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Eviota angustifascia, a new dwarfgoby from Fiji and New Guinea (Teleostei: Gobiidae)

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Abstract

A new species of dwarfgoby, *Eviota angustifascia* n. sp., is described from the Lau Group, Fiji and the island of New Guinea. The new species lacks all cephalic sensory-canal pores. It has a dorsal/anal fin-ray formula of 9/8, 13–14 pectoral-fin rays (all unbranched), the fifth pelvic-fin ray 10–17% of the fourth ray, and the male urogenital papilla not fimbriate. The body is crossed by 5 narrow, white, vertical lines separating wider dark bars, with the bar under the posterior second dorsal fin wider than the orbit diameter.

Key words: taxonomy, ichthyology, coral-reef fishes, gobies, Papua, Pacific Ocean, Indo-Pacific, Indonesia.

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Introduction

The dwarfgobies (genus *Eviota*) are a diverse group of tiny coral-reef fishes (usually <18 mm SL) found throughout most of the Indo-Pacific Ocean. Currently, there are 123 described species (including the new species described herein), with many having been described in the last 10 years. Greenfield & Winterbottom (2016) summarized the genus and presented a key, with photographs, to the 107 species described between 1871 and 2016. Greenfield (2017) reviewed the taxonomic history, systematics, reproduction, ecology, geographic distribution, genetic studies, and speciation of the dwarfgobies.

The pattern of the cephalic sensory-canal pores has been an important character in describing various species (reviewed in Greenfield [2017]). Nevertheless, in 2012, Greenfield & Winterbottom described *Eviota jewettae*, the first *Eviota* species to be described lacking all cephalic sensory-canal pores. Since that time, 6 additional species lacking all pores have been described: *Eviota deminuta* Tornabene, Ahmadia & Williams, 2013 (Marquesas Islands, French Polynesia); *Eviota occasa* Greenfield, Winterbottom & Suzuki, 2014 (Palau and Ryukyu Islands); *Eviota singula* Greenfield & Winterbottom, 2016 (Palau and Raja Ampat, Indonesia); *Eviota lateritea* Greenfield & Winterbottom, 2016 (usually lacking pores) (New Caledonia); *Eviota thamani* Greenfield & Randall, 2016 (Fiji); and *Eviota amamiko* Fujiwara, Suzuki & Motomura, 2019 (Ryukyu Islands).

When describing *E. jewettae*, Greenfield & Winterbottom (2012) examined specimens and photographs from Palau, the Philippine Islands, Papua New Guinea, and Indonesia, but, because of differences in fresh coloration, limited their type material to Palau. Since that time, the second author has collected a number of specimens from various locations that both lack all pores and have dark body bars separated by white bars; however, many show different live color patterns. These specimens were preliminarily assigned to *E.* cf. *jewettae*. Among these specimens are 5 from three different locations that consistently have wide dark body bars separated by very narrow white bars, described here as a new species.

Materials and Methods

Type specimens are deposited at the California Academy of Sciences, San Francisco, CA, USA (CAS).

Descriptions of pelvic-fin morphology and cephalic sensory-canal pores follow Greenfield & Winterbottom (2016), as originally formulated by Lachner & Karnella (1980) and Jewett & Lachner (1983). We follow Lachner & Karnella (1980: 4) in describing the membranes joining the first 4 pelvic-fin rays, which "…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". Dorsal/anal fin-ray formula counts (eg. 9/8) only include segmented rays.

Measurements were made to the nearest 0.1 mm using an ocular micrometer or dial calipers (the latter only for standard length, body depth, and caudal-peduncle depth), and are presented as percentage of standard length (SL). Lengths 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); origin of the first dorsal fin is measured from the median anterior point of the upper lip to the anterior base of the first dorsal-fin spine; origin of the second dorsal-fin is measured from the median anterior point of the upper lip to the anterior base of its spine; origin of the anal fin is measured from the median anterior point of the upper lip to the anterior base of its spine; body depth is measured at the center of the first dorsal fin; head length is taken from the upper lip to the posterior end of the opercular membrane; 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 is the straight-line distance from the anterior tip of the premaxilla to the end of the upper margin of the dentary where the maxilla joins behind it; caudal-peduncle depth is the least depth, and caudal-peduncle length is the horizontal distance between the verticals at the rear base of the anal fin and the caudal-fin base; pelvic-fin length is measured from the base of the pelvic-fin spine to the tip of the longest pelvic-fin soft ray.

Cyanine Blue 5R (acid blue 113) stain was used to make pores and scale outlines more obvious (Akihito et al. 1993, 2002, Saruwatari et al. 1997).

Eviota angustifascia, n. sp.

Whiteline Dwarfgoby

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Figures 1–4

Holotype. CAS 247247, 10.6 mm SL: male, Fiji, Lau Group, Tavunasici, -18.7336˚, 179.0996˚, 50 m, field number MVE-17-011, 9 May 2017, M.V. Erdmann.

Paratypes. CAS 247248, 10.2 mm SL female, Papua New Guinea, Milne Bay, Cherie's Reef, -10.2550˚, 150.9150˚, 15 m, field number MVE-16-084, 24 December 2016, M.V. Erdmann; CAS 247249, 11.9 mm SL male, Indonesia, northeast Papua, Mapia Atoll Channel pass, -0.8748˚, 134.2813˚, 60 m, field number MVE-18-068, 4 December 2018, M.V. Erdmann; CAS 247250, 9.1 SL male, 9.5 mm SL female, Papua New Guinea, Milne Bay Province, Ka Point, -10.2083˚, 150.5850˚, 65 m, field number MVE-19-069, 27 September 2019, M.V. Erdmann.

Diagnosis. A species of *Eviota* distinguished from all congeners by lacking all cephalic sensory-canal pores, dorsal/anal fin-ray formula 9/8, 13 or 14 unbranched pectoral-fin rays, fifth pelvic-fin ray present and 10–17% of fourth ray, body crossed by 5 narrow, white, vertical lines separating wider dark bars, with dark bar under posterior half of second dorsal fin wider than orbit diameter.

Description. Dorsal-fin elements VI+I,9, first dorsal fin triangular, spines not filamentous, second dorsal-fin soft rays unbranched, except last ray branched to base; anal-fin elements I,8, all soft rays unbranched, except last ray branched to base; pectoral-fin rays 14 (13–14, usually 14), unbranched, fin pointed, reaching to below second dorsal fin when unbroken; unbranched 5th pelvic-fin ray 17 (10–17)% length of 4th ray; 4th pelvic-fin ray with two branches, pelvic-fin membranes reduced, basal membrane reduced; caudal-fin rays mostly broken with 11 or 13 branched and 17 segmented rays; lateral-line scales 24 (23–24, usually 24); transverse scale rows 7; urogenital papilla of male smooth, not fimbriate, and long, tapered, and fringed at tip, extending just short of anal-fin spine; female papilla smooth, bulbous, with short finger-like projections on end; front of head rounded with an angle of about 60° from horizontal axis; mouth slanted obliquely, forming an angle of about 55° to horizontal axis of body, lower jaw not projecting; maxilla extending posterior to front of pupil; anterior tubular nares extending just past edge of upper lip; gill opening extending forward to below posteroventral edge of preoperculum. All cephalic-sensory-canal pores absent.

Figure 1. *Eviota angustifascia*, anesthetized holotype, CAS 247247, 10.6 mm SL male, Lau Group, Fiji (Mark V. Erdmann).

Measurements based on holotype and 4 paratypes, 9.1–11.9 mm SL: head length 31.1 (28.4–31.8, 29.9); origin of first dorsal fin 36.3 (36.3–39.6, 37.6); origin of second dorsal fin 56.6 (56.6–62.1, 58.8); origin of anal fin 62.3 (61.3–64.8, 63.0); caudal-peduncle length 25.5 (22.5–26.8, 24.5); caudal-peduncle depth 11.8 (11.8–13.2, 12.5); body depth 19.8 (19.8–27.5, 23.6); orbit diameter 10.8 (8.8–11.8, 10.4); snout length 4.4 (3.2–5.8, 4.3); upper-jaw length 8.0 (8.0–10.0, 9.4); pectoral-fin length 35.4 (25.9–35.4, 32.9); pelvic-fin length 38.7 (35.5–38.7, 37.0).

Color in life. (Figs. 1 & 3) Body translucent with vertebral column visible as a black line with golden-yellow line above it; sides overlain by copper color, crossed by five narrow white bars leaving intervening wide copper bars: first white line at anterior third of first dorsal fin; second at origin of second dorsal fin; third at center of second dorsal fin; fourth at end of second dorsal fin; fifth across posterior half of caudal peduncle. Side and top of head and jaws golden yellow, color connecting to line above spinal cord; iris uniform golden-yellow, area under eye more translucent with scattered golden-yellow blotches. Pectoral-fin base white with golden yellow on ventral margin, base of rays also golden yellow. First dorsal fin with rounded black spot at base over first three spines with white line from body curving up around its back, center of fin golden yellow with greenish tinge, distal one third with black band with iridescent blue margin. Second dorsal fin with second white bar extending up from body onto spine. Third white bar extending up behind first black spot at dorsal-fin base, remainder of fin golden yellow with greenish tinge, black along the base and distal margin iridescent blue. Caudal fin dusky with iridescent blue margin. Anal fin golden yellow with greenish tinge with two iridescent blue lines crossing it extending down from the third and fourth white body bars. Pectoral and pelvic fins immaculate.

The paratypes from northeast Papua and Papua New Guinea all have the same basic pattern of narrow, white vertical lines separating wide dark bars on the body and dark spots on the dorsal fins; however, the general body coloration differs somewhat from the holotype which has a golden-yellow head and copper-colored body bars. The paratype from Mapia Atoll in northeast Papua also has a golden-yellow head but the body bars are also golden yellow, whereas the paratypes from Milne Bay, Papua New Guinea are generally reddish.

Color in preservative. (Figs. 2 & 4) Background color of head and body cream, body crossed by 5 internal dark bars: first under first dorsal-fin origin and over abdomen; second at end of first dorsal fin; third under dark spot at front of second dorsal fin; fourth at end of second dorsal fin; fifth at caudal peduncle. A dark line of melanophores across the caudal-fin base. Two short lines of melanophores behind eye and another line behind and above eye. First dorsal fin with rounded black spot at base over first three spines, center of fin clear, distal one third with black band; second dorsal fin with two dark spots at base of fin, one at front and one at back, remainder of fin with scattered melanophores, denser distally; caudal fin with band of melanophores distally; anal fin with dark spot at base of fin on first three soft rays, distal three-quarters of fin with melanophores; pectoral and pelvic

Figure 2. *Eviota angustifascia*, preserved holotype, CAS 247247, 10.6 mm SL male, Lau Group, Fiji (David W. Greenfield).

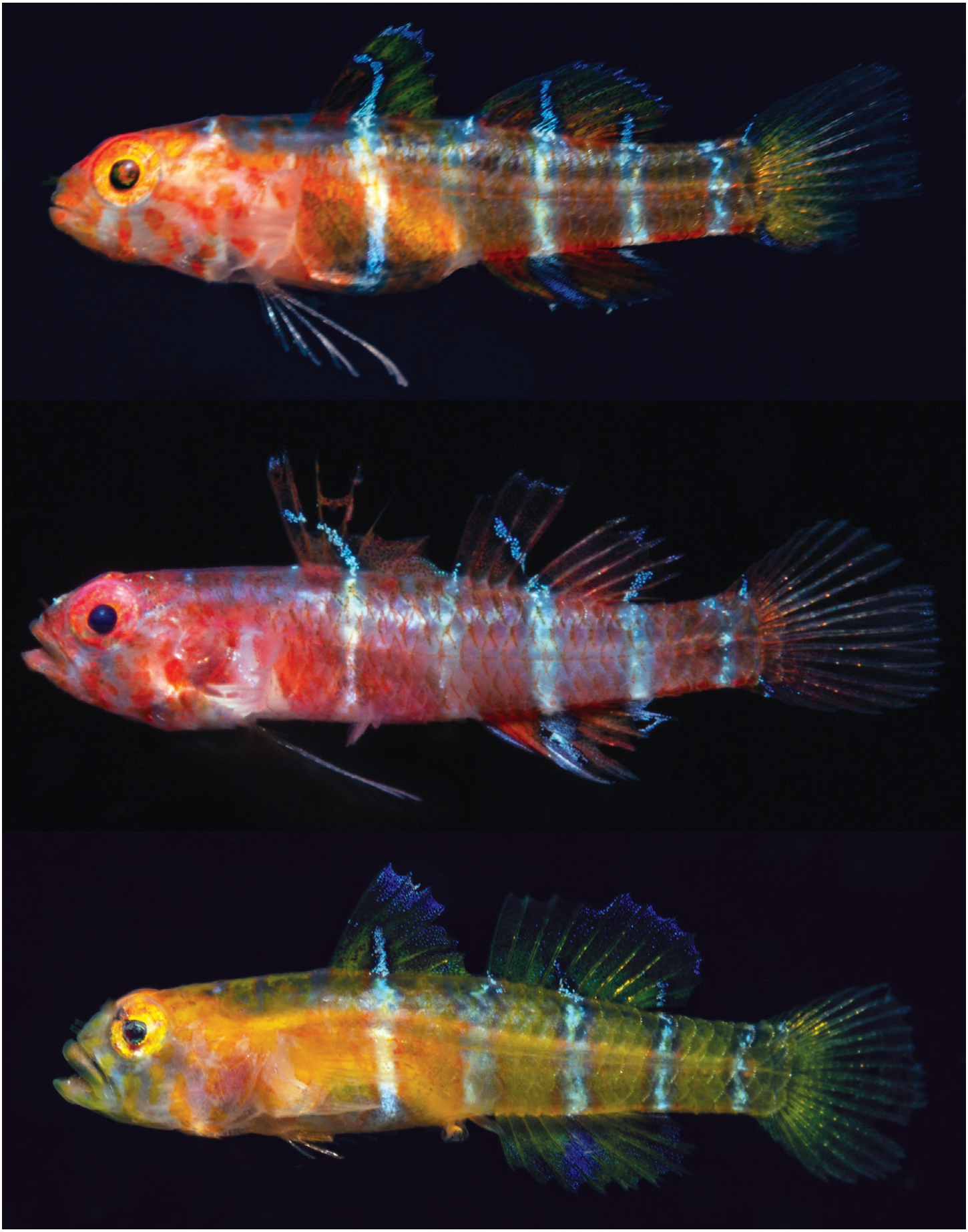

Figure 3. *Eviota angustifascia*, color variation, anesthetized paratypes: top: CAS 247250, Milne Bay, Papua New Guinea; middle: CAS 247248, Milne Bay, Papua New Guinea; bottom: CAS 247249, Mapia Atoll, northeast Papua (Mark V. Erdmann).

Figure 4. *Eviota angustifascia*, preserved paratype, CAS 247250, 9.5 mm SL female, Milne Bay (David W. Greenfield).

fins immaculate. Paratype similar but with some scales with dark edges laterally (Fig. 4).

Etymology. The specific epithet is from the Latin *angustus*, meaning narrow and the Latin *fascia* meaning band, referring to the narrow, white, vertical lines. The name is an adjective-noun combination treated as a noun in apposition.

Distribution. The new species is currently known only from the Lau Group, Fiji and the north coast of New Guinea from deep crevices on steep outer-reef slopes or walls exposed to current and clear oceanic waters; 4 of the 5 specimens were collected from depths of 50 m or greater. It is probably more widespread in the region in similar habitats.

Comparisons. *Eviota angustifascia* lacks all cephalic-sensory pores, a character shared with only 7 other described *Eviota* species. It differs from all of these except *E. lateritea* by having a dorsal/anal-fin formula of 9/8 vs. 8/7 in *E. deminuta* and *E. singula* and 8/8 in *E. amamiko*, *E. jewettae*, *E. occasa*, and *E. thamani*. It looks most similar to *E. jewettae* (Fig. 5), but besides the additional dorsal-fin ray, it has 13 or 14 pectoral-fin rays vs. 15 or 16, as well as slightly wider dark bars separated by narrow white lines (the bar under the posterior half of the second dorsal fin is wider than orbit diameter vs. about equal to or less than the orbit diameter). *Eviota angustifascia* differs from *E. lateritea* by a shorter 5th pelvic-fin ray, 10–17% vs. 50–74% of the fourth ray; 13 or 14 pectoral-fin rays vs. 15 or 16; and a few dark edges on some scales vs. dark scale edges forming a diamond

Figure 5. *Eviota jewettae*, fresh paratype, ROM 93605, 11.6 mm SL, Palau (Richard Winterbottom).

pattern. It differs from *E. thamani* by a smooth vs. fimbriate male urogenital papilla; 13 or 14 pectoral-fin rays vs. 15 or 16; and a dark spot on the first dorsal fin vs. none. It differs from *E. singula* by having no occipital spot vs. a conspicuous dark occipital spot; as well as from *E. deminuta* by having the fifth pelvic-fin ray >10% of the fourth vs. absent or rudimentary, and no distinct vertical lines under the eye vs. present. It differs from *E. amamiko* by having the fifth pelvic-fin ray >10% of the fourth vs. absent or rudimentary and having solid body bars not split or branching ventrally vs. dark body bars that are X- or Y-like. It differs from *E. occasa* by having the fifth pelvic-fin ray >10% of the fourth vs. absent or rudimentary; having a dark spot on the dorsal fin vs. no spot; and an unmarked caudal-fin base vs. a yellow-orange, broad, wedge-shaped bar at the caudal-fin base.

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