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A new species of *Liopropoma* Gill, 1862 from the Cape Verde Islands, Eastern Atlantic

(Teleostei, Perciformes, Serranidae)

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Liopropoma emanueli spec. nov. is described on the basis of two specimens from the Cape Verde Islands. The species is most similar to an undescribed *Liopropoma* from São Tomé Island and an undescribed *Liopropoma* from Brazil. It differs from all described *Liopropoma* species in having the dorsal fin clearly divided, more than 50 lateral line scales, and in having numerous, thin yellow lines on a pink body.

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Introduction

The serranid genus *Liopropoma* Gill currently contains 27 recognized species, 22 of which are distributed in the Indo-Pacific region, with a further five species in the Western Atlantic (Randall & Taylor 1988, Kon et al. 1999, Eschmaier 2011). Kotthaus (1970) described three larval specimens from the Gulf of Panama as a new genus, *Flagelloserranus*, that was later synonymized with *Liopropoma* (Randall & Taylor 1988).

In March 2010, the first author and Emanuel d'Oliveira were diving at a vertical wall covered with *Tubastrea* coral, near Tarrafal, Santiago Island, Cape Verde Islands; in 32 m depth, they saw an apparently new species of the genus *Liopropoma* disappearing into one of the many small caves in this wall. The first author took several photos of this fish and Emanuel d'Oliveira managed to capture it. A targeted search in the same area revealed additional individuals of this species, and in October 2010 a second specimen was captured.

Material and methods

We closely follow Randall & Taylor (1988) in taking measurements and used the description of *Liopropoma lemniscatum* in Randall & Taylor (1988) as an example. Measurements were taken point-to-point on the left side of specimens using a digital caliper with an accuracy of 0.01 mm and rounded to the nearest 0.1 mm. However, head length was measured to end of opercular spine, snout length from anterior edge of eye to tip of upper lip, caudal fin length from SL measuring point at caudal fin base to longest ray (not point to point), pectoral fin length from ventral insertion to longest ray. Gill rakers were difficult to count in both specimens, therefore the counts are minimum values only with possibly additional rudimentary gill rakers at the ventral and dorsal ends of both limbs.

Taxonomy

Liopropoma emanueli, spec. nov.

Figs 1–2, Table 1

Liopropoma sp. in d'Oliveira (2010: 183): two underwater photos by P. Wirtz.

Types. Holotype: ZSM 41221, 123.5 mm SL, male, dive site "Danger" near Tarrafal / Santiago Island (15°15' 51.22"N, 23°45'35.41" W), below overhanging large boulder, 20 m, P. Wirtz and E. d'Oliveira, 14 October 2010 (daytime), captured with a small harpoon. – Paratype: ZSM 41222, 101.8 mm SL, female, dive site "Kingfisher Wall" near Tarrafal / Santiago Island (15°16'27.00"N, 23°45'46.00" W), vertical wall of *Tubastrea aurea*, 32 m, P. Wirtz and E. d'Oliveira, 15 March 2010 (daytime), captured with a small harpoon.

Diagnosis. Dorsal rays VI–I–I+11; seventh dorsal spine is embedded and scaled over and can best be seen in the radiographs (Fig. 1c), first dorsal spine minute and only visible in the radiographs; sixth dorsal spine clearly visible above interdorsal ridge; pectoral rays 16; lateral-line scales about 54 (only countable in holotype); gill rakers approx. 4–5+1+8–11; inner teeth at front of jaws and side of lower jaw substantially longer than teeth in outer row; posterior margin of upper central part of preopercle irregular, finely serrated; pink ground coloration, with broad yellow-orange stripe from snout through eye along the midlateral part of flanks. Various thinner yellow-orange stripes above and below the central stripe, slightly irregular on opercle and tail. Upper and lower margin of caudal fin, dorsal margin of soft-ray dorsal fin and lower margin of anal fin yellow-orange. Caudal fin slightly emarginate. Description

Dorsal rays VI–I–I+11 (counted on radiographs, including rudiments; seventh dorsal spine is embedded and scaled over and can best be seen in the radiographs), first dorsal spine minute and only visible on the radiographs; sixth dorsal spine clearly visible above interdorsal ridge; pectoral rays 16; anal rays III+8, last ray divided at basis; lateral-line scales about 54 (only countable in holotype); scales above lateral line to origin of dorsal fin 8 (only countable in holotype); scales below lateral line to origin of anal fin 16; circumpeduncular scales 36; gill rakers due to countability of rudiments difficult to count, but at least 4+1+8.

Body moderately elongate, the depth 4.09 (holotype) and 3.77 (paratype) in SL, and compressed, the width 1.55 and 1.69 in depth; head pointed, the dorsal profile nearly straight, the head length 2.76 and 2.70 in SL; snout 3.7 and 4.0 in head; diameter of orbit 5.7 and 5.0 in head; interorbital space slightly convex (holotype) or flat (paratype), the least bony width

4.6 and 5.5 in head; mouth large, slightly oblique, the lower jaw projecting, the maxilla nearly reaching or just reaching a vertical at rear edge of orbit, the upper jaw length 2.2 in head; depth of caudal peduncle 1.5 and 1.6 times in maximum body depth.

Jaws with bands of villiform teeth, the bands broader anteriorly in jaws, particularly the upper; about 8 irregular rows of teeth at front of upper jaw of holotype and about 5 rows along side of jaw; about 7 irregular rows of teeth anteriorly in lower jaw, narrowing to 3–5 rows on side of jaw; inner teeth at front of jaws and side of lower jaw notably long and slender; palatines with a long band of villiform teeth in approximately 2 irregular rows. Tongue slender, the tip rounded. Lips smooth. Longest gill raker about as long as longest gill filaments on first gill arch.

Three flat spines on opercle, the upper and lower obtuse, both slightly anterior to central one, the distance of all three spines being approximately equidistant; posterior margin of upper central part preopercle irregular, finely serrated. Anterior nostril a thin membranous tube located in front of centre of eye at edge of groove at base of upper lip; posterior nostril an opening slightly anterior to a vertical at front of orbit at level of upper edge of pupil; distance between anterior and posterior nostrils contained 1.2 times in orbit diameter of holotype; no other large pores near posterior nostril, one diagonally.

Lateral line highly arched over pectoral region, the highest point below base of fourth dorsal spine where 4 rows of scales separate it from the fin base.

Head nearly fully scaled, with minute scales deeply embedded in the epidermis on the dorsal part of the snout; 8 diagonal rows of scales on cheek between orbit and corner of preopercle (discounting small scales next to orbit); small scales on basal third (posterior rays) to two thirds (anterior rays) of second dorsal and anal fins and about basal three-fourths of caudal fin; small scales basally on paired fins.

Origin of dorsal fin above seventh lateral-line scale; first dorsal spine slender, close to second spine, its length contained about 2.6 times in length of second spine; third dorsal spine longest, 2.65 (2.45–2.85) in head; a distinct scaly ridge between dorsal fins, the seventh and eighth spine clearly visible above middle of ridge; origin of anal fin below base of second to third dorsal soft rays; second anal spine slightly longer than third, 2.6 (2.55–3.15) in head; second anal soft ray longest, 1.8 (1.8–1.95) in head; caudal fin slightly emarginated with rounded or slightly pointed lobes; pectoral fins pointed, the fifth ray longest, not reaching a vertical at front of anal fin, the fin length 1.45 (1.35–1.55) in head; origin of pelvic fins slightly anterior to upper base of pectoral

fins, the fin length 1.7 (1.4–1.7) in head. See Table 1 for proportional measurements.

Colour in alcohol: overall brownish body colouration, darker in the dorsal region. No further distinct markings.

Life colour: pink ground colouration, with broad yellow-orange stripe from snout through eye along the midlateral part of flanks. Numerous, thin yellow-orange stripes along the body. The one on the midline of the body starts at the snout and is considerably wider (at least in its first two thirds) than the others; above and below yellow-orange midline on iris one whitish-blue stripe. Four to five thinner lines above and below the midlateral stripe, irregular on opercle and tail, turning into lines of yellow dots towards the rear of the animal. Many small yellow dots on caudal fin and soft part of dorsal fin. Upper and lower margin of caudal fin, and dorsal margin of soft-rayed dorsal fin and lower margin of anal fin yellow-orange. No ocelli in soft dorsal or anal fins. See Figures 1 and 2.

Habitat notes. The new species was originally encountered in front of a vertical wall covered with the sun coral *Tubastrea aurea*, in a depth of 36 m. It retreated into one of the many small (bucket to bathtub-sized) caves in this wall. When shining a torch into this cave, a second smaller individual of the same species was observed. During later dives, several other individuals were encountered along the same vertical wall. Additional individuals of the new species were later also seen in other areas, consisting of large boulders overgrown with black coral (*Antipathella* and *Tanacetipathes* species); when approached they retreated below these boulders. The most common species in the same area were the soldier fish *Myripristis jacobus* Cuvier, 1829 and *Sargocentron hastatum* (Cuvier, 1829). A third soldier fish, *Corniger spinosus* Agassiz, 1831, was also seen at the vertical *Tubastrea* wall.

Etymology. Named in honour of Emanuel d'Oliveira, whose knowledge of the marine fauna of Santiago Island has been a great help to the first author during many dives (d'Oliveira 2010, Reimer et al. 2010, Wirtz 2009).

Remarks. The specimens of *Liopropoma emanueli* spec. nov. completely agree with the definition of the genus *Liopropoma* Gill, 1862, as given by Randall & Taylor (1988). They differ from all described Indo-Pacific *Liopropoma* species in having the dorsal fin divided and more than 50 lateral line scales (Randall & Taylor 1988, Kon et al. 1999). In addition, the new species differs from all described Atlantic species in having only 11 soft dorsal rays (vs. 12–13; Randall 1963, Robins 1967), from *L. carmabi* (Randall, 1963)

and *L. rubre* (Poey, 1961) in lacking longitudinal brown or purple stripes as well as a large dark ocellus-like blotch in the soft part of the dorsal fin; from *L. eukrines* (Starck & Courtenay, 1962) in lacking a very broad dark midlateral band; from *L. mowbrayi* Woods & Kanazawa, 1951 by lacking dark markings in both the distal parts of the anal, dorsal and caudal fin, but having yellow-orange stripes on the flanks; from *L. aberrans* (Poey, 1860) it differs in having the yellow stripe originating on the snout continuing beyond the opercle onto the anterior portion of the flanks (Robins 1967).

A possibly undescribed *Liopropoma* species (similar to *L. aberrans*) from Bahia state, Brazil, also has a pink body and yellow fin margins but is clearly different (e.g. no midlateral yellow line and no other yellow lines on the flanks) (C. Sampaio, pers. comm.).

The only previous record of a *Liopropoma* in the

Table 1. Proportional measurements expressed as a percentage of the standard length.

	Holotype	Paratype
Standard length (mm)	123.5	101.8
Body depth	30.2	27.0
Body width	19.5	16*
Head length	44.8	37.5
Snout length	12.0	9.4
Orbit diameter	7.8	7.5
Bony interorbital width	9.8	6.8
Upper jaw length	20.8	16.9
Caudal peduncle depth	20.3	16.9
Caudal peduncle length	27.6	23.1
Predorsal length	52.6	45.3
Preanal length	82.4	67.8
Prepelvic length	44.5	35.1
Length of dorsal fin base	44.5	40.3
Length of first dorsal spine**	–	–
Length of second dorsal spine	14.4	13.4
Length of third dorsal spine	14.8	14.7
Length of longest dorsal ray	24.4	23.3
Length of anal fin base	25.3	18.9
Length of first anal spine	4.4	3.4
Length of second anal spine	11.5	6.4
Length of third anal spine	12.1	7.4
Length of longest anal ray	27.0	22.5
Caudal fin length	25.9	21.7
Pectoral fin length	28.1	26.0
Pelvic spine length	12.7	11.2
Pelvic fin length	24.7	20.2

* not measurable due to damage in paratype

** vestigial, not measurable from outside



Fig. 1. Holotype of *Liopropoma emanueli* spec. nov. (ZSM 41221), 123.5 mm SL. a. after capture (right side); b. preserved (left side); c. radiograph (right side).

Eastern Atlantic is from São Tomé and Príncipe Islands (Wirtz et al. 2007). An animal of about 10 cm length was photographed in 45 m depth at considerable distance (Fig. 3). This *Liopropoma* individual differs from *L. emanueli* spec. nov. by having not only the midlateral but also the top and lowermost yellow lines wide and conspicuous and extending to the end of the caudal fin. Similar to the case of two sister taxa of the gobiid genus *Didogobius*, *D. amicuscaridis* from São Tomé and *D. wirtzi* from Cape Verde islands (Schliewen & Kovačić 2008), the São Tomé *Liopropoma* could well be the sister species of *L. emanueli* spec. nov. Comparable habitats along the coast of tropical Africa remain virtually unexplored and these or other *Liopropoma* species might well exist there.

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Fig. 2. *Liopropoma emanueli* spec. nov. in the natural habitat, near Tarrafal, Santiago Island. a. in small cave at 18 m depth; b. in small cave at 32 m depth (with soldierfish *Myripristis jacobus* Cuvier, 1829). The animal on the right is the paratype (ZSM 41222, 101.8 mm SL).

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