



## ***Eviota sodwanaensis*, a new dwarfgoby from South Africa (Teleostei: Gobiidae)**

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### **Abstract**

A new species of dwarfgoby, *Eviota sodwanaensis*, is described from Sodwana Bay, Kwazulu-Natal, South Africa. The species has a complete cephalic sensory-pore system (pattern 1), a dorsal/anal fin-ray formula of 8/7, branched pectoral-fin rays, a short 5<sup>th</sup> pelvic-fin ray, a dark occipital spot, a dark spot on the preural centrum, black first dorsal and anal fins, and dark second dorsal fin. The description is based on 9 type and 5 non-type specimens.

**Key words:** taxonomy, systematics, ichthyology, coral-reef fishes, gobies, new species, Indian Ocean.

**Citation:** Greenfield, D.W. & Winterbottom, R. (2016) *Eviota sodwanaensis*, a new dwarfgoby from South Africa (Teleostei: Gobiidae). *Journal of the Ocean Science Foundation*, 22, 53–57.

**doi:** <http://dx.doi.org/10.5281/zenodo.154184>

**urn:lsid:zoobank.org:pub:9EB28BAA-D443-4CF0-9EB1-1D087FAF8C51**

**Date of publication of this version of record:** 16 September, 2016

### **Introduction**

The dwarfgobies, *Eviota*, form a dominant portion of the shallow tropical fish fauna of Indo-Pacific coral reefs. These tiny (usually <18 mm SL), often colorful fishes, most common in tidepools and marginally subtidal areas, have also been taken as deep as 73–79 m. Although little is known of the biology, the life cycle of three *Eviota* species was characterized by Depczynski & Bellwood (2006). One of these species, *E. sigillata* Jewett & Lachner, 1983, lives for a maximum recorded age of 59 days; shows rapid, linear growth; produces several generations of offspring during this time; and experiences high daily mortality (*op. cit.*). There are 109 described species (with

many more known, but as yet undescribed, species). The majority of this diversity occurs in the western Pacific Ocean, with only about 17 species currently known from the Indian Ocean (plus Red Sea). The South African fauna is particularly depauperate, with only two known species, i.e. *E. prasina* (Klunzinger, 1871) and the species described here, which was formerly misidentified as *E. notata* Greenfield & Jewett, 2012.

The new species fits the diagnosis of *Eviota*: the pelvic fins are separate and lack a frenum; the 5<sup>th</sup> pelvic-fin ray, if present, is unbranched; the membrane joining the 5<sup>th</sup> pelvic-fin rays is weakly developed; there are ctenoid scales on the body but no scales on the head, nape, or pectoral-fin base; the breast either lacks scales or has only 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 & Karnella (1980) and Jewett & 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 2–3 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. We follow (Lachner & Karnella 1980, 4) in describing the membranes joining the first four [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”. The dorsal/anal fin-ray formula 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, 2002, Saruwatari *et al.* 1997) and an airjet was 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.

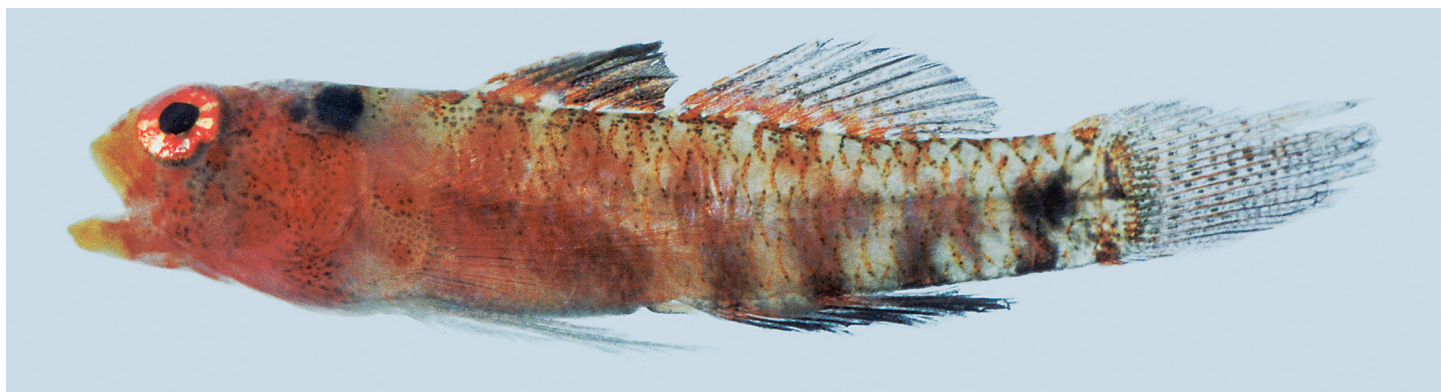
## *Eviota sodwanaensis*, n. sp.

### Sodwana Dwarfgoby

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Figures 1–4.

**Holotype.** ROM 72842, 13.6 mm SL, male, South Africa, Kwazulu-Natal, S. of Uniform Reef, NNE of Sodwana Bay, 27°30'10" S, 32°42'07" E, 28–30 m, field no. RW01-04, R. Winterbottom *et al.*, May 5, 2001.



**Figure 1.** *Eviota sodwanaensis*, fresh holotype, ROM 72842, 13.6 mm SL, male, Kwazulu-Natal, South Africa (R. Winterbottom).



**Figure 2.** *Eviota sodwanaensis*, fresh paratype, ROM 72739, 15.5 mm SL, male, Kwazulu-Natal, South Africa (R. Winterbottom).

**Paratypes.** (all from Kwazulu-Natal, South Africa) ROM 101550, 12.6 mm SL, male, taken with holotype. ROM 72739, 15.5 mm SL, male, off NE Sodwana Bay, 27°31'54" S, 32°41'35" E, 20–27 m, field no. RW01-01, R. Winterbottom *et al.*, May 12, 2001; CAS 241593 (previously ROM 72935), 12.9 mm SL, male, NNE of Sodwana Bay, 27°26'53" S, 32°43'02" E, 14–17 m, field no. RW01-03, R. Winterbottom *et al.*, May 14, 2001; CAS 241594, 17.5 mm SL, male, taken with SAIAB 73834; SAIAB 63001, 16.8 mm SL, female, South Africa, Aliwal Shoal, Deep Cracker Reef, 30°16'59.9982" S, 30°49'0.0042" E, P. & E. Heemstra, Aug. 8, 2000; SAIAB 73834, 17.8 mm SL, male & 16.7 mm SL, female, Aliwal Shoal, Manta Point, 30°16'34" S, 30°48'44" E, P. & E. Heemstra, May 18, 2002; SAIAB 64539, 15.6 mm SL, female, Sodwana Bay, Eight Mile Reef, 27°31'59.88" S, 32°40'59.88" E, P. & E. Heemstra, May 14, 2001.

**Non-type material.** (all from Kwazulu-Natal, South Africa) SAIAB 66055, 19.8 mm SL, sex undetermined, Aliwal Shoal, Manta Point, 30.25° S, 30°49'0.0042" E, P. & E. Heemstra, Sept. 23, 2002; SAIAB 74860, 13.6 mm SL, female, Sodwana Bay, 27°31'13" S, 32°41'38" E, P. & E. Heemstra, Sept. 17, 2002; SAIAB 56539, 17.3 mm SL, female, 2 males 13.8 mm SL, & 12.2 mm SL, South Africa, reef off Sodwana Bay, 27°30'59.9898" S, 32°41'0.0024" E, P. & E. Heemstra, July 24, 1976.

**Diagnosis.** A species of *Eviota* with a complete cephalic sensory-pore system (pattern 1); some branched pectoral-fin rays; a dorsal/anal fin-ray formula of 8/7; 5<sup>th</sup> pelvic-fin ray short, 20% of 4<sup>th</sup> ray; a dark occipital spot; a dark spot on preural centrum; two orange (not dark) spots on pectoral-fin base, upper twice size of lower; black first dorsal and anal fins; and dark second dorsal fin.

**Description.** Dorsal-fin elements VI+I, 8, first dorsal fin triangular in shape, 3<sup>rd</sup> spine longest, none filamentous, extending just to origin of second dorsal fin, all second dorsal-fin soft rays branched except first, last ray branched to base; anal-fin elements I, 7, all soft rays branched, last ray branched to base; pectoral-fin rays 15, at least rays 9–14 branched, reaching to below middle of second dorsal fin; 5<sup>th</sup> pelvic-fin ray rudimentary or up to 20% of 4<sup>th</sup> pelvic-fin ray, 8–10 (usually 8) branches on 4<sup>th</sup> ray, 2 (1–2) segments between consecutive branches of 4<sup>th</sup> pelvic-fin ray, pelvic-fin membrane reduced and no basal membrane; caudal fin with 12 (12–14) branched and 17 segmented rays; lateral-line scales 23; transverse scale rows 7; urogenital papilla in male smooth, elongate, and pointed, urogenital papilla of female bulbous, with several short finger-like projections distally; front of head rounded with an angle of about 60° from horizontal axis; mouth slanted obliquely upwards, forming an angle of about 60° to horizontal axis of body, lower jaw slightly projecting; maxilla extending posteriorly to middle of pupil; anterior narial tube short, not reaching posterior margin of upper lip; gill opening extending forward to below posteroventral edge of vertical limb of preoperculum; cephalic sensory-pore system complete (pattern 1), cutaneous sensory papilla not obvious on side of cheek.

Measurements (based on holotype and 7 paratypes, 12.6–17.8 mm SL): head length 30.9 (28.6–33.9, 30.6); distance to origin of first dorsal fin 35.3 (33.3–38.4, 35.8), first-dorsal-fin origin lying behind posterior margin of pectoral-fin base; distance to origin of second dorsal fin 54.4 (50.7–57.5, 54.6), second-dorsal-fin origin slightly in advance of anal-fin origin; distance to origin of anal fin 59.5 (57.7–63.2, 60.3); caudal-peduncle length 25.0 (23.5–27.1, 25.1); caudal peduncle slender, its depth 11.8 (11.8–15.5, 13.5); body slender, its depth 18.4 (18.2–24.2, 21.0); eye diameter 10.3 (9.2–10.9, 10.0); snout length 4.8 (4.1–5.7, 4.7); pectoral-fin length broken





**Figure 3.** *Eviota sodwanaensis*, preserved holotype, ROM 72842, 13.6 mm SL, Kwazulu-Natal, South Africa (D.W. Greenfield).

in holotype (29.4–34.5, 31.6); pelvic-fin length 31.2 (25.4–33.3, 28.9), reaching anal-fin origin.

**Color of fresh holotype and paratype.** (Figs. 1 & 2) Background color of head and body translucent light cream. Most distinctive features a bold, round, black occipital spot a little larger than pupil, preceded by a small irregular spot; a moderately large black spot centered over preural centrum; and black first-dorsal and anal fins. Body with five black, short, postanal subcutaneous bars, including two over anal fin and three over caudal peduncle, starting at midline and extending to ventral surface. Two black spots at caudal-fin base, one dorsal and one ventral, not counted as postanal spots. Two brownish orange bars under first dorsal fin extending down over abdomen. A third brownish orange bar below origin of second dorsal fin, meeting dark subcutaneous bar at anal-fin base. Two short brownish orange bars extend down from second dorsal fin but not meeting dark subcutaneous bars. Anterior margins of scale pockets, especially posteriorly from origin of second dorsal fin, outlined with orange. Pectoral-fin base with two brownish orange spots, one dorsal and one ventral, upper spot twice as large as lower, entire base peppered with small black chromatophores. Markings on head brownish orange. Side of head over preoperculum and operculum with scattered brownish orange spots (close-spaced in holotype), extending up behind eye, peppered with small dark chromatophores. Round spot under eye at 4 o'clock position and second spot directly below that. Bar under eye at 6 o'clock, extending down behind jaws; another bar at 7 o'clock extending down across jaws. Snout and jaws with yellowish tinge. Pupil of eye black, iris orange colored with light yellow diagonal stripe through top of pupil, and three equidistant light yellow radii below that. First-dorsal-fin base light with short extensions of brownish orange bars onto it, remainder of fin black. Base of second dorsal fin similar to first, rays black, membranes lighter with small black spots. Caudal fin dusky with strong tiny black spots on rays. Anal fin black with brownish orange extending from body bars at base. Pectoral and pelvic fins dusky.

**Color of holotype in preservative.** (Fig. 3) Background color of head and body light yellow. Most distinctive features a bold brown occipital spot and a brown spot over preural centrum. Top of head and nape peppered with small brown chromatophores. Body with five indistinct postanal subcutaneous bars below midline. Two faint brown spots on caudal-fin base, one dorsal and one ventral. Pectoral-fin base with light peppering of small dark chromatophores. Cheek, interorbital area, snout, narial tubes, and jaws without dark pigment. Iris black. Caudal-fin rays with brown spot on each segment. Anal and first dorsal fin black, second dorsal fin and pelvic fins dusky. Pectoral-fin rays with some brown pigment. Preserved paratype (CAS 241594, 17.5 mm SL male) as in Fig. 4.

**Etymology.** The specific epithet, is an adjective derived from the name of where it was first collected, Sodwana Bay, plus the Latin suffix *ensis* (denoting locality of occurrence), alluding to the place of capture of the holotype.

**Distribution.** Known from Sodwana Bay south to Aliwal Shoal, Kwazulu-Natal Province, South Africa.

**Comparisons.** Of the 39 described species with a complete cephalic sensory-pore system, only two have a dorsal/anal-fin formula of 8/7 as is found in *E. sodwanaensis*: *E. pardalota* Lachner & Karnella, 1978, occurring in the Red Sea and Arabian Gulf; and *E. rubriguttata* Greenfield & Suzuki, 2011, known from the Ryukyu Islands, Japan. *Eviota pardalota* has two dark prominent spots on the pectoral-fin base in preservative (absent in preserved *E. sodwanaensis*, but orange spots when fresh) and lacks an obvious dark occipital spot (vs. present). *Eviota rubriguttata* has large red spots covering both dorsal fins in life (vs. absent), lacks the 5<sup>th</sup> pelvic fin ray (vs. present), and has 17 pectoral-fin rays (vs. 15). The somewhat similar-looking *E. notata*, from the islands of the western Indian Ocean, differs in having only 7 (vs. 8) dorsal-fin rays and a series of three (vs. one) dark markings on the nape. *Eviota sodwanaensis* also bears a superficial resemblance to *E. prasina* (Klunzinger, 1871)(*E. verna*



**Figure 4.** *Eviota sodwanaensis*, preserved paratype, CAS 241594, 17.5 mm SL, Kwazulu-Natal, South Africa (D.W. Greenfield).

Smith, 1958, is a synonym), but *E. prasina* lacks the IT cephalic sensory-pore (pattern 2), vs. a complete pore system (pattern 1) in *E. sodwanaensis*, and *E. prasina* has a fimbriate male urogenital papilla vs. non-fimbriate in *E. sodwanaensis*.

## Acknowledgments

The staff of the California Academy of Sciences provided valuable curatorial and logistic support: David Catania, Jon Fong, Mysi Hoang, and Luiz Rocha. The curatorial expertise of Don Stacey and Margaret Zur (both ROM) is gratefully acknowledged. Roger Bills and Elaine Heemstra (both SAIAB) kindly located and loaned specimens of *E. sodwanaensis*, and we thank Elaine Heemstra and Wouter Holleman for examining the type material of *E. verna*. RW thanks Dennis and Sally Polack for expansive accommodation and superb company (and meals) during his visit to Sodwana Bay when the ROM specimens were collected. Financial support to RW was generously provided by the ROM's Department of Natural History, the ROM Foundation, and NSERC Discovery Grant A7619, and is gratefully acknowledged.

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