



***Eviota tetha*, a new species of dwarfgoby from Cenderawasih Bay, West Papua, Indonesia (Teleostei: Gobiidae)**

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Abstract

A new species of dwarfgoby, *Eviota tetha*, with a cephalic sensory-canal pore pattern lacking only the IT and NA pores and with the AITO pore positioned far forward and opening anteriorly, is described from Cenderawasih Bay, West Papua, Indonesia. It has a dorsal/anal-fin formula of 8/7, pectoral-fin rays unbranched, the 5th pelvic-fin ray is absent or flexible and rudimentary and less than 10% of the 4th, the fourth pelvic-fin ray has 2–3 branches, very long anterior tubular nares, and a distinctive black spot at the caudal-fin base. In life it is red-orange with five distinctive small white spots along the posterior midline and two white lines over the abdomen.

Key words: taxonomy, gobies, new species, Indo-Pacific, Pacific Ocean, coral-reef fishes, *Eviota infulata*.

Introduction

The gobiid genus *Eviota* currently has 91 described species (Eschmeyer 2014), and we are aware of a number of other species waiting to be described. Many of these species have been described in recent years (Greenfield *et al.* 2014), mostly from the area in or near the “Coral Triangle”, home to the greatest diversity of coral reef fishes (Allen & Erdmann 2012). During his surveys of the fishes of Cenderawasih Bay in the Bird’s Head region of West Papua, the second author photographed and collected a species of *Eviota* he did not recognize, and that species is described here.

The new species fits the description typical of all species of *Eviota*: the pelvic fins are separate and lack a frenum; the 5th pelvic-fin ray, if present, is unbranched; the membrane joining the 5th pelvic-fin rays is rudimentary or absent; there are ctenoid scales on the body but no scales on the head, nape or pectoral-fin base; the breast

either lacks scales or may have a few embedded cycloid scales; the teeth in the upper jaw are in two or more rows, and there are 1–3 enlarged curved canine-like teeth in the innermost row of the lower jaw just behind the jaw symphysis.

Materials and Methods

Counts and measurements, descriptions of fin morphology and the cephalic sensory-canal pore patterns follow Lachner and Karnella (1980) and Jewett and Lachner (1983). Postanal midline spots, along the posterior ventral midline of the body, begin at the anal-fin origin and extend to a vertical drawn 2 to 3 scale rows anterior to the ends of the hypurals where they articulate with the caudal-fin ray bases, the additional smaller spot posterior to this, if present, is not counted. “The membranes joining the first four [pelvic] fin rays are considered to be well developed when the membranes extend beyond the bases of the first branches; they are considered to be reduced when they are slightly developed, not extending to the bases of the first branches” (Lachner & Karnella 1980, p. 4). Dorsal/anal fin-ray counts only include segmented rays.

Measurements were made to the nearest 0.1 mm using an ocular micrometer and 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; Nakabo 2002) and an airjet used to observe them. For measurements, values for the holotype are given first, followed by the range for all types and the mean in parentheses.

Specimens have been deposited in the following museums: CAS – California Academy of Sciences, San Francisco; MZB - Museum Zoologicum Bogoriense, Cibinong, Indonesia; ROM – Royal Ontario Museum, Toronto; USNM – United States National Museum (Smithsonian), Washington D.C., and WAM – Western Australian Museum, Perth, Western Australia.



Figure 1. *Eviota tetha*, holotype preserved, CAS 237105. Photograph by Jon D. Fong.

Eviota tetha Greenfield & Erdmann, n. sp.

Tetha's Dwarfgoby

Figures 1–4.

Holotype. CAS 237105, 11.6 mm SL male, Indonesia, West Papua, Cenderawasih Bay, Kwatisore South Bay, 03° 14.990' S, 134° 57.558' E, 25m on foliose corals in lagoon, 14 July 2013, M.V. Erdmann (Fig. 1).

Paratypes. All taken with the holotype. CAS 237106, 11.2 mm male, 10.0 mm female; MZB 22099, 10.1 mm male; ROM 94929, 10.6 mm male, 10.1 mm female; USNM 427308, 10.6 mm male, 8.9 mm female; WAM 34021-001, 11.0 mm & 11.3 mm males.

Diagnosis. A species of *Eviota* with a cephalic sensory-canal pore pattern lacking only the IT and NA pores and with the AITO pore positioned far forward and opening anteriorly, very long anterior tubular nares, the dorsal/anal-fin formula 8/7, pectoral-fin rays unbranched, 5th pelvic-fin ray is absent or flexible and rudimentary and less than 10% of the 4th, and there is a black spot at the caudal-fin base. In life it is red-orange with five distinctive small white spots along the posterior midline and two white lines over the abdomen.

Description. Dorsal-fin elements VI+I,8 (all); anal-fin elements I,7 (all); pectoral-fin rays 14 (14 [6]–15 [3]) all unbranched; fifth pelvic-fin ray absent or flexible and rudimentary and less than 10% of the 4th; 3 (2–3) branches on 4th ray; 1 (1–2) segments between consecutive branches of 4th pelvic-fin ray, segments not obvious; pelvic-fin membrane between the rays well developed between rays 1–3, reduced between rays 3–4; 11 branched and 17 segmented caudal-fin rays; 23 (22 [1], 23 [6], 24 [1]) lateral scale rows; transverse scale rows 7; scales on ventral surface of abdomen, cycloid scales on breast; first dorsal fin triangular in shape, 2nd spine filamentous in holotype, extending back to middle of second dorsal fin, first, second, and third filamentous in some paratypes; genital papilla in male smooth, not fimbriate, long and narrow, expanded into two lateral horns at tip, extending past anal-fin spine; genital papilla of female smooth, bulbous, with several short finger-like projections on end; front of head sloping with an angle of about 58° from horizontal axis; mouth slanted obliquely upwards, forming an angle of about 55° to horizontal axis of body, lower jaw not projecting; maxilla extending posteriorly just past anterior edge of pupil; anterior tubular nares long, extending past anterior margin of upper lip; gill opening extending forward to below posteroventral edge of preoperculum; only missing IT and NA cephalic sensory-pores, with the AITO pore positioned far forward and opening anteriorly (Fig. 2), or sometimes the entire interorbital

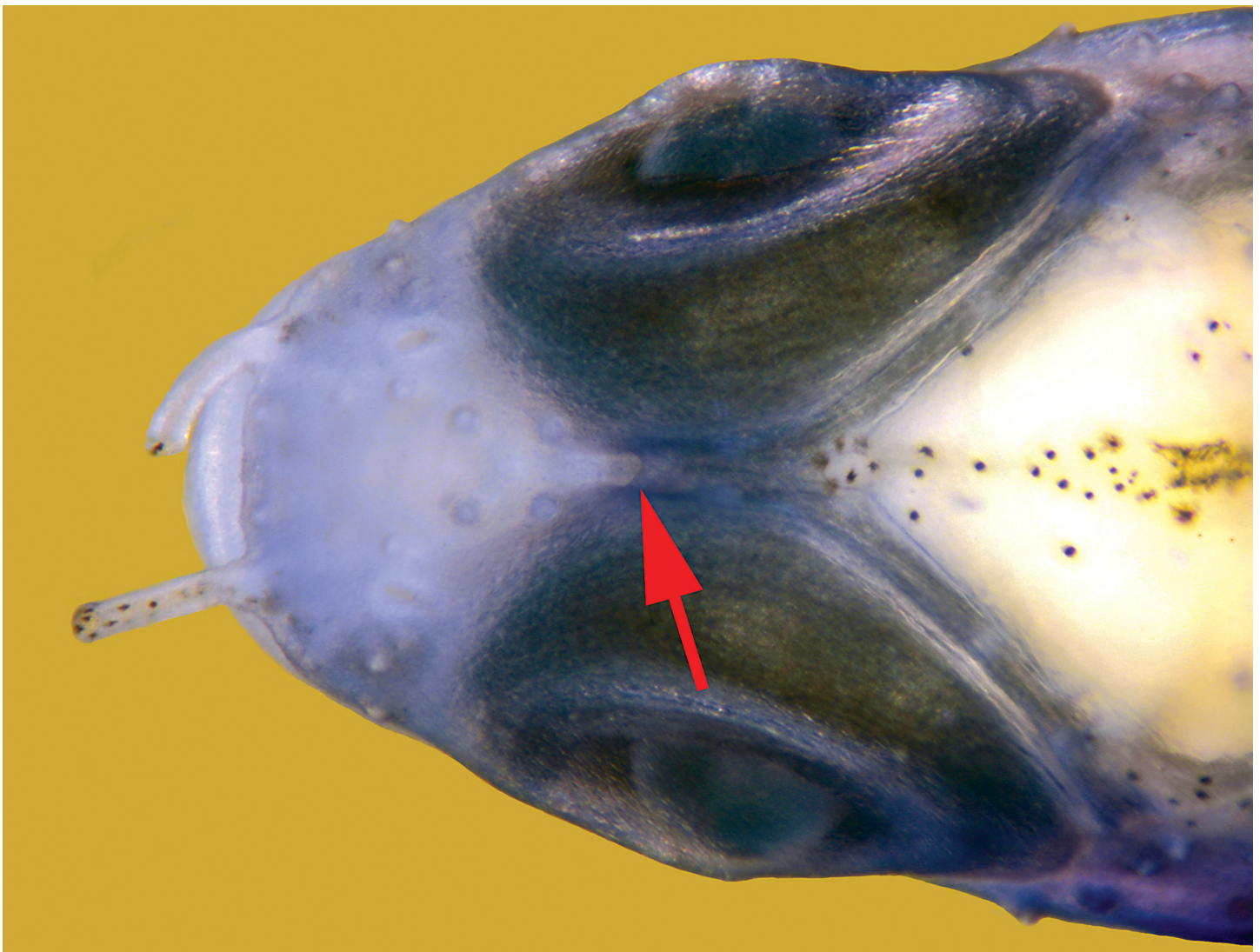


Figure 2. The cephalic sensory-canal pore pattern on the top of the head of *Eviota tetha*, ROM 94929, 10.1 mm SL, illustrating the forward opening AITO pore (red arrow). Photograph by R. Winterbottom.

area open, perhaps due to the membranous roof being damaged, cutaneous papilla system similar to papilla pattern B-1 (of Lachner & Karnella, 1980).

Measurements (based on holotype and 9 paratypes, 8.5–10.9). Head length 30.0 (30.0–33.0, 31.5); origin of first dorsal fin 37.3 (35.6–41.0, 38.1), lying behind posterior margin of pectoral-fin base; origin of second dorsal fin 57.5 (55.7–58.4, 57.1), slightly in advance of anal-fin origin; origin of anal fin 58.8 (58.0–61.0, 59.3); caudal-peduncle length 26.2 (23.1–27.2, 25.4); caudal peduncle slender, 12.9 (10.9–12.9, 12.0); body very slender, its depth 21.4 (17.7–21.4, 19.6); eye diameter 10.7 (10.2–12.3, 11.1); snout length 5.1 (3.9–6.2, 4.5); pectoral-fin length 30 (27.4–39.3, 31.6); pelvic-fin length 37.8 (32.0–43.7, 39.7).

Color in preservative of holotype (Fig. 1). Background color of head and body pale cream with only bold marking on body a black spot at caudal-fin base. Top of head with a line of dark chromatophores extending posteriorly from PITO pore back onto nape. Another line of dark chromatophores extending from posterodorsal portion of eye back above preoperculum. Ventral half of head below middle of eye peppered with dark chromatophores extending from under eye posteriorly to pectoral-fin base. A line of dark chromatophores extending from middle of eye anteriorly to base of tubular nares. Nares without pigment except for a few melanophores on distal tip. A horizontal band of dark chromatophores across center of pectoral-fin base. Abdomen with a heavy peppering of dark chromatophores. Scale borders on ventral portion of body behind anus to caudal fin lightly outlined with dark chromatophores. Pelvic fins immaculate, membranes of pectoral fins with a light peppering of melanophores. Anal and second dorsal-fin membranes peppered with melanophores. First dorsal fin with a concentration of melanophores along its basal one quarter. Caudal fin with a peppering of dark chromatophores and melanophores on membranes, with a dark area extending from dark spot at caudal-fin base onto lower half of fin.

Color of live individuals of *E. tetha* (Figs. 3 & 4) Background color of body above midline and posterior to anus translucent with a yellowish tinge. Top of head and area over abdomen below midline red-orange, continuing posteriorly as a line just dorsal to vertebral column, with five distinctive small white dots spread along its length from above anus to caudal-fin base. Red-orange area over abdomen with a narrow white line over vertebral column extending from behind eye to above anus. A second wider white line below first, extending back from pectoral-fin base. Lower portion of abdomen below second white line translucent. Posterior half of body with red-orange lines extending dorsally and ventrally from vertebral column following neural and haemal spines, ventral lines



Figure 3. *Eviota tetha*, underwater photograph of one of the type series. Photograph by M.V. Erdmann.

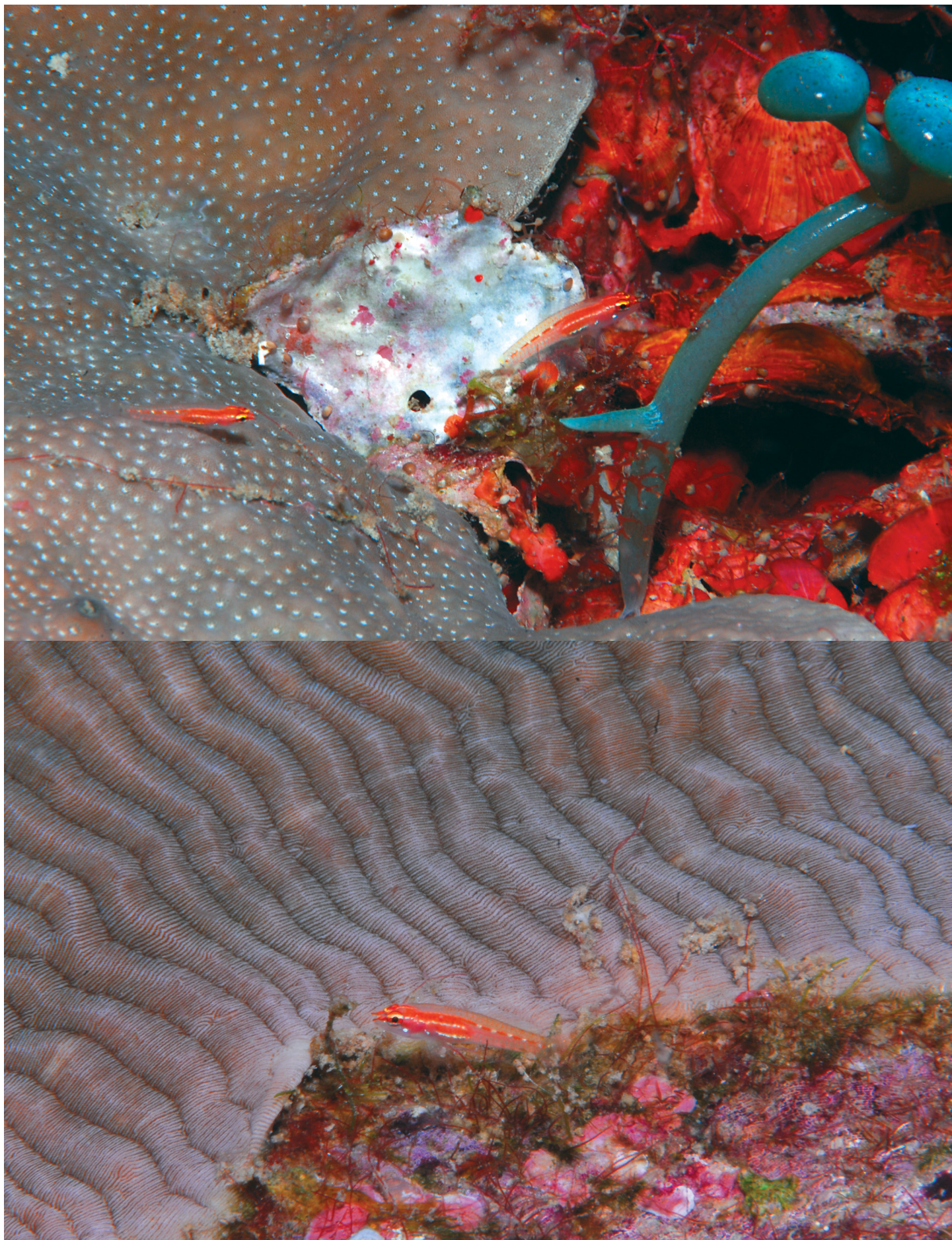


Figure 4. Underwater photographs of *Eviota tetha* in its habitat. Photographs by M.V. Erdmann.

more red and intense. Head bicolored, ventral half below eye translucent white, dorsal half red-orange, extending anteriorly to snout and tubular nares. A narrow yellow line extending from nape anteriorly through interorbital area. Side of head over operculum more reddish with a white line behind eye above operculum and a bright white spot below preoperculum. Pectoral-fin base with a similar white spot. Pupil of eye black, iris red-orange with a wide yellow bar running across it above pupil and a narrow white line crossing eye below pupil.

Distribution. Known only from Kwatisore South Bay within Cenderawasih Bay, West Papua, Indonesia.

Etymology. The specific epithet is named for Creusa Hitipeuw, known to her colleagues as “Tetha”, a passionate and highly-respected Indonesian marine conservationist who dedicated her career to saving the coral reefs and especially marine turtles of Indonesia, with a strong focus on Teluk Cenderawasih and the Bird’s Head region of West Papua. Tetha tragically passed away shortly after the discovery of this species, and it is an honor to name this species in her memory.

Comparisons. The only other described species of *Eviota* lacking both the IT and NA pores and with the AITO pore positioned far forward and opening anteriorly is *E. infulata* (Smith 1956), which also has a dorsal/anal count of 8/7. *Eviota infulata* has a distinctive dark, large irregular mark, often W-shaped, on the body just above and posterior to the pectoral-fin base (lacking in *E. tetha*), and the 5th pelvic-fin ray is well developed, up to 30% of the length of the 4th (absent or flexible and rudimentary and less than 10% of the 4th in *E. tetha*). *Eviota tetha* has a distinctive dark spot on the caudal-fin base that is lacking in *E. infulata*. In life, *E. tetha* is red-orange with five distinctive small white dots on the posterior midline of the body (all lacking in *E. infulata*- Fig. 5). In cases where the membranous roof of the interorbital area is damaged, it might appear to have an enlarged AITO pore that is fused with the PITO, as is found in *E. shimadai* and about 50% of *E. pinocchio* specimens, but *E. tetha* differs greatly in coloration from both (Figs. 6 & 7).

Remarks. *Eviota tetha* appears to be most similar to *E. infulata*, sharing its D/A formula, unbranched pectoral-fin rays, unique cephalic sensory-canal pore pattern, and having long tubular nares, but its live coloration is quite different. Although *E. infulata* has been taken to the east and west of the Indonesian area, to date it has not been collected there.

Eviota tetha occupies a very specific microhabitat and depth range. It was observed and collected exclusively from a very sheltered and coral-rich lagoon (Kwatisore South Bay) with limited water flow and water temperatures that are commonly elevated above that of the surrounding reef areas (commonly between 30–31° C). It occurs in a rather narrow depth range of 25–30 m depth (it was not found either deeper or shallower than this, despite extensive searching), and was found resting and moving about on the surfaces of the extensive foliose and plating coral colonies (mostly *Pachyseris* and *Turbinaria* spp. colonies) in the lagoon. Co-occurring coral goby species included *E. atriventris*, *E. fallax*, *E. lachdeberiei*, and *Trimma emeryi*.



Figure 5. Underwater photograph of *E. infulata*, Moorea lagoon, French Polynesia. Photograph by J.E. Randall.



Figure 6. Underwater photograph of *E. shimadai*, Ogasawara Islands. Photograph by J.E. Randall. Figure 10 from Greenfield and Randall (2010).

Eviota tetha is currently known only from Cenderawasih Bay in the Bird's Head region of West Papua, Indonesia. As noted in Allen and Erdmann (2012), Cenderawasih Bay is home to a remarkable number of endemic species of reef fishes, stomatopod crustaceans and hard corals, likely as a result of the bay's repeated geologic isolation over the past 5–6 million years. Currently, there are at least 13 known Cenderawasih endemic reef fishes, including *Hemiscyllium galei* Allen & Erdmann 2008a; *Microbrotula geraldalleni* Schwarzhans & Nielsen 2012; *Pictichromis caitlinae* Allen, Gill & Erdmann 2008; *Pterocaesio monikae* Allen & Erdmann 2008b; *Forcipiger wanae* Allen, Erdmann & Jones-Sbrocco 2012; *Amblyglyphidodon flavopurpureus* Allen, Erdmann & Drew 2012; *Chromis unipa* Allen & Erdmann 2009; *Chrysiptera pricei* Allen & Adrim 1992; *Cirrhilabrus cenderawasih*



Figure 7. Fresh specimen underwater of *Eviota pinocchio*, Indonesia. Photograph by M.V. Erdmann. Figure 11 from Greenfield and Winterbottom (2012).

Allen & Erdmann 2006a; *Paracheilinus walton* Allen & Erdmann 2006b; *Meiacanthus erdmanni* Smith-Vaniz & Allen 2011; *Lepadichthys akiko* Allen & Erdmann 2012; and *Calumia eilperinae* Allen & Erdmann 2010. While it is possible that *E. tetha* will eventually be found outside of Cenderawasih Bay, the second author's extensive surveys in the adjacent regions of the Bird's Head and eastern Indonesia have yet to uncover the species in those areas, despite a concerted focus on cryptic gobies. As such, we provisionally consider *E. tetha* to be yet another restricted range endemic of Cenderawasih Bay.

Other material examined. *Eviota infulata*, CAS 219749 (41), Fiji.

Acknowledgments

We wish to express our sincere gratitude to the Cenderawasih Bay National Park Authority (BBTNTC), the people of Kwatisore village and Simon and Andrina and all the crew of the Damai liveaboard for hosting us during the trip during which this species was discovered. Burt Jones, Maurine Shimlock and Gerald Allen were helpful dive companions. We also thank Renny Hadiaty at the Indonesian Institute of Sciences for curation of the MZB type specimen. Richard Winterbottom kindly photographed the head pores of *Eviota tetha* and Jon D. Fong photographed the holotype of *Eviota tetha*. The staff of the California Academy of Sciences as usual has provided continual support: David Catania, Jon D. Fong, Mysi D. Hoang, and Luiz A. Rocha. The manuscript was reviewed by Luke Tornabene and Richard Winterbottom.

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