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Eviota minuta, a new dwarfgoby from the Philippine Islands (Teleostei: Gobiidae)

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Abstract

A new species of dwarfgoby, *Eviota minuta*, with a complete cephalic sensory-canal pore system (pattern I) and a concave, cup-shaped male urogenital papilla with undulating margins is described from the Philippine Islands. It has a dorsal/anal fin-ray formula 8/8, three dark bars radiating from the lower eye, a dark oblong spot on the ventral pectoral-fin base, two more dark spots on the dorsal portion or these spots fusing into a dark oblong spot angling anterodorsally, and four broad, dark subcutaneous bars on the posterior body.

Key words: taxonomy, gobies, new species, Philippine Islands, Indo-Pacific, Pacific Ocean, coral-reef fishes

Introduction

During the 1970s and 1980s, the second author, sometimes under the name Karnella, published with Ernest A. Lachner descriptions of a number of new gobies in the Indo-Pacific genus *Eviota* (Lachner & Karnella 1978, Lachner & Karnella 1980, Karnella & Lachner 1981, Jewett & Lachner 1983). At the time of Lachner's death they were working on descriptions of a number of species that were not completed. Since then we have described several of these species (*E. hoesei* and *E. readerae* Gill & Jewett 2004; *E. rubriceps* Greenfield & Jewett 2011; *E. notata* and *E. springeri* Greenfield & Jewett 2012; *E. jewettae* Greenfield & Winterbottom 2012; *E. aquila* and *E. epistigmata* Greenfield & Jewett 2014). In addition, Allen (2001) described two more of these species, *E. mikiae* and *E. raja*. In this paper we describe another of these species, *E. minuta*, collected at the Philippine Islands by staff from the Smithsonian Institution in 1978 and 1979. Specimens similar to those from the type locality from widespread areas are discussed.

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 paratypes in parentheses, if different.

Specimens have been deposited in the following museums: AMNH – American Museum of Natural History, New York; AMS – Australian Museum, Sydney; ANSP – Academy of Natural Sciences, Philadelphia; CAS – California Academy of Sciences, San Francisco; and USNM – United States National Museum (Smithsonian), Washington D.C. The type material is in a poor state of preservation, the fins are frayed and the scales are mostly lost, resulting in certain limited meristic data.



Figure 1. Eviota minuta, preserved holotype, USNM 230090, 12.9 mm, female. Photograph by S.L. Jewett.

Eviota minuta, n. sp.

Minute Dwarfgoby

Figures 1–5.

Holotype. USNM 230090, 12.9 mm, female, Philippine Islands, Negros Oriental, Maloh, 09°03.1' N, 122° 59.7' E, 0–3.1 m, 18 May 1979, H.A. Felmann, LK 79–19.

Paratypes. USNM 230088, (2 females 10.1–11.7 mm, 6 males 11.4–12.7 mm), taken with holotype; USNM 230089, (12.0 mm, female), Mindanao, Zamboanga del Norte, W. side Solino (Selinog) I., 0–4.6 m, L. Knapp, LK 79–7; AMNH 55059, (13.5 mm, female), southern Negros Oriental, Port Siyt, 0–3.1 m, L. Knapp, LK 79–4; The following three lots with same collection data: AMS I.23989–001 (10.0 mm); ANSP 150919, 13.2 mm, male; CAS 52734, (12.0 mm, female, 12.1 mm, male), Palawan Province, Putic I., N.W. side Cuyo Is., 0–4.6 m, Smithsonian team, SP 78–18.



Figure 2. Eviota minuta, preserved paratype, USNM 230088, 12.2 mm, male. Photograph by S.L. Jewett.

Diagnosis. A small species, almost always under 14 mm SL; male with concave, cup-shaped urogenital papilla with undulating margins; cephalic sensory-canal pore system complete (pattern I); dorsal/anal fin-ray formula 8/8; four broad, dark subcutaneous bars on posterior body; three broad, dark bars radiating from lower eye, another along posterior margin of preoperculum; four dark, transverse bars over nape and a series of dark spots along dorsal midline of body; a large, dark oblong spot on ventral pectoral-fin base and two more on dorsal portion either as two separate spots or fusing into a dark oblong spot angling anterodorsally.

Description. Dorsal-fin elements VI+I,8 (all); anal-fin rays I,8 (all); pectoral-fin rays 15 (14 [1], 15[12]), lower 4 rays branched in one paratype, broken in remainder of types; fifth pelvic-fin ray a rudiment or less than 10% of 4th ray; 6 branches on 4th ray in 2 paratypes, and 2 segments between consecutive branches of 4th pelvic-fin ray; pelvic-fin membrane reduced; lateral scale rows mostly lost, 23 or 24 estimated from scale pockets; transverse scale rows estimated to be 6; breast scaleless; first dorsal fin triangular in shape, no spinous dorsal-fin elongation observed; male urogenital papilla concave, cup-shaped, with undulating margins; female urogenital papilla bulbous and large, several short finger-like projections on the end; body slender, front of head sloped with an angle of about 45° from the horizontal axis; mouth oblique, forming an angle of about 55° to horizontal axis of body, lower jaw projecting; maxilla extending to center of pupil; anterior tubular naris short, not reaching edge of upper lip; gill opening extending forward to posteroventral edge of preoperculum; cephalic sensory-canal pore system pattern I (complete); cutaneous papillae system obscure. General body shape shown in Fig. 1.

Measurements (based on holotype and 9 paratypes 10.1–13.5 mm SL). Head length 31.1 (30.0–34.1, 31.7); origin of first dorsal fin 38.6 (37.0–41.6, 39.4), above posterior end of pectoral-fin base; origin of second dorsal fin 57.9 (51.4–63.3, 58.7); origin of anal fin 59.0 (58.4–64.2, 61.3), a vertical through 2nd (1st in some paratypes) soft ray of second dorsal fin; caudal-peduncle length 23.6 (18.9–23.6, 21.5); caudal-peduncle slender 12.6 (11.7–13.6, 12.5); body slender, its depth 21.2 (17.9–21.8, 19.3); eye diameter 11.8 (10.0–11.8, 11.0); snout length 4.7 (3.8–5.4, 4.6); upper-jaw length 9.8 (9.8–12.4, 11.4); pectoral-fin length broken in holotype (one paratype 30.4); pelvic-fin length broken in holotype (21.9–31.0 in four paratypes).

Color in preserved type specimens (Figs. 1, 2, & 3). Salient color marks of this species consist of dark bars laterally on head, wide transverse nape bars, dark spots along dorsal midline of body, one or two dark spots on upper fleshy pectoral-fin base and a smaller spot on lower portion of base (Fig. 4); four broad, dark



Figure 3. Eviota minuta, preserved paratype, AMNH 55059, 13.5 mm, female. Photograph by D.W. Greenfield.

subcutaneous bars on posterior body and associated postanal ventral midline spots. Side of head with three dark bars radiating from lower eye at about 4:00, 6:00 and 8:00 o'clock positions, a dark vertical bar at posterior margin of preoperculum, remainder of head usually pale or sprinkled with a few dark chromatophores. Tubular anterior nares dark. Snout and chin with scattered dark chromatophores. Nape with four dark transverse bars. Nape bars continue along dorsal midline of body as series of 9 to 10 dark spots terminating at procurrent caudal-fin rays. A dark oblong spot, often broken into two spots or nearly so, on upper portion of fleshy pectoral-fin base, diagonally oriented and extending onto bases of upper and middle pectoral-fin rays. A smaller round less dense spot present on lower portion of fleshy base. Remainder of pectoral-fin base pale or sprinkled with less pronounced chromatophores. Scale pockets weakly to moderately pigmented with dark chromatophores, usually more fully developed on anterior dorsolateral portion of body. Lower body with four (or five) wide dark postanal

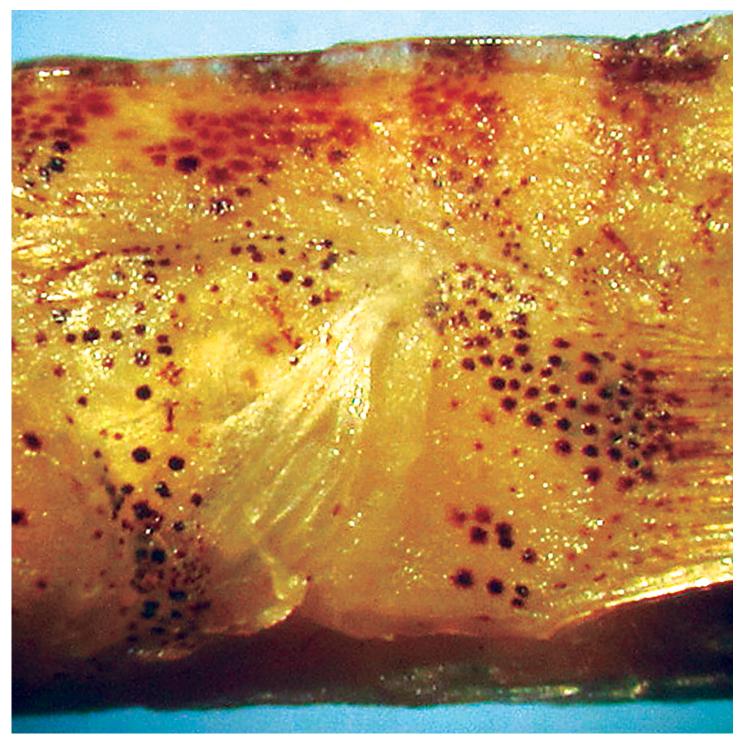


Figure 4. Pectoral-fin base coloration of *Eviota minuta*, preserved paratype, USNM 230088, 12.4 mm, male. Photograph by D.W. Greenfield.

ventral midline spots plus a smaller dark spot at procurrent rays. Spots integrated with broad dark subcutaneous bars

Distribution. Type material is all from the Philippine Islands.

Etymology. The specific epithet is derived from the Latin word *minutus* (little or small) in reference to the small size of this species.

Comparisons. Eviota minuta is unique in having a cup-shaped male urogenital papilla (Fig. 5) and a complete cephalic sensory-canal pore pattern. Only two other species, *E. hinanoae* and *E. saipanensis*, have a cup-shaped genital papilla, and they both lack the IT pore. In coloration, *E. minuta* is most similar to *E. specca* Greenfield, Suzuki & Shibukawa 2014, geographically closest to the Philippine Islands, but because the single specimen of *E. specca* is immature, it is not known if the male genital papilla is cup-shaped. Eviota specca lacks a dark mark on the lower portion of the pectoral-fin base (vs. present) and the body and fins are heavily sprinkled with small, dark chromatophores (vs. absent). As discussed below, it also is similar in coloration to a number of different species from more distant locations.

Remarks. We have restricted the type series to the Philippine Islands because specimens appearing in coloration to be *E. minuta* are widespread, ranging from the Seychelles Islands in the Indian Ocean to Marquesas Islands in the east, the Marshall Islands to the north, and the Loyalty Islands to the south; however, the male genital papilla in some of these populations is not cup-shaped as in *E. minuta*, many lots only contain females, and there is variation in cephalic sensory-canal pore patterns. We have a number of lots of such a species from Fiji, as a manuscript name, that were awaiting description, but subsequently were described as *E. lacrimosa* from the Marquesas Islands by Tornabene *et al.* (2013). We have observed cup-shaped papilla in specimens from the Seychelles Islands and Australia, but there are usually 5 instead of 4 postanal spots. With increasing knowledge of the genus, we have realized that often species thought to be widespread based on preserved material were in fact composed of more than one species (Greenfield *et al.* 2014). It is possible that this may be another example of a complex of related species as in the *Eviota nigriventris* complex (Greenfield & Tornabene 2014). Thus, until information on live coloration and DNA are available, it is prudent to restrict the type series to the Philippine Islands.

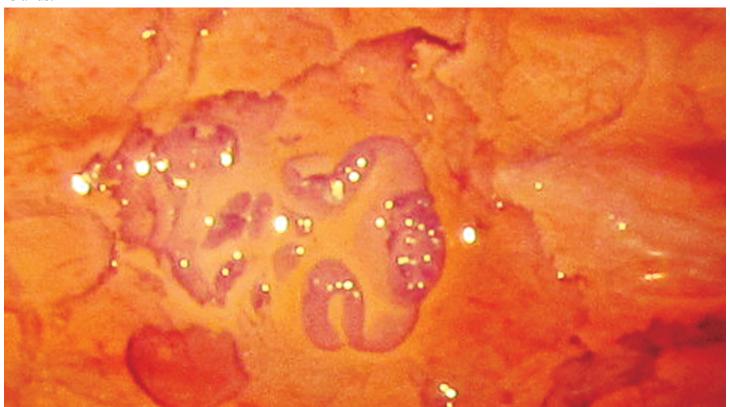


Figure 5. Cup-shaped male urogenital papilla, stained, of paratype of *Eviota minuta*, CAS 52734, 12.1 mm, male. The papilla is the deeply invaginated purple ring with undulating margins; white spots are light reflections. Photograph by D.W. Greenfield.

Eviota minuta is probably more common than indicated from collections. Gobies as small as this species are usually only taken with rotenone, and only picked up by persons interested in collecting small fishes. In addition, when gobies this small are collected, they are often left unidentified in collections. Eviota minuta is not necessarily the smallest species in the genus, but the name was chosen in the early 1980s and specimens sent to museums with that name.

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