



Sueviota bryozophila, a new species of coral-reef goby from Indonesia (Teleostei: Gobiidae)

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Abstract

A new species of gobiid fish, *Sueviota bryozophila*, is described from Indonesia, at Ambon, Molucca Islands and Lembah Strait, North Sulawesi, on the basis of six specimens, 9.9–13.2 mm SL. The new species differs from the other four members of the Indo-Pacific genus by having reduced sensory pores on the dorsal surface of the head, with only paired pores at the mid-interorbital, and by having four pelvic-fin rays unbranched and a single branching of the fifth ray. Moreover, the new species is unique among both *Sueviota* and *Eviota* in having a complete membrane linking the two pelvic fins to form a disk. Other diagnostic features include 8–9 dorsal-fin soft rays, 7–8 anal-fin soft rays, 16 pectoral-fin rays, no pelvic frenum, and enlarged nostrils. The head and body is generally whitish to pale pink with scattered red spots. Unlike other members of the genus, there are no internal dark bars. The new species is only found associated with small pale bryozoan colonies, in which they are well-camouflaged.

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

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Introduction

The family Gobiidae, with more than 220 genera and 1,500 species (Larson & Murdy 2001), is the largest family of marine fishes and is particularly well-represented on coral reefs and surrounding silt, sand, and rubble substrates of the Indo-west Pacific region. This diverse group has long attracted the attention of taxonomists and remains the focus of considerable research activity. For example, a total of 327 species have been described between January 1980 and April 2014, making it the leading family for new discoveries and accounting for 22.8 percent of all Indo-west Pacific reef-fish species descriptions during this period (Allen 2014). One of the primary reasons for the huge number of new discoveries is the presence of a diverse community of very small and inconspicuous gobiids, for which we coined the term “microgobies” (Allen & Erdmann 2012). This speciose polyphyletic assemblage contains reef-dwelling species that are generally less than about 40 mm total length, with many attaining less than half this size. Although numerous species were described in the last century, frequently on the basis of rotenone collections, the widespread adoption of scuba diving and especially underwater photography in ichthyological research has created a new awareness of this fascinating component of the reef-fish fauna, resulting in the specific targeting of these tiny fishes by collectors.

Two Indo-Pacific genera in particular, *Eviota* Jenkins, 1903 and *Trimma* Jordan & Seale, 1906, account for a disproportionate number of recent gobiid species descriptions. Allen (2014) reported they were among the leading three genera for new reef-fish species descriptions since 1980, with 63 and 57 species respectively. Both genera continue to yield new finds and it is likely that each will soon contain more than 100 described species. The genus *Sueviota* Winterbottom & Hoese, 1988, although containing only a few species, is the apparent sister group of *Eviota*, since the two greatly resemble one another in basic morphology and general habits. However, Winterbottom & Hoese (1988) concluded that *Eviota* may not be monophyletic, and it is unclear whether *Sueviota* is the sister group of all or only some species of *Eviota*. The two genera share a number of features, including the absence of scales on the head, nape, and pectoral-fin base, reduced cheek papillae, relatively few (< 11) dorsal and anal-fin rays, and the presence of 1–3 enlarged canines near the symphysis of the lower jaw. However, *Sueviota* differs from *Eviota* in having the fifth or innermost pelvic-fin ray branched.

We describe here a new species of *Sueviota* from Indonesia that first came to our attention when its photograph was sent to us for identification. It did not seem to match any reef gobiid we were familiar with and even the generic allocation was uncertain. We eventually obtained specimens and with the aid of several colleagues have provisionally assigned it to the genus *Sueviota*. However, it displays unique features that may eventually justify recognition as a new genus.

Materials and Methods

Counts and measurements, descriptions of fin morphology, and the cephalic sensory-canal pore patterns follow the methodology of 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). Cyanine Blue 5R (acid blue 113) stain was used to make pores and papillae more obvious (Saruwatari *et al.* 1997) and an airjet was used to further accentuate them. Digital x-rays were utilized for vertebral counts. Type specimens are deposited at the Indonesian Biodiversity Research Centre at the University of Udayana, Bali, Indonesia (MB); the Museum Zoologicum Bogoriense, Cibinong, Java, Indonesia (MZB); and the Western Australian Museum, Perth, Australia (WAM).

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 from the origin of the pelvic fins; head length from the upper lip to the posterior end of the opercular membrane; eye diameter is the greatest fleshy diameter; snout length 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; lengths of spines and rays are measured to their extreme bases; caudal and pectoral-fin lengths are the length of the longest ray; pelvic-fin length is measured from the base of the pelvic spine to the tip of the longest segmented ray. One of the paratypes (MB-0614601, preserved in 95% ethanol) was sequenced for the COI mtDNA barcode marker (GenBank accession number KU159760), using the methods described in Allen *et al.* (2015).



Figure 1. *Sueviota bryozophila*, holotype, MZB 22140, 13.1 mm SL, Cyanine Blue-stained, Ambon, Indonesia (G.R. Allen)

***Sueviota bryozophila*, n. sp.**

Bryozoan Goby

Figures 1–4.

Holotype. MZB 22140, male, 13.1 mm SL, Ambon Bay (03° 42.003' S, 128° 06.340' E), Ambon, Maluku Province, Indonesia, 20 m, hand net, O. Lahendking, May 5, 2014.

Paratypes. MZB 22139, 2: 11.1 & 11.6 mm SL, collected with holotype; WAM P.34481-001, 2: 9.9 & 13.2 mm SL, collected with holotype; WAM P.34257-001, 13.0 mm SL, Jahir, Lembeh Strait (01° 29.888' N, 125° 14.240' E), North Sulawesi Province, Indonesia, 30 m, hand net, M.V. Erdmann, July 24, 2014; MB-0614601, 10.1 mm SL, collected with WAM P.34257-001.

Diagnosis. A species of *Sueviota* with the following combination of characters: second dorsal-fin rays I,8 or 9; anal-fin rays I,7 or 8; pectoral-fin rays 16, all rays unbranched; segmented pelvic-fin rays unbranched, except fifth ray with single branching, all pelvic-fin rays connected by a well-developed membrane, extending nearly to tip of each ray, forming disk, pelvic frenum absent; sensory pores on dorsal surface of head reduced, only a single pair of mid-interorbital pores; other cephalic sensory pores include supraotic (1), anterior otic (1), and preopercular (2); missing head pores include nasal, anterior interorbital, and intertemporal; anterior nares forming enlarged tube, its length about half pupil diameter; color in life whitish to light pink with scattered red spots; lives in association with bryozoan.

Description. Dorsal-fin elements VI+I,9 (three paratypes I,8 and one I,9); first dorsal fin gently rounded without filamentous spines, second and third spines longest; anal-fin elements I,8 (two paratypes I,7); pectoral-fin rays 16, all rays unbranched; pelvic-fin rays I,5, first to fourth segmented rays unbranched, fifth ray with single branching about half-way along its length, fourth and fifth rays longest, pelvic-fin membranes between the rays well-developed, forming disk, pelvic frenum absent; caudal fin with 12 branched and 17 segmented rays and 5–6 unsegmented (procurrent) rays dorsally and ventrally; total vertebrae 26 (3 specimens).

Lateral scale rows 25 (two paratypes with 24); transverse scale rows 7; scales finely ctenoid on body (Fig. 1), no cycloid scales present; head, belly and breast region without scales; anterior extent of scales level with a line between upper margin of pectoral fin and about origin of second dorsal fin, except narrow naked area also present immediately below base of second dorsal fin.

Front of head sloping with an angle of about 55° from horizontal axis; mouth terminal, inclined obliquely upwards, forming an angle of about 65° to horizontal axis of body, lower jaw not projecting; maxilla extending posteriorly to about anterior edge of pupil; dentition as illustrated for genus by Winterbottom & Hoese (1988),

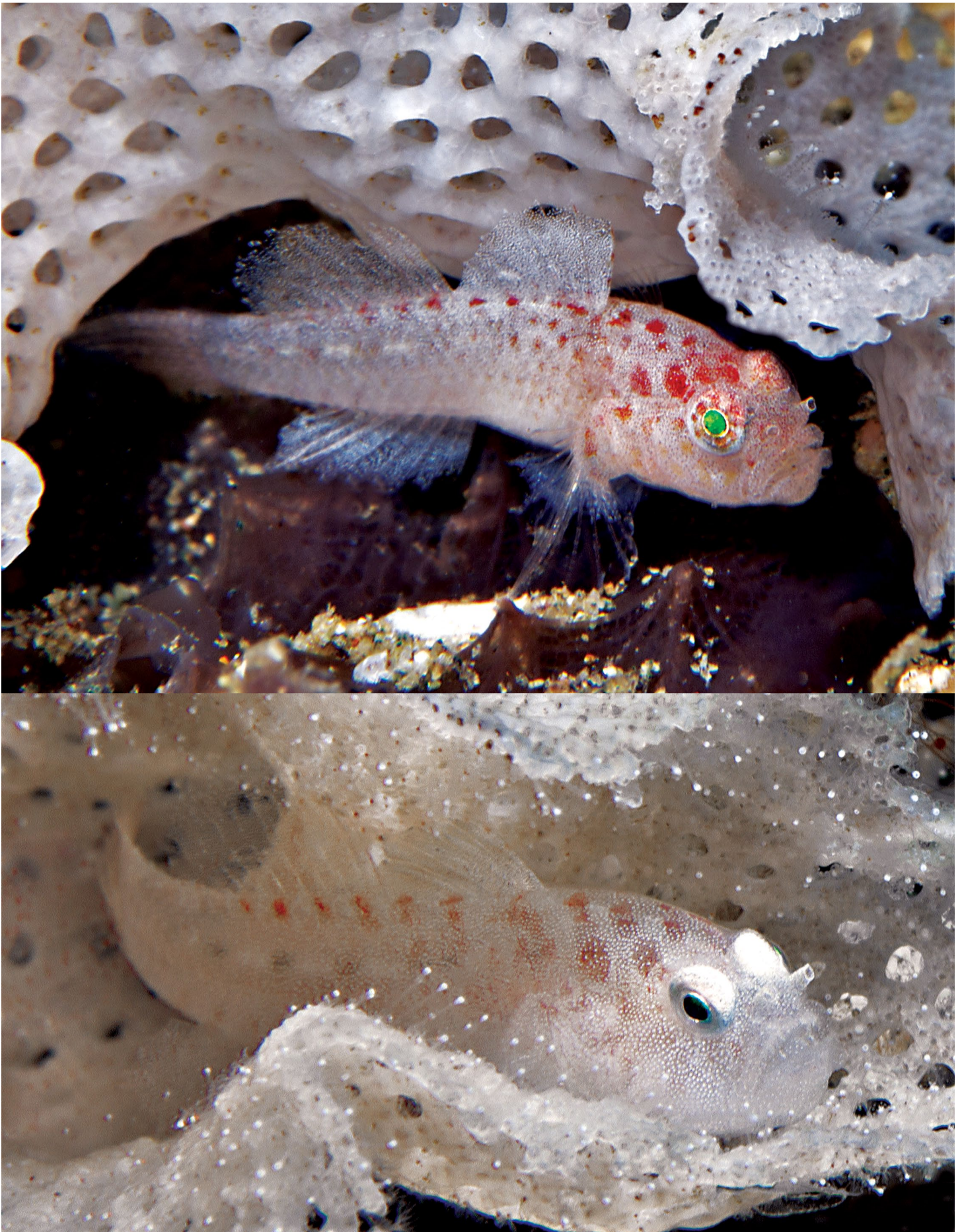


Figure 2. *Sueviota bryozophila*, underwater photographs (upper and lower), approx. 12 mm SL, with host bryozoan, Ambon, Indonesia (N. DeLoach).

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 single enlarged canine in innermost row near symphysis; both nostrils with enlarged opening, anterior nares forming tube, its length about half pupil diameter, posterior nares with elevated rim; gill opening extending forward to below posteroventral edge of preoperculum; pattern of cephalic sensory pores and papillae as shown in Fig. 3; cephalic sensory pores include paired interorbital pores, supraotic pore, anterior otic pore, and paired preopercular pores.

Urogenital papilla in female smooth, bulbous, with pair of finger-like projections laterally on each side; that of male smooth and elongate (reaching base of anal-fin spine), with weakly fimbriate margin.

Measurements from 13.1 mm SL holotype (range and mean of all types): head length 32.1 (31.4–33.9, 32.5); origin of first dorsal fin 36.3 (33.1–37.5, 36.0), lying slightly behind posterior margin of pectoral-fin base; origin of second dorsal fin 58.2 (53.0–59.7, 57.1), about level with anal-fin origin; origin of anal fin 57.1 (58.6–64.4, 60.1); caudal-peduncle length 21.4 (17.0–21.1, 19.4); caudal peduncle of moderate depth 15.5 (14.3–15.8, 15.2); body relatively deep, its depth 26.0 (25.3–27.0, 26.2); eye diameter 10.0 (8.5–10.2, 9.3); snout length 6.4 (5.2–7.0, 6.4); pectoral-fin length 27.6 (26.8–30.2, 28.6); pelvic-fin length 20.4 (21.2–23.5, 22.1).

Color in life. (from underwater *in situ* photographs, Fig. 2) Generally pale pink to whitish, semi-translucent on posteriormost portion of body, including caudal peduncle; widely scattered red spots on dorsal surface of head, nape, upper operculum, and along base of dorsal fin, generally smaller posteriorly; interrupted, diffuse, internal white stripe following vertebral column sometimes evident; fins semi-translucent white; head, body, and fins densely covered with fine, bright white speckling; pupil green when illuminated with strobe light.

Color in alcohol. Uniformly whitish to slightly pale yellowish with no hint of red spots as seen in life. The Cyanine Blue-stained holotype is illustrated in Fig. 1.

Distribution and habitat. Probably widespread in the East Indian region, but easily overlooked due to its small size and cryptic habits. It is currently known only from the type specimens from Indonesia at Ambon, Molucca Islands (type locality) and from Lembah Strait, North Sulawesi, as well as from underwater photographs in Banda, Molucca Islands, and Alor, Lesser Sunda Islands. It is apparently invariably closely associated with a bryozoan, which is provisionally identified as a member of the genus *Triphyllozoon*. The color pattern of the fish effectively blends with the coloration of the host invertebrate (Fig. 2), and the fish effectively maintains a burrow within the folded recesses of the bryozoan colony. The depth range of collections and observations was about 15–30 m, usually on black volcanic-sand slopes, with the inconspicuous bryozoan colonies (roughly spherical-shaped with a diameter ranging from 3–7 cm) often attached to small pieces of coral rubble or volcanic rock. An intensive

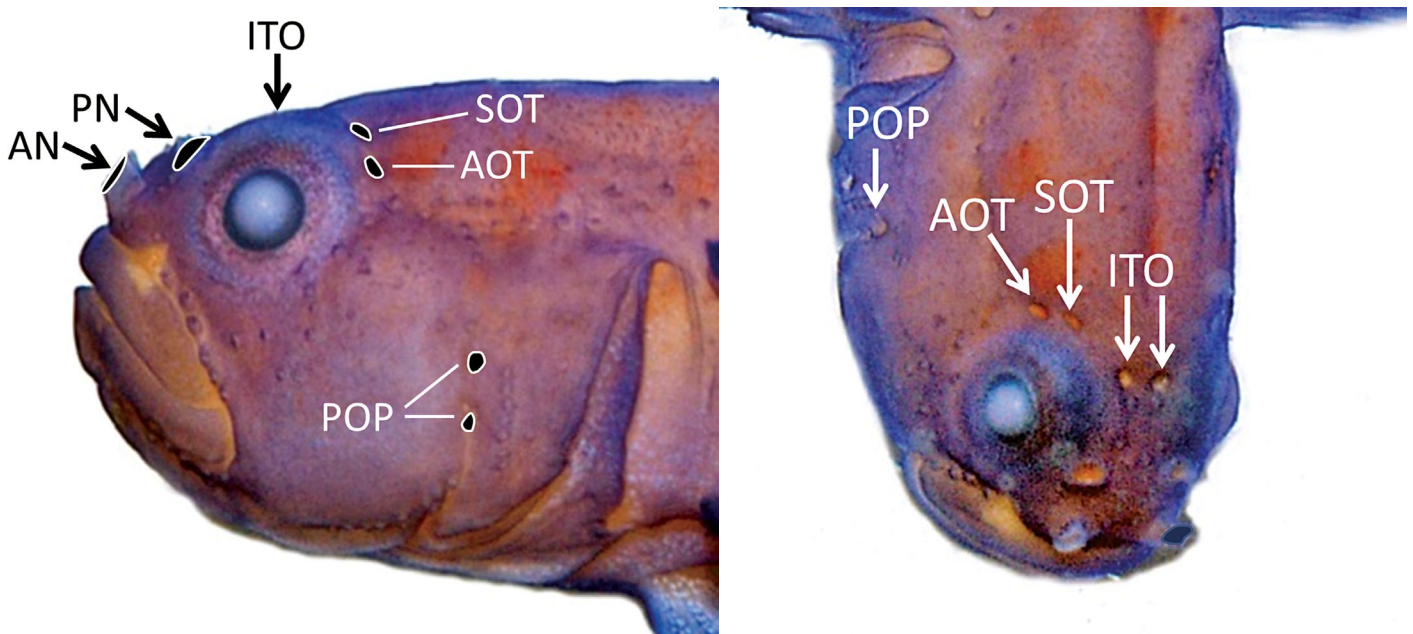


Figure 3. *Sueviota bryozophila*, holotype, stained with Cyanine Blue to show pattern of cephalic sensory papillae and pores: lateral view at left, dorsal view at right (ITO = interorbital, SOT = supraotic, AOT = intertemporal, and POP = preopercular). Anterior and posterior nasal openings indicated by AN and PN, respectively (G.R. Allen).

search of over 60 bryozoan colonies at one site in Lembeh Strait revealed only about 5% of bryozoans had the goby associate, usually with a single individual, but in one case with two individuals in the same bryozoan colony.

Etymology. The species is named *bryozophila* (Latin: bryozoan-loving), with reference to its association with bryozoan colonies.

Remarks. The new species is provisionally placed in the genus *Sueviota* based on its morphological characteristics. The genus is most easily differentiated from the closely-related *Eviota* by the condition of the fifth or innermost pelvic-fin ray, which is branched in *Sueviota* (Fig. 4) and unbranched in *Eviota*. Additionally, the presence of a complete membrane linking the two pelvic fins to form a single disk in the new species appears to be unique among both *Sueviota* and *Eviota*. The new taxon essentially agrees with most characters listed by Winterbottom & Hoese (1988) in their diagnosis of *Sueviota*. However, it does not appear to be closely related to any of the four previously described species, differing in several important features, including the lack of any branching in the first four segmented pelvic-fin rays (Fig. 4), the absence of branching in all pectoral-fin rays, only a single pair of mid-interorbital sensory pores on the dorsal surface of the head, exceptionally enlarged nasal openings (Fig. 3), the lack of cycloid scales anteroventrally on the side, and the absence of internal dark bars. These characters may eventually justify its placement in a separate genus, but, for the time being, we have adopted a conservative approach in assigning it to *Sueviota*.

In addition to the new species, *Sueviota* contains four species, all described by Winterbottom & Hoese (1988), comprising *S. aprica* (Chagos Archipelago to Fiji), *S. atrinasa* (northwestern Australia and eastern Indonesia to Vanuatu), *S. lachneri* (Chagos Archipelago to Ogasawara Islands and Fiji), and *S. larsonae* (northwestern Australia). Features that have been used to separate the four species include the presence of paired preopercular pores (present in *S. larsonae* and *S. lachneri*, but absent in *S. aprica* and *S. atrinasa*), absence of a pelvic frenal membrane (all species except *S. larsonae*), number of second dorsal-fin rays (usually 8–9 except 10 in *S. aprica*), and color

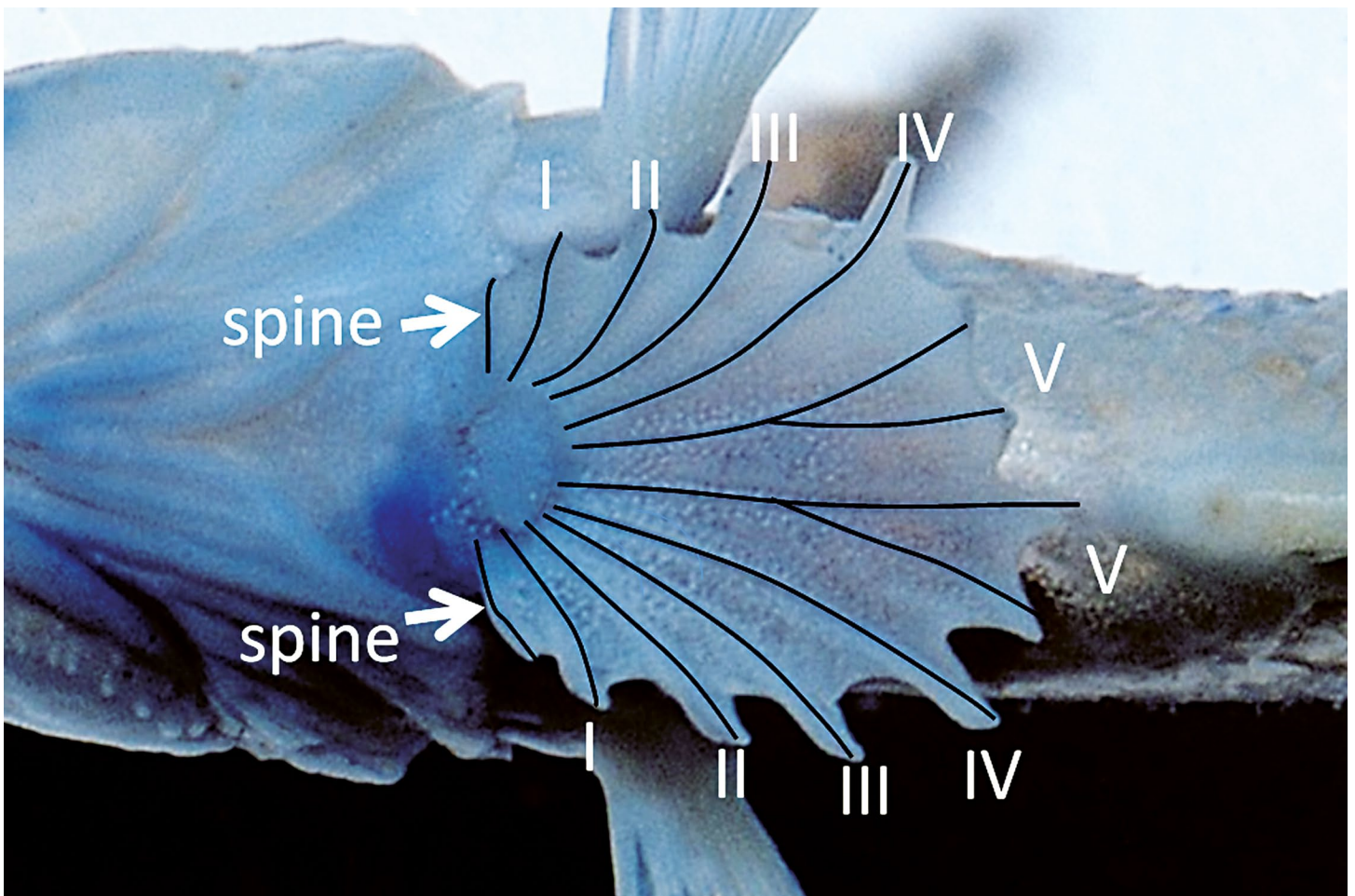


Figure 4. *Sueviota bryozophila*, holotype, stained with Cyanine Blue; pelvic-fin structure with black lines added to clearly show individual elements; segmented rays labeled with Roman numerals (G.R. Allen).

of the anterior nasal tube (entirely black or with black rim in *S. atrinasa* and *S. aprica*, plain in the other two species).

A preliminary genetic analysis comparing the COI mtDNA sequence of the new species to other sequences of microgoby specimens collected by us in eastern Indonesia (including a range of *Trimma*, *Eviota*, *Sueviota*, and *Lubricogobius* specimens) indeed shows *S. bryozophila* forming a clade with *S. atrinasa* (N.K.D. Cahyani, unpublished data). These data are now being incorporated into a much larger and more comprehensive genetic study in progress by Luke Tornabene (pers. comm.), who is examining relationships of *Eviota* and close relatives—the results of which will provide further insights on the evolutionary relationships of this enigmatic new bryozoan goby to its relatives.

Acknowledgments

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