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A new species of mesophotic *Fusigobius* goby (Teleostei: Gobiidae) from eastern Papua New Guinea

GERALD R. ALLEN
Department of Aquatic Zoology, Western Australian Museum,
Locked Bag 49, Welshpool DC, Perth, Western Australia 6986
https://orcid.org/0000-0002-4661-4898 E-mail: gerry.tropicalreef@gmail.com

MARK V. ERDMANN
Re:wild, PO Box 129, Austin, Texas 78767, USA
Research Associate, Department of Ichthyology,
California Academy of Sciences, Golden Gate Park, San Francisco, CA 94118-4503, USA
https://orcid.org/0000-0002-3644-8347 E-mail: mverdmann@gmail.com

WILLIAM M. BROOKS
2961 Vallejo Street, San Francisco, CA 94123, USA
E-mail: rewmb1@aol.com

NESHA K. ICHIDA
Thrive Conservation, Jl. Subak Sari 13, Tibubeneng, Bali 80361, Indonesia
E-mail: nesha@thriveconservation.org

Abstract

Fusigobius tranversus, n. sp. is described from a single female specimen, 26.6 mm SL, collected at mesophotic depths, at 62 m on a steep outer-reef slope at Milne Bay Province, Papua New Guinea. It clearly differs from all currently recognized members of the genus in having a well-developed transverse pattern (vertical rows) of cheek papillae rather than a generic pattern of a reduced transverse series, i.e. a single vertical row below the eye and short horizontal rows behind the jaws and across the cheek. Other features include dorsal-fin elements VI +I,9; anal-fin elements I,9; pectoral-fin rays 18; gill rakers 1+9; the body with finely ctenoid scales, except for the pectoral-fin base and prepelvic area with embedded cycloid scales, the head and nape scaleless; the first dorsal fin elevated anteriorly, without filamentous spines, the second dorsal-fin spine slightly longer than the first and third spines; the pelvic fins united to form a disc and a weakly developed ventral frenum. Its color pattern is similar to most congeners except for a prominent greenish-yellow band and a broad dark outer margin on the anterior first dorsal fin.

Key words: taxonomy, ichthyology, coral-reef fishes, cryptobenthic, DNA barcoding, Indo-Pacific Ocean, cryptic species

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Introduction

The genus *Fusigobius* Whitley 1930 contains small (> 80 mm SL) gobiid fishes occurring on sandy surfaces of Indo-Pacific coral reefs. There are currently 13 species recognized as valid (Fricke et al. 2026), with the "East Indian" region (Andaman Islands to Solomon Islands, north to Philippines) containing the richest concentration of species (Allen & Erdmann 2024). Members of the group (with approximate geographic range in parentheses) include: *F. aureus* Chen & Shao, 1997 (Bali to Coral Sea and Philippines); *F. duospilus* Hoese & Reader, 1985 (E. Africa to Hawaii, and Australia to Japan); *F. gracilis* (Randall, 2001) (E. Indonesia to Fiji, and Australia to Japan; *F. humeralis* (Randall, 2001) (Maldives to French Polynesia, and Australia to Japan); *F. humerosus* Kovačić et al. in Bogorodsky et al., 2023 (Red Sea & Gulf of Aden); *F. inframaculatus* (Randall, 2001) (E. Africa to Tonga, and W. Caroline Islands, and Australia to Taiwan); *F. longispinus* Goren, 1978 (Red Sea); *F. maximus* (Randall, 2001) (Madagascar and Red Sea to Coral Sea, and north to Japan); *F. melacron* (Randall, 2001) (Andaman Islands to Fiji, and Australia to Japan); *F. neophytus* (Günther, 1877) (E. Africa to French Polynesia, and Australia to Japan); *F. pallidus* (Randall, 2001) (E. Africa to Marshall Islands and Coral Sea); *F. signipinnis* Hoese & Obika, 1988 (Indonesia and Philippines to Tonga, and Australia to Japan); and *F. taipinensis* Chen et al., 2024 (Taiwan & Timor Leste).

Bogorodsky et al. (2023) recently reviewed the genus with a more complete generic description and including a new species from the Red Sea and Gulf of Aden. After a genetic analysis of the mtDNA COI marker for 12 species along with 8 additional cryptic lineages, they found the group to comprise a monophyletic set of lineages sister to the Atlantic genus *Coryphopterus*. Their diagnosis of the genus *Fusigobius* indicates that the absence of a fleshy crest or ridge extending from the base of the first dorsal-fin spine anteriorly to the interorbital can separate the genus from the closely related genera *Coryphopterus*, *Lophogobius*, and *Rhinogobiops*. Furthermore, *Fusigobius* species are found broadly in the Indo-West Pacific and do not overlap with the New World (western Atlantic and eastern Pacific) range of *Coryphopterus*, *Lophogobius*, and *Rhinogobiops*.

Herein we describe a new species of *Fusigobius* from Papua New Guinea that we collected during a reef-fish survey in September 2024. Although only a single specimen was collected, it differs substantially in having a distinctive pattern of cephalic sensory papillae on the cheek, leaving no doubt as to its difference from congeners. Other than the prominent transverse pattern (vertical rows) of cephalic sensory papillae, it conforms to the expanded updated description of *Fusigobius* provided by Bogorodsky et al. (2023).

Materials and Methods

The holotype is deposited at the Western Australian Museum, Perth, Australia (WAM).

Standard length (SL) is 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 is measured at both the origin of the pelvic fins and the origin of the anal fin; body width is measured at the base of the pectoral fins; head length (HL) is taken from the upper lip to the posterior end of the opercular membrane, and head width over the posterior margin of the preopercle; orbit diameter is the greatest fleshy diameter; snout length is measured from the median anterior point of the upper lip to the nearest fleshy edge of the orbit; upper-jaw length from the same anterior point to the posterior end of the maxilla; interorbital width is the least fleshy width; 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; base of the dorsal fins is the distance from the first dorsal-fin origin to the base of the last segmented ray of the second dorsal fin; base of the anal fin is the distance from the anal-fin origin to the base of the last segmented anal ray; caudal and pectoral-fin lengths are the length of the longest ray; pelvic-fin length is measured from the base of the pelvic-fin spine to the tip of the longest segmented ray.

Terminology and abbreviations for cephalic sensory-canal pores follow Akihito et al. (1993). Cyanine Blue 5R (acid blue 113) stain was used to make pores, papillae, and scale outlines more obvious (Akihito et al. 1993, 2002, Saruwatari et al. 1997). Lateral scales are counted from the uppermost part of the inner pectoral-fin base ("armpit") to the posterior edge of the hypural plate; scales in the transverse series are counted from the origin of the anal fin posterodorsally to the base of the second dorsal fin; gill rakers are counted on the first gill arch, those on the upper limb listed first; rudiments are included in the counts.

Figure 1. *Fusigobius transversus*, fresh holotype, WAM P.36190-00, female, 26.6 mm SL, East Cape, Milne Bay, Papua New Guinea (M.V. Erdmann).

Fusigobius transversus, n. sp.

Transverse Sandgoby

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Figures 1–5

Holotype. WAM P.36190-00, female, 26.6 mm SL, Papua New Guinea, Milne Bay Province, East Cape vicinity, submerged reef 0.9 km SE of Boia Boia Waga Island and 3 km NE of East Cape mainland, Cobb's Cliff dive site, -10.2158, 150.9131, 62 m, clove oil & hand net, M.V. Erdmann & N.K. Ichida, 9 September 2024.

Diagnosis. A species of *Fusigobius* with the following combination of characters: dorsal-fin elements VI+I,9; anal–fin elements I,9; pectoral-fin rays 18; gill rakers 1+9; longitudinal scales 26; transverse scales 7; nearly full complement of cephalic sensory-canal pores; cheek papillae in distinctive series of transverse (vertical) rows; scales absent on nape, cheek, and opercle; first dorsal fin elevated anteriorly, without filamentous spines, second spine slightly longer than first and third spines; pelvic fins joined by connecting membrane for full length; frenum weakly developed; pelvic-fin rays with three branch points; head and body semi-translucent with scattered, variable-sized orange spots and white flecks; outer half of first dorsal fin between first 4 spines with a prominent, rectangular, greenish-yellow band and a broad, brown, outer margin; iris yellowish red with 4 or 5 relatively inconspicuous, reddish, spoke-like markings on dorsal scleral surface (Fig. 1).

Description. Dorsal-fin elements VI+I,9, distal edge of first dorsal fin slightly incised between spinous rays without filamentous spines, second dorsal-fin spine slightly longer than first and third spines; anal-fin elements I,9; all dorsal and anal-fin rays branched; pectoral-fin rays 18, all rays branched except uppermost two and lowermost unbranched; pelvic-fin rays I,5, all segmented rays with three branch points, 4th ray longest; pelvic fins joined by connecting membrane for full length of fifth rays (although slightly torn), frenum weakly developed; caudal fin with 12 branched and 16 segmented rays, and 8 unsegmented (procurrent) rays dorsally and 6 ventrally; gill rakers on outer face of first gill arch 1+9; pseudobranchs 7; vertebrae 10+16 =26; longitudinal scales 26; transverse scales 7; circumpeduncular scales 12.

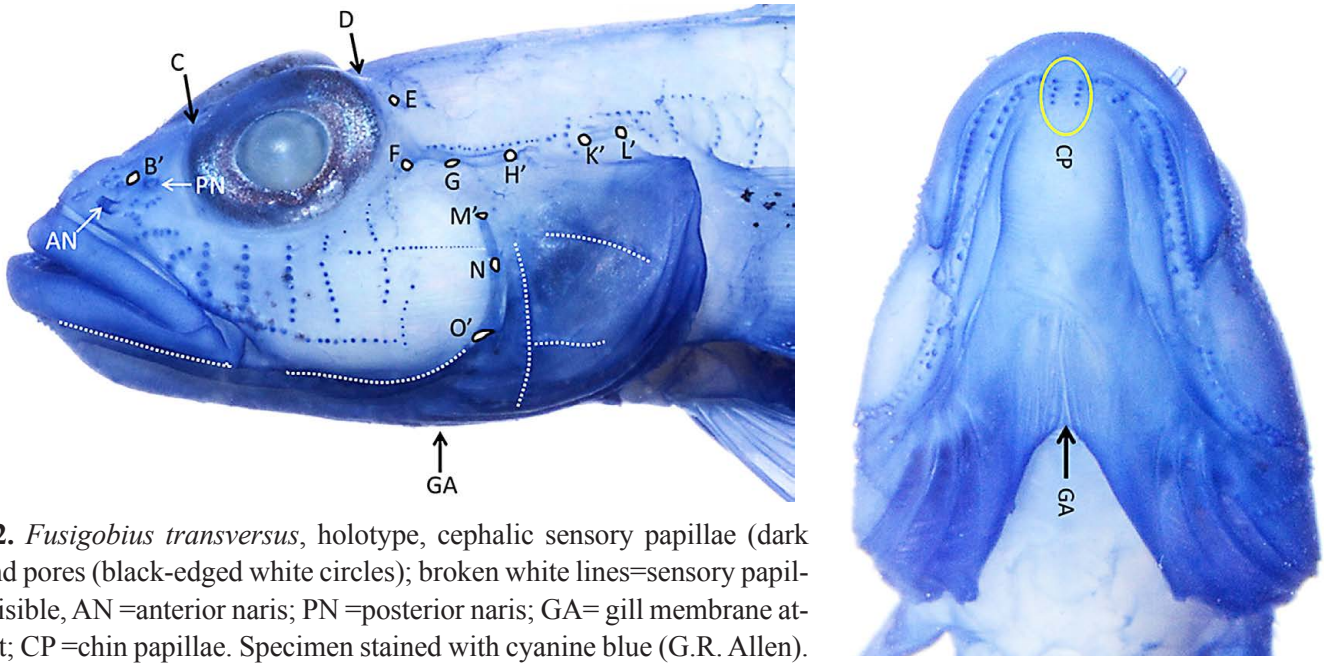

Figure 2. *Fusigobius transversus*, holotype, cephalic sensory papillae (dark spots) and pores (black-edged white circles); broken white lines=sensory papillae not visible, AN =anterior naris; PN =posterior naris; GA= gill membrane attachment; CP =chin papillae. Specimen stained with cyanine blue (G.R. Allen).

Body elongate, depth at pelvic-fin origin 5.0 and depth at anal-fin origin 5.6, both in SL; body compressed, width at pectoral-fin origin 1.3 in BD; head length 3.0 in SL; head compressed, width 0.9 in BD at pelvic origin; snout short, length 3.4 in HL; orbit diameter 3.2 in HL; interorbital space extremely narrow, 12.7 in orbit diameter; caudal-peduncle depth 3.2 in HL; caudal-peduncle length 1.3 in HL. Lower jaw slightly protruding, maxilla forming angle of about 40° to horizontal axis of head and body; maxilla reaching vertical near anterior edge of pupil, upper-jaw length 2.5 in HL; gill opening extending anteriorly to just beyond rear margin of preopercle; gill membranes continuous across isthmus, but not forming free fold; jaw teeth strongly retrose with 2–4 rows of slender villiform teeth in upper and lower jaws, none significantly enlarged; no teeth on vomer or palatines; outer edge of lips finely fimbriate; tongue tip broadly truncate.

Anterior naris a short membranous tube, just above edge of upper lip; posterior naris a round aperture in front of center of eye about 1/3 distance between front of eye and rear edge of maxilla. Cephalic sensory-canal pores and papilla rows as shown in Fig. 2. Cheek papillae arranged in a mainly transverse pattern (Fig. 1, upper); nearly full complement of pores consisting of posterior nasal pore (B'), anterior interorbital pore (D), postorbital pore (E), infraorbital pore (F), lateral canal pore (G), terminal canal pore (H'), anterior and posterior lateral canal tube pores (K' and L' respectively), and preopercular pores (M', N, and O'); chin tip with a short longitudinal row of papillae on each side of median line, each containing 4 papillae (Fig. 2).

Body covered with finely ctenoid scales arranged in regular transverse rows (Fig. 3), except embedded cycloid scales on pectoral fin-base and prepelvic area, scales extending forward to line connecting dorsal-fin origin and upper pectoral-fin base. Scales absent on nape, cheek, and opercle (Fig. 2), no scales on fins except two or three rows at base of caudal fin, mostly smaller than those on adjacent caudal peduncle.

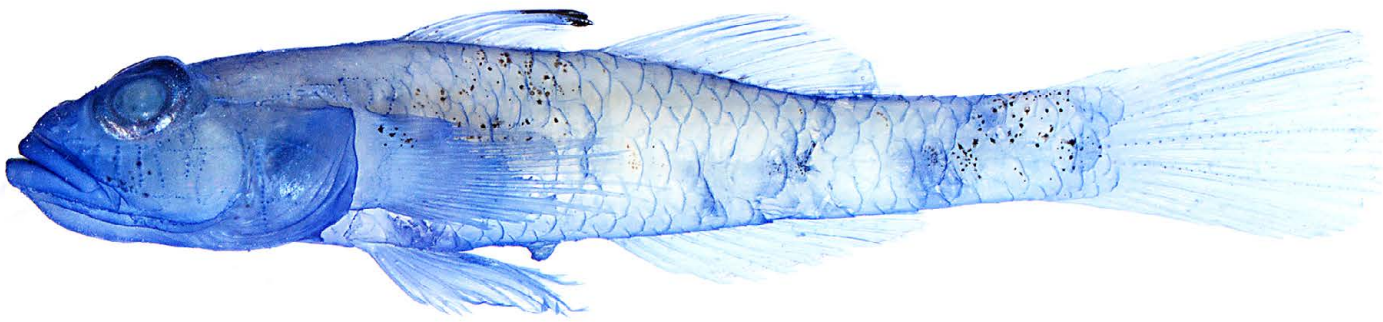

Figure 3. *Fusigobius transversus*, holotype, WAM P.36190-00, female, 26.6 mm SL, East Cape, Milne Bay, Papua New Guinea. Specimen stained with Cyanine blue to show pattern of scales (G.R. Allen).

Origin of first dorsal fin about one pupil width behind rear margin of opercle; predorsal length 2.6 in SL; first dorsal fin elevated anteriorly, without filamentous spines; dorsal-fin spines slender and flexible, none filamentous; second dorsal-fin spine longest, 1.7 in HL; first dorsal-fin spine 1.8 in HL; 6th dorsal-fin spine 5.8 in HL; spine of second dorsal fin 2.2 in HL; first segmented dorsal-fin ray longest, 1.7 in HL; origin of anal fin level with origin of second dorsal fin; preanal length 1.9 in SL; anal-fin spine 3.2 in HL; penultimate segmented anal-fin ray longest, 2.0 in HL; caudal fin slightly rounded, nearly equal to head length, 3.3 in SL; pectoral fins pointed, middle rays longest, reaching well beyond level of anal-fin origin, 3.3 in SL; prepelvic length 2.9 in SL; pelvic-fin tips reaching anal-fin origin when adpressed, length of pelvic fin 4.1 in SL; pelvic-fin spine about one-third length of longest ray; pelvic frenum weakly developed (Fig. 4), membrane extending about two-thirds length of each pelvic-fin spine. Female urogenital papilla bulbous (Fig. 4).

Measurements of holotype expressed as percentage of SL: head length 33.2; head width 21.5; body depth at pelvic-fin and anal-fin origins 19.8 and 17.8 respectively; body width 15.5; snout length 9.6; orbit diameter 10.5; interorbital width 0.8; upper-jaw length 13.3; caudal-peduncle depth 10.3; caudal-peduncle length 25.8; predorsal length 38.9; preanal length 53.7; prepelvic length 34.0; base of dorsal fins 38.1; first dorsal-fin spine 18.1, second 19.2; 6th 5.8; spine of second dorsal fin 15.1; longest segmented dorsal-fin ray 19.4; base of anal fin 19.7; anal-fin spine 10.2; longest segmented anal-fin ray 16.7; caudal-fin length 30.0; pectoral-fin length 30.2; pelvic-fin length 24.3; pelvic-fin spine length 7.7.

Figure 4. *Fusigobius transversus*, holotype, pelvic fins with associated frenum structure and urogenital papilla behind everted cloaca, the conspicuous dark mass; Cyanine blue stain to show scales and details (G.R. Allen).

Color when freshly collected. (Fig. 1) Head and body semi-translucent with scattered, variable-sized, orange spots and white flecks, most much smaller than pupil, except for a relatively large spot on lower cheek directly below eye, reddish-orange spot on lower half of opercle and irregular-shaped spot on middle of side below first dorsal fin; scattered tiny melanophores on side of head and body, most noticeable on cheek below middle of eye, at base of uppermost pectoral-fin rays, on anterior body between first dorsal fin base and middle of side, and laterally on caudal peduncle; median fins mainly translucent to whitish without prominent markings, except outer half of first dorsal fin between first 4 spines with a prominent, rectangular, greenish-yellow, slightly oblique band and a broad, brown outer margin on first three membranes, remainder of fin with frosty-white areas below colored band and along posterior margin of fin, second dorsal fin translucent except basal half of each ray with a few minute white and yellow spots; caudal fin with numerous minute white spots and streaks and 4 or 5 transverse rows of small yellow spots; anal fin mainly whitish with a faint yellow marginal band and yellow streaks along bases of third, 6th, and last segmented rays; pectoral fin translucent except basal portion of 9 lowermost rays white, with corresponding membranes densely white-spotted, yellow markings at base of uppermost rays; a prominent oblique white band across middle of pectoral-fin base, continuous with a curved, silvery-white band on lower margin of opercle; pelvic fins mainly white; iris yellowish red with 4 or 5 relatively inconspicuous reddish, spoke-like markings on dorsal scleral surface.

Figure 5. *Fusigobius transversus*, preserved female holotype, 26.6 mm SL, Milne Bay, Papua New Guinea (G.R. Allen).

Color in alcohol. (Fig. 5) Head and body whitish with translucent fins except for a brown marking at tip of first 4 dorsal spines and a pattern of tiny melanophores as in freshly collected specimen.

Etymology. The new species is named *transversus* (Latin: crosswise) with reference to its most distinctive feature, the transverse pattern of sensory papillae on the cheek region.

Distribution and habitat. The new species is currently known only from the type locality in Milne Bay Province of Papua New Guinea, though it is presumably more widespread on deeper mesophotic reefs throughout the East Indies. The holotype was collected on a sandy bottom under a rocky overhang on a steep outer-reef dropoff at 62-m depth.

Comparisons. The new species is similar in appearance, morphology, and meristic counts to other *Fusigobius* spp., including the head, body, and fin shape, the typical semitransparent bland color pattern with scattered yellow and white flecks, and the absence of a fleshy crest or ridge on the dorsal head midline. It also shares the squamation pattern, consisting of relatively large, mainly ctenoid scales (with the exception of cycloid scales on the pectoral-fin base and prepelvic area) arranged in parallel transverse rows, and the absence of scales on the cheek, opercle, and nape (although some *Fusigobius* species do have scales on the side of the nape). Additionally, its pattern of cephalic sensory-canal pores is about the same as other members of the genus. The main distinguishing feature is the diagnostic well-developed transverse pattern of cheek papillae not evident on other *Fusigobius* spp., which share the generic pattern of a single vertical row below the eye and short horizontal rows behind the jaws and across the rear-mid portion of the cheek (Fig. 6).

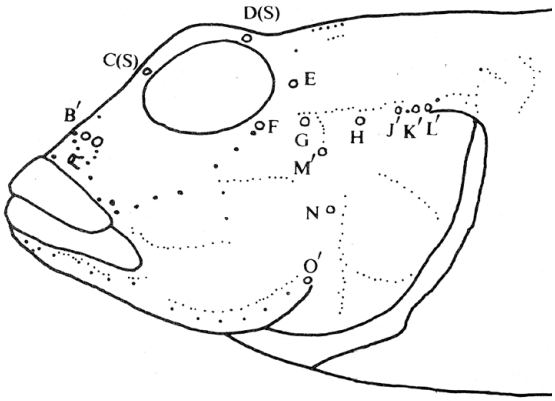

Figure 6. *Fusigobius neophytus,* with the typical *Fusigobius* pattern of cephalic sensory papillae and pores, from Akihito et al. (1984).

An interesting parallel is present in the gobiid genus *Priolepis*, with most of the 39 recognized species having a reduced transverse pattern (Fig. 7A) and 11 species with a well-developed transverse pattern (Fig. 7B). The

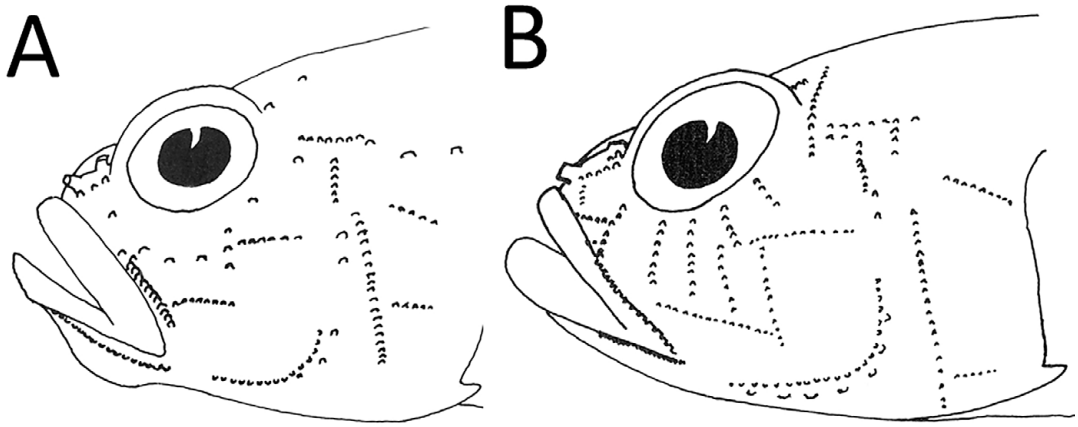

Figure 7. Comparison of the cephalic sensory papillae patterns in two *Priolepis* species A) *P. semidoliata* from Winterbottom & Burridge (1993) and B) *P. fallacincta* from Winterbottom & Burridge (1992).

Figure 8. *Fusigobius taipinensis*, approximately 30 mm SL, Atauro Island, Timor Leste, 60 m depth (M.V. Erdmann).

several species from relatively deep water (30–114 m) have the well-developed tranverse pattern, suggesting an association between deeper habitat and papillae pattern. The 62-m depth of our holotype is well below the typical depth distribution of the genus, with most species occurring in 5-20 m, and only *Fusigobius pallidus* reaching 60 m (Allen & Erdmann 2024). However, we have recently collected *Fusigobius taipinensis* 60 m deep at Timor Leste (WAM P. 34562-002) (Fig. 8). This species was formerly known only from Taiping Island, Spratly Group in the South China Sea and from southwestern Taiwan at depths to about 15 m.

The small size of 26.6 mm SL for the mature female holotype of *F. transversus* suggests a small size for the species, similar to that of *F. humeralis* (max. 31.8 mm SL), *F. humerosus* (max. 31.5 mm SL), and *F. melacron* (max. 36.0 mm SL). In contrast, other congeners reach about 40–60 mm SL, with some larger, e.g. *F. inframaculatus* (max. 67 mm SL), *F. maximus* (max. 75 mm SL), *F. neophytus* (max. 69 mm SL), and *F. pallidus* (max. 65 mm SL).

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References

Akihito, Sakamoto, K., Ikeda, Y. & Sugiyama, K. (2002) Gobioidei. *In*: Nakabo, T. (Ed.), *Fishes of Japan with pictorial keys to the species. English edition*, *Vol. II.* Tokai University Press, Tokyo, Japan, pp. 1139–1310.

Akihito, Sakamoto, K., Iwata, A. & Ikeda, Y. (1993) Cephalic sensory organs of the gobioid fishes. *In*: Nakabo, T. (Ed.), *Fishes of Japan with pictorial keys to the species*. Tokai University Press, Tokyo, Japan, pp. 1088–1116.

Allen, G.R. & Erdmann, M.V. (2024) *Reef Fishes of the East Indies. Second Edition. Volume III*. Tropical Reef Research, Perth, Australia, pp. 946–1466.

Bogorodsky, S.V., Kovačić, M., Mal, A.O. & Alpermann, T.J. (2023) A new species of *Fusigobius* (Teleostei: Gobiidae) from the Red Sea and Gulf of Aden. *Zootaxa*, 5256 (2), 101–124. https://doi.org/10.11646/zootaxa.5256.2.1

Chen, I.-S., Chen, K.-T., Yang, Y.-C., Harefa, T., Chou, L.-C., Shen, K.-N. & Chang, C.W. (2024) Taxonomic review and molecular phylogenetics of the reef gobiid genus *Fusigobius* from Taiwan with comments on a new species from South China Sea. *Zootaxa*, 5550 (1), 17–31. https://doi.org/10.11646/zootaxa.5550.15

Chen, I-S. & Shao, K.-T. (1997) *Fusigobius aureus*, a new species of gobiid fish (Perciformes, Gobiidae) from Flores Island, Indonesia. *Acta Zoologica Taiwanica*, 8 (2), 87–92.

Fricke, R., Eschmeyer, W.N. & van der Laan, R. (Eds.) (2026) *Eschmeyer's catalog of fishes: Genera, Species, References*. San Francisco (California Academy of Sciences). Electronic version accessed 29 April 2026 at http://researcharchive.calacademy.org/research/ichthyology/catalog/fishcatmain.asp

Goren, M. (1978) A new gobiid genus and 7 new species from Sinai coasts (Pisces: Gobiidae). *Senckenbergiana Biologica*, 59 (3/4) 191–203.

Günther, A.C.L.G. (1877) Andrew Garrett's Fische der Südsee, beschrieben und redigirt von Albert C.L.G. Günther. Band II, Heft IV. *Journal des Museum Godeffroy*, 4 (9), 129–168.

Hoese, D.F. & Y. Obika, Y. (1988) A new gobiid fish, *Fusigobius signipinnis*, from the western tropical Pacific. *Japanese Journal of Ichthyology*, 35 (3), 282–288.

Hoese, D.F. & S. Reader, S. (1985) A new gobiid fish, *Fusigobius duospilus*, from the tropical Indo-Pacific. *The J.L.B Smith Institute of Ichthyology Special Publication*, 36, 1–9.

Randall, J.E. (2001) Five new Indo-Pacific gobiid fishes of the genus *Coryphopterus*. *Zoological Studies*, 40 (3) 206–225.

Saruwatari, T., Lopez, J.A. & Pietsch, T.W. (1997) Cyanine blue: a versatile and harmless stain for specimen observations. *Copeia* 1997 (4), 840–841. https://doi.org/10.2307/1447302

Whitley, G.P. (1930) Additions to the check-list of the fishes of New South Wales. (No. 3). *Australian Zoologist*, 6 (2), 117–123.

Winterbottom, R. & Burridge, M. (1992) Revision of *Egglestonichthys* and of *Priolepis* species possessing a transverse pattern of cheek papillae (Teleostei; Gobiidae), with a discussion of relationships. *Canadian Journal of Zoology*, 70 1934–1946.

Winterbottom, R. & Burridge, M. (1993) Revision of Indo-Pacific *Priolepis* species possessing a reduced transverse pattern of cheek papillae, and predorsal scales (Teleostei; Gobiidae). *Canadian Journal of Zoology*, 71 2056–2076.