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Eviota lentiginosa, a new dwarfgoby from Norfolk Island, Australia (Teleostei: Gobiidae)

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Abstract

A new endemic species of dwarfgoby, *Eviota lentiginosa* n. sp., is described from Norfolk Island, an isolated island 1400 km east of the Australian mainland. The new species is distinguished by having the cephalic sensory-canal pore system with only the IT pore lacking (Pattern 2); a flat, rounded, plate-like male urogenital papilla; the dorsal/anal fin-ray formula 8/8; all pectoral-fin rays apparently unbranched; the fifth pelvic-fin ray absent; a dark spot on the lower half of the pectoral-fin base; and the body color yellow with a peppering of small brown melanophores in life. It is the sixth species of *Eviota* known from Norfolk Island.

Key words: taxonomy, systematics, ichthyology, coral-reef fishes, gobies, Pacific Ocean, endemism.

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Introduction

In February 1991, the second author and Malcolm P. Francis spent two weeks diving, collecting, and photographing fishes at Norfolk Island, a territory of Australia in the southwestern Pacific Ocean, 1400 km from the Australian mainland at 29° S, about equidistant (approx. 1000 km) from Lord Howe Island to the west, New Caledonia to the north, and New Zealand to the south (Fig. 1). The expedition resulted in new additions to the species list known from that island (Francis & Randall 1993). On one dive, they collected two specimens of *Eviota* from a cave that are described here as a new species, apparently endemic to Norfolk Island. There are 5 other species of *Eviota* recorded from Norfolk Island: *E. hoesei* Gill & Jewett, 2004; *E. prasina* (Klunzinger, 1871); *E. queenslandica* Whitley, 1932; *E. smaragdus* Jordan & Seale, 1906; and *E. zonura* Jordan & Seale, 1906 (M.P. Francis, pers. comm.), all found in other locations in the region or widespread in the Indo-Pacific Ocean.

The gobiid genus *Eviota*, known as dwarfgobies, is a very speciose genus with 113 valid described species to date, not including this new species (Greenfield 2017). A recent overview of the genus by Greenfield (2017) provides a broad background on the systematics of *Eviota* and Greenfield & Winterbottom (2016) presented a key to the 107 species described at that time. A number of characters have been utilized to separate the various species, including cephalic sensory-canal pore patterns, dorsal/anal fin-ray formulas, branched vs. unbranched pectoral-fin rays, presence or absence and length of the fifth pelvic-fin ray, degrees of dorsal-fin-spine elongation, type of male urogenital papilla, morphometrics, and preserved and live color patterns.

Materials and Methods

Type specimens are deposited at the Queensland Museum, Brisbane, Queensland, Australia (QM) and the California Academy of Sciences, San Francisco, CA, USA (CAS).

Counts and measurements, descriptions of fin morphology, and the cephalic sensory-canal pore patterns follow Lachner & Karnella (1980) and Jewett & Lachner (1983). Postanal ventral-midline spots begin at the anal-fin origin and extend to a vertical about 2–3 scale rows anterior to the end of the hypurals, the additional smaller spot posterior to this, if present, is not counted. 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, and are presented as percentage of standard length (SL). All specimen lengths are SL in mm. Cyanine Blue 5R (acid blue 113) stain and an airjet were used to make the cephalic sensory-canal pores more obvious (Akihito *et al.* 1993, 2002, Saruwatari *et al.* 1997). For measurements, values for the holotype are given first, followed by that for the paratype in parentheses.

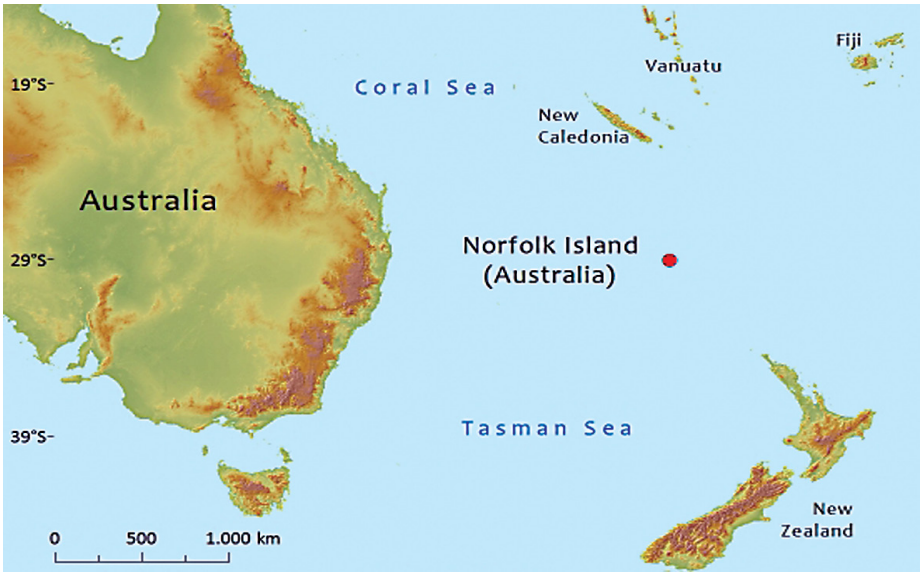

Figure 1. Map of southwestern region of Pacific Ocean with Norfolk Island represented by red circle.

Eviota lentiginosa, n. sp.

Frecked Dwarfgoby

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Figures 2 & 3.

Holotype. QM I.40817, 13.4 mm SL, male, Australia, Norfolk Island, Sydney Bay near Bombora Rock, approx. –29.062°, 167.943°, cave, 13.5 m, rotenone, J.E. Randall & M.P. Francis, 17 February 1991.

Paratype. CAS 244001, 12.7 mm SL, female, taken with holotype.

Diagnosis. A species of *Eviota* with cephalic sensory-canal pore system lacking only an IT pore (Pattern 2); dorsal/anal fin-ray formula 8/8; pectoral-fin rays 16 or 17, all apparently unbranched (but broken ends); fifth pelvic-fin ray absent; male urogenital papilla a flat rounded plate (Fig. 2); a dark spot on lower half of pectoral-fin base; no dark spot at caudal peduncle or caudal-fin base; scales without black edges on pockets; caudal fin not crossed by dark vertical bars; head and body yellow with a peppering of small brown melanophores in life.

Description. Dorsal-fin elements VI+I,8, first dorsal fin triangular, first spine filamentous, reaching to first soft ray of second dorsal fin when adpressed; anal-fin elements I,8; pectoral-fin rays 17 (16), apparently unbranched (but broken ends); pectoral fin long and apparently pointed, reaching at least to below middle of second dorsal fin; fifth pelvic-fin ray absent; fourth pelvic-fin ray broken, except for part of one ray with 2 elongate branches on paratype; lateral-line scales 24 (23), transverse scale rows 6; front of head rounded with tangent to apex of its curve about 60° from horizontal axis; mouth slanted obliquely upwards, forming an angle of about 70° to horizontal axis of body; lower jaw slightly projecting; maxilla extending posteriorly to level of front of pupil; anterior narial tube short, not reaching posterior margin of upper lip; gill opening extending forward to a vertical at posteroventral edge of vertical limb of preoperculum; cephalic sensory-canal pore system lacking only an IT pore (Pattern 2); cutaneous sensory papillae pattern obscure; male urogenital papilla a flat rounded plate (Fig. 2); urogenital papilla of female paratype small and rounded.

Measurements (percentage of SL): head length 30.6 (29.1); distance to origin of first dorsal fin 38.8 (37.8), first dorsal-fin origin lying behind posterior margin of pectoral-fin base; distance to origin of second dorsal fin 57.8 (61.4); second dorsal-fin origin in advance of anal-fin origin; distance to origin of anal fin 62.3 (63.0); caudal-peduncle length 20.9 (22.4); caudal-peduncle depth 10.8 (11.8); body slender, depth 19.4 (19.7); eye diameter 10.4 (10.2); snout length 5.6 (3.9); pectoral and pelvic fin-rays not measured, mostly broken.

Color of fresh holotype. (Fig. 2) Background color of head and body yellow. Lower side below pectoral fin

Figure 2. *Eviota lentiginosa*, fresh holotype, QM I.40817, 13.4 mm SL, male, Norfolk Island, Australia (J.E. Randall).

whitish; another white area above operculum; entire body and head peppered with small dark-brown melanophores; lower half of pectoral-fin base and basal portion of rays dark brown; a short, narrow, brown vertical bar centered at posterior edge of preoperculum; a short brown bar at 4 o'clock position behind eye and another at 8 o'clock position below eye extending down to upper jaw; anterior narial tube brown; iris yellow with brown areas on dorsal half and part of lower half at 4 o'clock position; first dorsal-fin spine white, remainder of first dorsal fin, second dorsal fin, anal fin, and caudal fin yellow with brown peppering as on body; pelvic fins and ventral surface of abdomen white.

Color in preservative. Color of holotype and paratype faded; background color of head and body light yellow; lower half of pectoral-fin base and basal portion of rays light brown; area behind upper half of eyes and across top of head with scattering of discrete black melanophores; a short brown bar at 4 o'clock position behind eye and another at 8 o'clock position below eye extending down to upper jaw; anterior narial tube brown; no other dark pigmentation evident.

Etymology. The specific epithet is from the Latin adjective *lentiginosus* (full of freckles), referring to the many tiny dark spots covering the yellow head and body. The name is treated as a feminine nominative singular adjective.

Distribution. Currently known only from Norfolk Island.

Comparisons. The new species is unique in *Eviota* in having the combination of a plate-like male urogenital papilla and Pattern 2 cephalic sensory-canal pore system. Only two other species of *Eviota*, *E. mimica* and the undescribed *E.* cf. *specca*, share the unusual flat, rounded, plate-like male urogenital papilla, but both have a complete cephalic sensory-canal pore system (Pattern 1) and are described from Fiji (Greenfield & Randall 2016).

Of the 40 described *Eviota* species with cephalic sensory-canal pore system Pattern 2 (only the IT pore missing), 9 share the dorsal/anal fin-ray formula of 8/8 and all have branched pectoral-fin rays (Greenfield 2017). None of the *Eviota* with unbranched rays have a formula of 8/8 (Greenfield 2017). Following the key to the *Eviota* species by Greenfield & Winterbottom (2016), and selecting those with only the IT pore missing, unbranched pectoral-fin rays, a dorsal/anal fin-ray formula of 8/8, a fifth pelvic-fin ray 10% or less of the length of the fourth ray (includes absent), no spot at the caudal-fin base, no conspicuous black pigment along scale pockets, the caudal fin not crossed by thick dark vertical lines, and no dark postocular spot, the progression then ends at couplet 60 with *E. ancora* and *E. atriventris*. Both of those species differ from the new species by having the dorsal/anal formula of 8/7, the fifth pelvic-fin ray present, and very different fresh coloration.

Remarks. The ends of all the pectoral-fin rays are broken on both the holotype and paratype and the remaining parts of the rays show no indication of branching; however, it cannot be ruled out that the rays had branching on

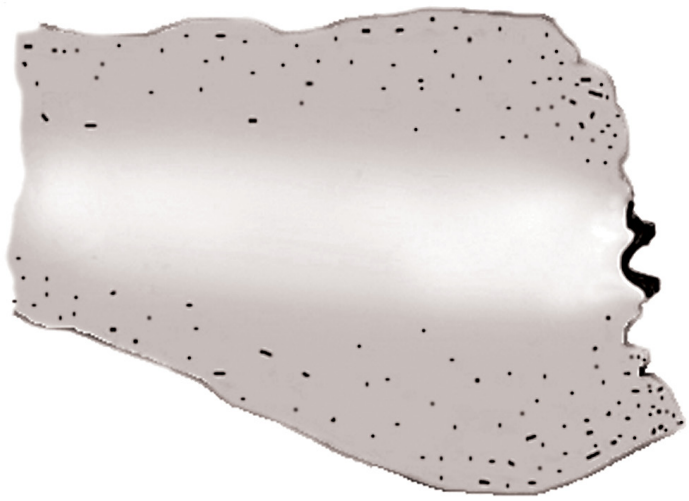

Figure 2. *Eviota lentiginosa*, drawing of flat, plate-like urogenital papilla of male, anterior to left, from Cyanine-Blue-stained preserved holotype, QM I.40817, 13.4 mm SL (D.W. Greenfield).

the missing ends. If this were the case, then *E. lentiginosa* would be most similar to *E. bipunctata*, which shares the dorsal/anal formula of 8/8 and also has some individuals with a dark spot on the lower portion of the pectoral-fin base. However, *E. bipunctata* has a fifth pelvic-fin ray that is 10% of the length of the fourth ray (vs. absent in *E. lentiginosa*), the male urogenital papilla is elongate with prominent fringing on the tip (vs. a flat rounded plate), and the fresh coloration is very different from *E. lentiginosa* (Fig. 3). Additional specimens are necessary to resolve the question of pectoral-fin branching, but regardless, *E. lentiginosa* can be easily distinguished from any other described species of *Eviota*.

Figure 3. *Eviota bipunctata*, underwater photograph, CAS 243925, Timor Leste (M.V. Erdmann).

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