



Sueviota tubicola, a new species of coral-reef goby (Teleostei: Gobiidae) from Papua New Guinea

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Abstract

A new species of gobiid fish, *Sueviota tubicola*, is described from Milne Bay Province, Papua New Guinea, on the basis of nine specimens, 13.0–17.6 mm SL. The new species is most similar to *S. larsonae* from the Northern Territory of Australia and adjacent Arafura Sea, with both species sharing a suite of features that include an identical pattern of cephalic sensory pores, usually 9 segmented dorsal-fin rays and 8 segmented anal-fin rays, black-tipped anterior nostril tubes, the presence of a full pelvic frenum, and a filamentous first dorsal-fin spine. However, the new species differs from *S. larsonae* in having a pair of large dark spots on the pectoral-fin base, 26 longitudinal scales (versus 21–24), 14–15 branched pectoral-fin rays (versus 6–9), and the first two dorsal-fin spines elongated (vs. only the first dorsal-fin spine in *S. larsonae*). Moreover, *S. tubicola* inhabits shallower depths (20–35 m) compared to the 40–82 m range of *S. larsonae*. All type specimens of *S. tubicola* were associated with an unidentified tubeworm that constructs vertical, stick-like structures projecting about 30 cm above the silty-sand substrate and encrusted with sessile invertebrates.

Key words: taxonomy, systematics, ichthyology, coral-reef fishes, Indo-Pacific Ocean, *Eviota*.

Citation: Allen, G.R. & Erdmann, M.V. (2017) *Sueviota tubicola*, a new species of coral-reef goby (Teleostei: Gobiidae) from Papua New Guinea. *Journal of the Ocean Science Foundation*, 25, 1–7.

doi: <http://dx.doi.org/10.5281/zenodo.262097>

urn: lsid:zoobank.org:pub:A5E1F83C-AE3E-450F-AEBC-2238940361B2

Date of publication of this version of record: 28 January 2017

Introduction

The Indo-Pacific genus *Sueviota* Winterbottom & Hoese, 1988 contains tiny gobiid fishes inhabiting tropical coral reefs. Until recently, only four species were known, all described by Winterbottom & Hoese (1988): *S. aprica* ranging from Fiji and Tonga to the Chagos Archipelago, *S. atrinasa* from Vanuatu to northwestern Australia and central Indonesia, *S. lachneri* from Fiji and Tonga to the Chagos Archipelago and Maldives, and *S. larsonae* from northwestern Australia and South China Sea. Additionally, a fifth species, *S. bryozophila* Allen, Erdmann & Cahyani, 2016, was recently described from Indonesia. Winterbottom & Hoese (1988) suggested an apparent sister relationship with *Eviota* Jenkins, 1903, a highly speciose Indo-Pacific genus with at least 111 described species (Greenfield & Winterbottom 2016) and numerous new species yet to be described. The two genera are very similar in general appearance and share the specialization of having internal or subdermal bars of pigmentation, but can be distinguished by having the fifth pelvic-fin ray branched in *Sueviota* and unbranched in *Eviota*. However, preliminary phylogenetic evidence (L. Tornabene, pers. comm.) calls into question whether *Eviota* and *Sueviota* are reciprocally monophyletic. Moreover, Winterbottom & Hoese (1988) stated “it is not entirely clear whether *Eviota* is monophyletic either, and whether *Sueviota* is the sister group of all or only some species of *Eviota*”. The generic position of *Sueviota* is further complicated by several atypical features in *S. bryozophila*, including a lack of branching in the first four pelvic-fin rays and all pectoral-fin rays, the presence of a double mid-interorbital sensory pore, exceptionally enlarged nasal openings, the lack of any cycloid scales, and the absence of internal dark bars. It also has a unique commensal association with an unidentified bryozoan.

The present paper describes a sixth species of *Sueviota* that we discovered during a visit to Milne Bay Province in May 2016. The new species occupies an unusual habitat compared to its congeners, consisting of abandoned worm tubes, which were numerous on a sand-rubble slope at depths of 20–35 m. Despite the apparently tenuous validity of *Sueviota*, the new taxon conforms to the definition presented by Winterbottom & Hoese (1988) and we therefore provisionally assign it to this genus. A study of generic relationships within *Eviota*, currently in progress by Luke Tornabene (University of Washington, WA, USA), will no doubt clarify the validity of *Sueviota*.

Materials and Methods

Counts and measurements, descriptions of fin morphology and the cephalic sensory-canal pore patterns follow Lachner & Karnella (1980) and Winterbottom & Hoese (1988). Measurements were made to the nearest 0.1 mm using digital dial calipers, and are presented as percentage of standard length (SL). All specimen lengths are SL in mm. Cyanine Blue 5R (acid blue 113) stain was used to make pores more obvious (Akihito *et al.* 1993, Saruwatari *et al.* 1997), and an airjet used to accentuate them. Digital x-rays were utilized for vertebral counts. Counts and measurements for the holotype are given first, followed by the range for all types and the mean in parentheses. Type specimens are deposited at the National Museum of Natural History, Smithsonian Institution, Washington, D.C., USA (USNM) and the Western Australian Museum, Perth, Australia (WAM). Comparative specimens of *Sueviota larsonae* were examined at the Museum and Art Gallery of the Northern Territory, Darwin, Australia (NTM).

Standard length (SL) was 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; head length was taken from the upper lip to the posterior end of the opercular membrane; eye diameter is the greatest fleshy diameter; snout length was measured from the median anterior point of the upper lip to the nearest fleshy edge of the eye; 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; length of the first dorsal-fin spine is measured from the base of the spine to its filamentous tip; 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.



Figure 1. *Sueviota tubicola*, alcohol-preserved holotype, WAM P. 34558–002, 17.0 mm SL, Normanby Island, Papua New Guinea (G.R. Allen).

Sueviota tubicola, n. sp.

Tubeworm Dwarfgoby

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Figures 1–4.

Holotype. WAM P. 34558–002, male, 17.0 mm SL, Bunama Village, 10° 08.696' S, 151° 09.235' E, Normanby Island, D'Entrecasteaux Islands, Milne Bay Province, Papua New Guinea, 23–28 m, clove oil and hand net, M.V. Erdmann, 27 May 2016.

Paratype. USNM 432522, 4 specimens, 13.0–17.6 mm SL, collected with holotype; WAM P.34558–008, 4 specimens, 16.0–17.6 mm SL, collected with holotype.

Diagnosis. A species of *Sueviota* with the following combination of characters: dorsal-fin rays VI + I,9, first two spines filamentous; anal-fin rays I, 8; pelvic fins relatively short, the longest rays falling well short of anal opening; segmented pelvic-fin rays branched; pelvic-fin membrane and frenum fully developed; longitudinal scales 26; cephalic sensory pores include nasal pores (NA), anterior (AITO) and posterior (PITO) interorbital pores, supraotic pores (SOT), anterior otic pores (AOT), and upper and lower preopercular pores (POP); color in life generally semi-translucent pale brown with orange hue imparted by narrow orange margins of body scales; first dorsal fin translucent yellowish, except elevated first two spines whitish; second dorsal, anal, and caudal fins slightly yellowish with small orange-to-reddish spots; pelvic fins pale pinkish; pectoral fins translucent with pair of large brown spots separated by a narrow white band on base; lives in association with worm tubes.

Description. Dorsal-fin elements VI+I,9; first two spines forming elongate filament; anal-fin elements I,8; pectoral-fin rays 19 (mostly 18, but 2 with 19), all rays branched except uppermost pair and lowermost pair (total branched rays 14–15); pelvic-fin rays I,5, each ray branched twice, fourth and fifth rays longest; pelvic-fin membrane and frenum fully developed; caudal fin with 12 (11–13) branched and 17 segmented rays and 6 (6–7) unsegmented (procurrent) rays dorsally and 6 (5–6) rays ventrally; gill rakers poorly developed, 2 + 5; total vertebrae 26 (3 specimens).



Figure 2. *Sueviota tubicola*, Cyanine Blue-stained paratype, WAM P. 34558-008, 16.5 mm SL, Normanby Island, Papua New Guinea (G.R. Allen).

Longitudinal scales 26; transverse scales 8; scales ctenoid on body, except cycloid anteroventrally on abdomen and anterolaterally from upper pectoral-fin base to below base of first dorsal fin; no scales on head, abdominal midline, pectoral-fin base, prepectoral area, and prepelvic area; anterior extent of upper-body scales level with a line between upper margin of pectoral fin and about base of third dorsal-fin spine, except narrow naked area also continues posteriorly just below dorsal-fin base to level of base of sixth spine.

Front of head sloping with an angle of about 45° from horizontal axis; mouth terminal, inclined obliquely, forming an angle of about 46° to horizontal axis of body, lower jaw not projecting; maxilla extending posteriorly to about posterior edge of pupil; dentition as illustrated for genus by Winterbottom & Hoese (1988), consisting of about three irregular rows of short conical teeth in each jaw, with 3–5 enlarged, curved, spaced canines in outer row near symphysis of upper jaw; lower jaw with 1–2 enlarged canines in innermost row near symphysis; both nostrils with enlarged opening, anterior nares forming short tube, its length about one-third pupil diameter, posterior nares with elevated rim; gill opening extending forward to below posterior margin of preoperculum; pattern of cephalic sensory pores and papillae as shown in Fig. 3; cephalic sensory pores conforming to *Eviota* pattern B (Fig. 4 in Lachner & Karnella 1980), or essentially the same as shown for *Sueviota lachneri* and *S. larsonae* in Winterbottom & Hoese (1988), which includes nasal pores (NA), anterior (AITO) and posterior (PITO) interorbital pores, supraotic pores (SOT), anterior otic pores (AOT), and upper and lower preopercular pores (POP).

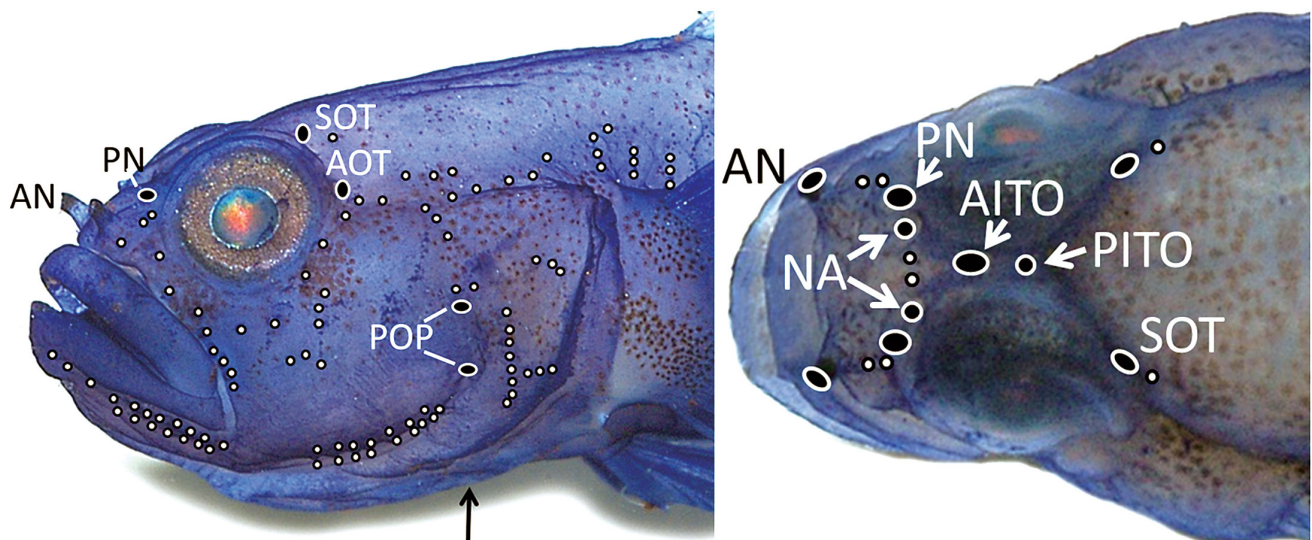


Figure 3. *Sueviota tubicola*, holotype, stained with Cyanine Blue to show pattern of cephalic sensory pores and papillae: NA= nasal pores, AITO= anterior interorbital, PITO= posterior interorbital, SOT= supraotic, AOT= anterior otic, POP= preopercular, AN= anterior nasal openings, PN= posterior openings, black arrow= anterior extent of gill opening (G.R. Allen).

Urogenital papilla in female flattened and broad, with finger-like projection laterally on each side, urogenital papilla of male narrow and elongate with weakly fimbriate margin

Measurements (percentage of SL; based on holotype and 8 paratypes 13.0–17.6 mm SL): head length 30.3 (29.7–32.2, 31.1); origin of first dorsal fin 36.9 (37.4–42.7, 38.8), lying slightly behind origins of pectoral and pelvic fins; origin of second dorsal fin 55.9 (55.9–61.1, 59.0), slightly anterior to anal-fin origin; origin of anal fin 60.2 (55.7–62.0, 59.7); caudal-peduncle length 26.0 (21.0–27.2, 24.3); caudal peduncle of moderate depth 13.0 (13.0–14.4, 13.5); body relatively slender, its depth 21.9 (21.5–25.2, 23.4) at level of pelvic-fin origin and 17.4 (17.4–21.7, 19.6) at level of anal-fin origin; eye diameter 8.5 (8.1–9.5, 8.9); snout length 6.6 (6.5–8.1, 7.1); pectoral-fin length 24.8 (24.8–28.6, 26.1); pelvic-fin length 23.0 (21.8–24.0, 23.2); and length of filamentous first dorsal-fin spine 46.1 (27.6–46.1, 38.7). As percentage of head length: eye diameter 28.1 (25.6–30.2, 28.6); snout length 21.9 (20.7–25.7, 22.8); upper-jaw length 48.3 (40.2–48.3, 43.4); and anterior nasal tube length 8.1 (6.1–9.6, 7.6).

Color in life. (from Fig. 4) Generally semi-translucent pale brown with orange hue imparted by narrow orange margins of body scales; body scales also delineated by matrix of thin brown broken lines; five diffuse subdermal brown saddles below base of dorsal fins and 5–6 subdermal brownish bars faintly evident just above anal-fin base; relatively narrow diffuse brown bar at base of caudal fin; head includes complex mixture of yellowish lips, yellow markings ventrally on cheek, brown blotches with greyish white areas on cheek and opercle, and yellowish blotch or short band behind upper rear corner of eye; most of nape region pale brown, entire head overlaid with numerous tiny melanophores; eye with greenish pupil and pink iris with 7–8 orange spoke-like bands; first dorsal fin translucent yellowish except elongated first two spines whitish; second dorsal, anal, and caudal fins slightly yellowish with small orange-to-reddish spots; pelvic fins pale pinkish; pectoral fins translucent with a pair of large reddish-brown spots separated by a narrow white band on base.

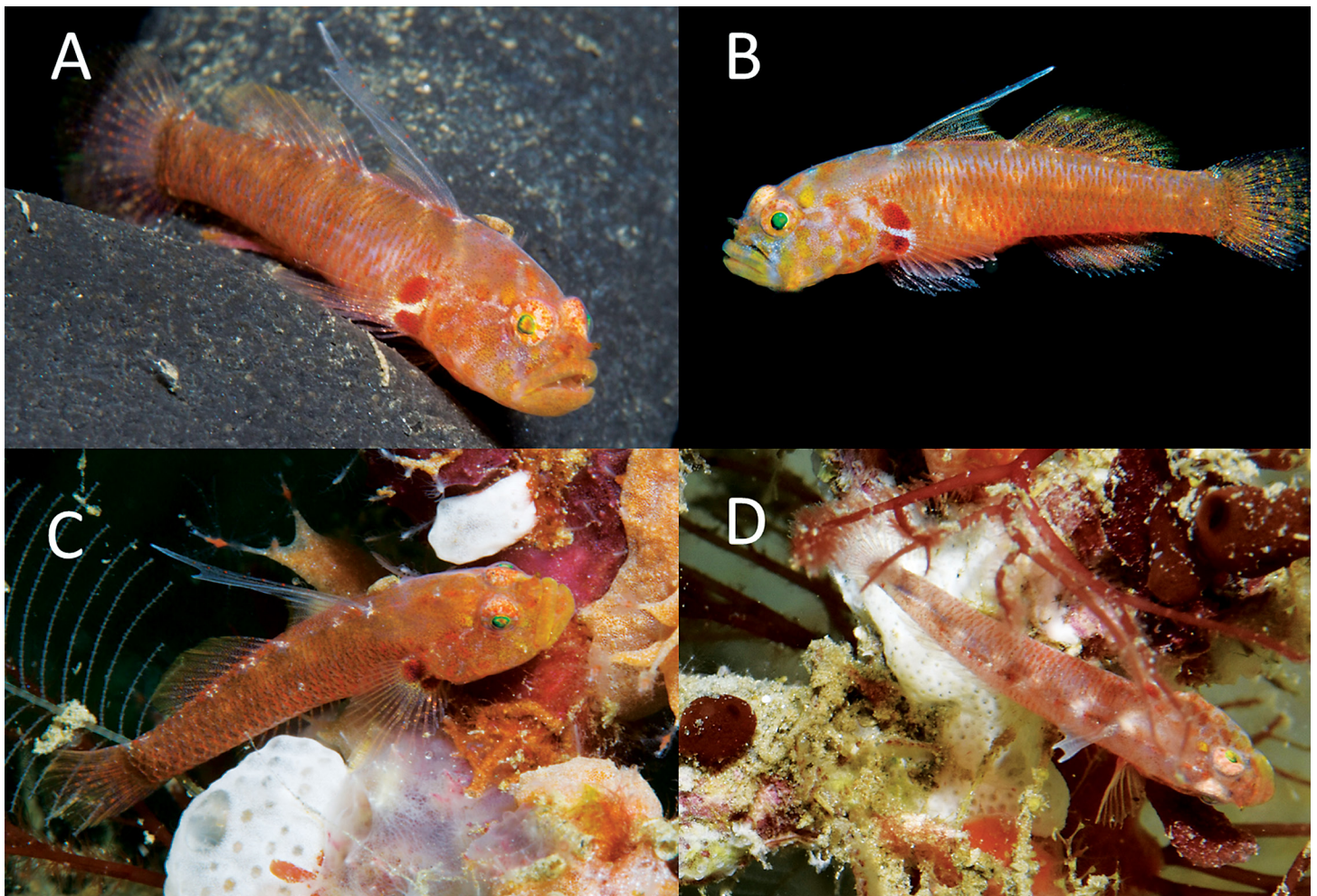


Figure 4. *Sueviota tubicola*, underwater photographs, approx. 15–17 mm SL, Normanby Island, Papua New Guinea (M.V. Erdmann & G.R. Allen).

Color in alcohol. (Figs. 1 & 2) Generally whitish with 3–8 tiny pepper-like spots delineating each scale margin on side of body; six diffuse subdermal greyish bars faintly evident just above anal-fin base and subdermal greyish spot mid-laterally on middle of caudal peduncle; narrow diffuse brown bar faintly evident at base of caudal fin; scattered pepper-like melanophores on nape and side of head, denser on operculum; pair of relatively large (about half pupil size) brownish spots, one each below front and rear portion of eye; outer one-third to one-fourth of tubular anterior nostrils blackish; fins generally translucent, median fins with numerous tiny melanophores, densest on second dorsal and anal fins; pectoral-fin base with distinctive pair of large brown spots, composed of dense concentrations of melanophores.

Etymology. The species is named *tubicola* (Latin: tube-inhabitant) with reference to its association with worm tubes.

Distribution and habitat. The new species is currently known only from the type locality, which is adjacent to Bunama Village on southeastern Normanby Island in the D'Entrecasteaux Islands of Milne Bay Province, Papua New Guinea. All of the type specimens were obtained within about 150 m of each other on a gently sloping to nearly flat, silty-sand bottom in depths of about 20–35 m. They were invariably associated with an unidentified tubeworm species that constructs vertical, stick-like structures that project to a height of about 30 cm above the substrate. The worm tubes were variously populated with a wealth of encrusting, sessile invertebrates such as sponges, tunicates, hydrozoans, and bryozoans that provided shelter for the fish as well as small crabs and shrimps. We estimated about 20–30% of the worm tubes were inhabited by the gobies, which were mainly solitary, although rarely in pairs. The fish were usually observed perched among the sessile invertebrate growth, retreating to the interior of the worm tube via a variety of openings when disturbed.

Remarks. The new species is provisionally placed in the genus *Sueviota* based on its branched fifth pelvic-fin rays. Features that have been used to separate the original four members of this genus include the presence of paired preopercular pores (present in *S. larsonae* and *S. lachneri*, but absent in *S. aprica* and *S. atrinasa*), the absence of a pelvic frenum (in all species except *S. larsonae*), the number of second dorsal-fin rays (usually 8–9 except 10 in *S. aprica*), and the color of the anterior nasal tube (pale in *S. lachneri* and entirely black or with a black rim in other species). The fifth species in the genus, the recently described *S. bryozophila*, is distinct in having the first four pelvic-fin rays and all pectoral-fin rays unbranched, a double mid-interorbital sensory pore, exceptionally enlarged nasal openings, exclusively ctenoid scales, as well as lacking internal dark bars. The new species is most similar to *S. larsonae*, sharing various features that include an identical system of cephalic sensory pores, usually 9 segmented dorsal-fin rays and 8 anal-fin rays, black-tipped anterior nostril tubes, presence of a full pelvic frenum, and a filamentous first dorsal-fin spine. The fresh coloration of *S. larsonae* was described as pale pinkish peach overall with an orangish head, and pale yellowish or yellow-orange median fins with scattered red spots. This color pattern, although similar to that of *S. tubicola*, lacks the distinctive pair of large dark spots on the pectoral-fin base. The new species further differs in having 26 longitudinal scales versus 21–24 for *S. larsonae*, 14–15 branched pectoral-fin rays (vs. only 6–9), and has the first two dorsal-fin spines elongated compared to only the first dorsal-fin spine in *S. larsonae*. Additionally, *S. larsonae* is known from deeper water (40–82 m) compared to the 20–35 m depth range of *S. tubicola*.

Material examined. *Sueviota larsonae* (all paratypes): NTM S.11900-001, 2 specimens, 15.5–16.2 mm SL, 100 km north of Boncant Bay, Arafura Sea, Northern Territory, Australia; NTM S.11924, 14.6 mm SL, north of Dampier, Western Australia; NTM 11925-003, 20.6 mm SL, north of Goulburn Island, Arafura Sea, Northern Territory, Australia; NTM S.11955-001, 15.3 mm SL, north of Goulburn Island, Arafura Sea, Northern Territory, Australia.

Acknowledgments

We are grateful to Matt Brooks and Pam Rorke for providing financial assistance for trips to Milne Bay Province during March and May 2016. Rob Vanderloos, owner of Milne Bay Charters, and his staff provided excellent logistic support aboard MV *Chertan* during both trips. We are also grateful to the people of Bunama Village on Normandy Island for allowing us access to the type locality of the new species. Thanks are also due Mark Allen

and Glenn Moore of WAM and Jeffrey Clayton of USNM for curatorial assistance. Michael Hammer of NTM facilitated a visit by the first author for the purpose of examining paratypes of *Sueviota larsonae*. Finally, we thank the Paine Family Trust and Wolcott Henry for their continued support of our taxonomic research. The manuscript was reviewed by David Greenfield and Luke Tornabene.

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