the type location on Rabi Island, Fiji, although presumably wider spread in the Pacific Ocean.

**Comparisons.** *Tomiyamichthys reticulatus* differs from all described species in the genus by having a combination of 12 dorsal-fin and 13 anal-fin soft rays and 21 pectoral-fin rays. Only 7 of the 12 *Tomiyamichthys* species share a lanceolate or semi-lanceolate caudal fin with *T. reticulatus*. These are listed here along with their dorsal/anal and pectoral-fin counts: *T. dorsostigma* Bogorodsky, Kovačić & Randall, 2011 (12/12, 17); *T. fourmanoiri* (Smith, 1956) (12/12, 16); *T. lanceolatus* (Yanagisawa, 1978) (12/12, 16–18); *T. praealta* (Lachner & McKinney, 1981) (10/10, 18); *T. russus* (Cantor, 1849) (10/10, 15–19); *T. smithi* (Chen & Fang, 2003) (12/12, 18); *T. tanyspilus* Randall & Chen, 2007 (11/12, 17–18). The remaining species have a caudal fin that is rounded, ovate, or fan-like. Although the fresh coloration of the first dorsal fin and mid-lateral spots of *T. tanyspilus* are similar to that of *T. reticulatus*, the fin-ray counts are notably higher in the new species.

## Acknowledgments

I would like to thank T.A. Greenfield, R.C. Langston, J. Philippoff, and Captain B. Vasconcellos and the crew of the *Moku Moku Hine* for assistance in the field. I am grateful to the late J. Seeto, G.R. South, and R.W. Tuxton of the University of the South Pacific, Fiji for facilitating our collecting in Fiji, and a special thanks to R.R. Thaman, also of U.S.P., for his unending assistance: without his help this project literally would not have been possible. We also thank the Fijian Government and local village chiefs for permission to collect fishes. I thank G.R. Allen for assistance in recognizing the shrimpgoby as possibly undescribed and B.C. Victor for assistance with the fresh photograph. I thank D. Catania, J. Fong, M. Hoang, and L. Rocha of the California Academy of Sciences for assistance with specimens. This research was supported by National Science Foundation grants INT97-29666 and DEB0-1027545, and Sea Grant Project R/FM-6PD. The manuscript was reviewed by two reviewers.

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