

Coralliophila luglii spec. nov. (Gastropoda, Muricidae, Coralliophilinae) from the eastern Pacific Ocean

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Based on shell characters, *Coralliophila luglii* spec. nov. (Muricidae, Coralliophilinae) is described from two localities in the tropical eastern Pacific Ocean (Cocos Island and westcoast of Panama). The new taxon is represented by eight specimens, two of which collected alive in association with an unidentified scleractinian. *Coralliophila luglii* spec. nov. differs in teleoconch shape, sculpture and colour pattern from the similar, sympatric *C. violacea* (Kiener, 1836). Some biogeographical implications of the co-occurrence of *C. violacea* and *C. luglii* in the tropical eastern Pacific are discussed.

Key words: Muricidae, Coralliophilinae, *Coralliophila luglii* spec. nov., taxonomy, Costa Rica, Pacific Ocean.

INTRODUCTION

Coralliophila violacea (Kiener, 1836), type species of the genus *Coralliophila* H. & A. Adams, 1853, is probably the best-studied coralliophiline species, being very common and exhibiting a wide distribution that spans the entire Indo-Pacific region (Oliverio, 2008). *Coralliophila violacea* is a shallow-water species, occurring from the lower intertidal to 25 m depth; it is generally associated with scleractinians of the genus *Porites*.

Its nomenclatorial history has been clarified by Oliverio (2008). We had the opportunity to examine nine shells, three of which with animals preserved, of an unknown coralliophiline that is most similar to *C. violacea*. The shells had been collected at two localities in the tropical eastern Pacific Ocean, viz. Cocos Island (Costa Rica) and along the coast of Panama. They show features that are typical of the genus *Coralliophila* s. s. After a comparison with the similar and sympatric *C. violacea*, we are convinced that these coralliophilines represent a new species, which is described below.

MATERIAL AND METHODS

The material of *Coralliophila luglii* spec. nov. is in the Museo di Zoologia di Bologna, Italy (holotype), and in the private collections of Carlo Smriglio and Paolo Mariottini, Rome, Italy (paratypes A, B, F, G), Angelo Lugli, Modena, Italy (paratypes C, D, E) and Marco Oliverio (paratype H).

Abbreviations: AL, colln A. Lugli, Modena, Italy; CSPM, colln C. Smriglio & P. Mariottini, Rome, Italy; MO, colln M. Oliverio, Rome, Italy; MZB, Museo di Zoologia di Bologna, Italy; lv, live; s, shell.

Specimens of *Coralliophila violacea* (Kiener, 1836) in CSPM and MO were studied from: Baudisson Bay, Papua New Guinea, 2 s; Cebu, Philippines, 93 s; Balut, Philippines, 15 lv; Panama, Chiriqui Bay, 3 s; Inhaca Is-

land, Mozambique, 2 s; Tuléar, Madagascar, outer reef, 5 m, 1 juv; Seychelles Is., 3 s; Sharm El Sheikh, Egypt, 5 lv; Moorea, Society Islands, 2-5 m, with *Porites*, 2 lv; Hawaii, ex coll. E. Marshall (Seattle), 2 lv; Bunaken I., Sulawesi, Indonesia, 3-8 m, with *Porites*, 9 lv; Serayaki, Okinawa, Japan, 3 m, with *Porites*, 9 lv; Laura, Majuro Atoll (Marshall Islands), 1-2 m, 1 s; Ofu, Samoa, ex coll. E. Marshall (Seattle), 3 lv; Rarotonga, Cook Is., 1 m, with *Porites*, 7 lv; Zanzibar I., 2-3 m, 2 lv; Sanganeb Reef, Sudan, 3-6 m, 2 s; Pescadores (Penghu) Is., Taiwan, 2 lv.

SYSTEMATIC PART

Muricoidea Rafinesque, 1815

Muricidae Rafinesque, 1815

Coralliophilinae Chenu, 1859

Coralliophila H. & A. Adams, 1853.

Type species: *Coralliophila violacea* (Kiener, 1836)

Coralliophila luglii spec. nov. (Figs 1-3, 5)

Type series. - Costa Rica, Cocos Island, Chatham Bay, at 5-10 m (MZB 49885/holotype [Fig. 1], CSPM/paratypes A [Fig. 5] and B; AL/paratypes C-E). Panama, Chiriquí Bay, at 6-7 m, collected alive at the base of an unidentified scleratinian by SCUBA diver (dealer source) (CSPM/paratypes F [Fig. 3] and G [Fig. 2]). Galapagos Archipelago, Santa Cruz Is., ex colln E. Marshall (Seattle), collected alive, (MO/paratype H). The measurements are summarized in Table 1.

Description. - Shell small for the genus (see Table 1), thick, inflated, convex, ovoid-conical, slightly depressed, siphonal canal short and open. Protoconch usually eroded. Teleoconch consisting of about three whorls, aperture oval and encompassing about 80 % of the total height, last whorl almost covering all previous whorls. One strong abapical spiral cord forming an evident keel, composed of squamae, partially eroded. Aperture oval, sharply angulate in correspondence to the shoulder keel. Teleoconch sculpture of numerous flat spiral cords, homogeneous in size; interspaces between cords are narrow furrows. Spiral cords on subsutural ramp smooth and partially eroded, a marked squamose basal cord is present. Axial sculpture of only very weak undulations and growth lines over entire teleoconch.

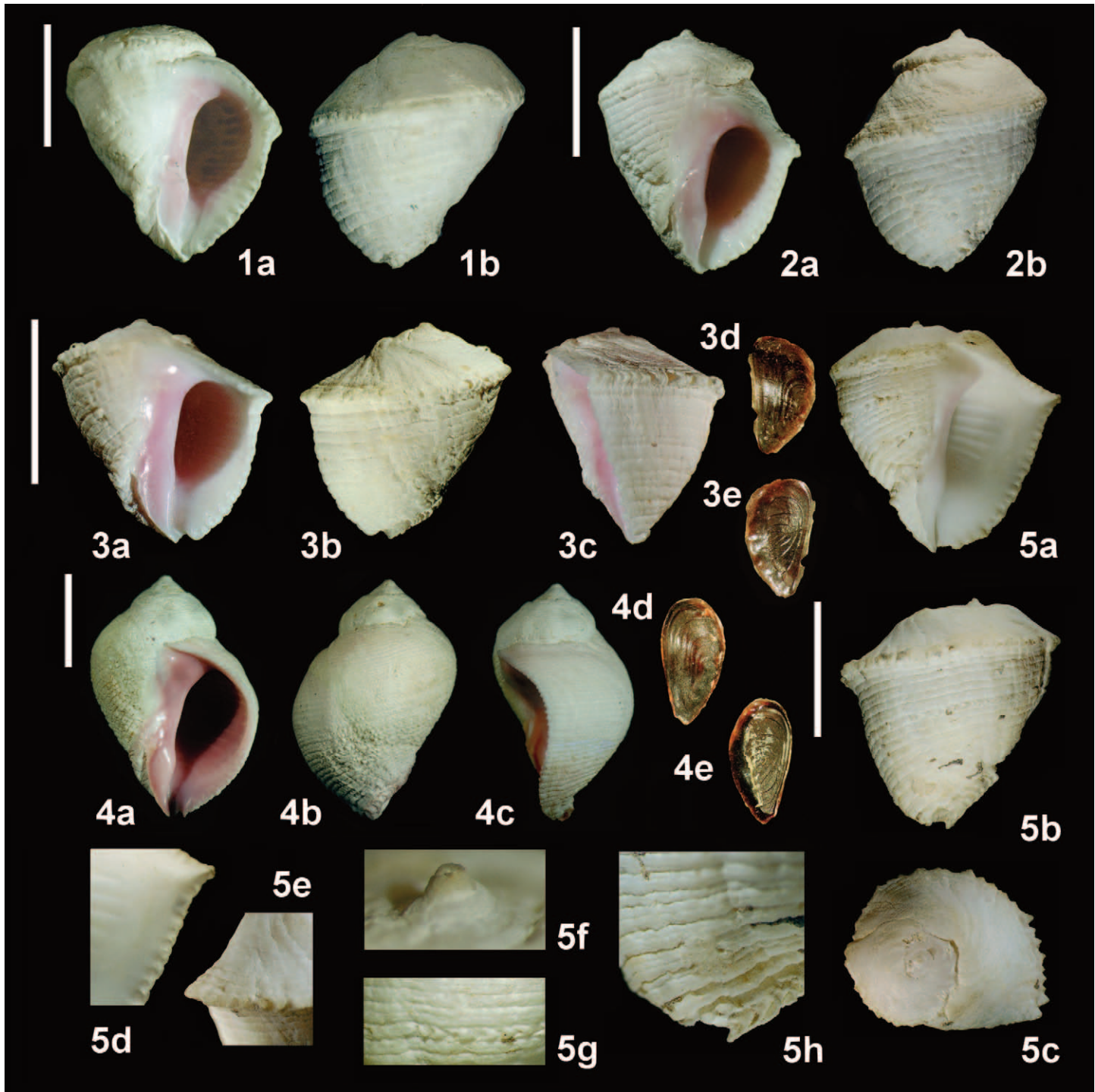
Type material	H (mm)	D (mm)	Depository
Holotype	18.5	17.5	MZB 49885
Paratype A	16.2	15.1	CSPM
Paratype B	22.2	17.4	CSPM
Paratype C	20	17.5	AL
Paratype D	18	19	AL
Paratype E	25.2	25	AL
Paratype F	12.9	13	CSPM
Paratype G	17	15	CSPM
Paratype H	22.8	20.5	MO

Table 1. Shell characters of *C. luglii* n. sp.

Teleoconch dull milky-white. Aperture internally dark pink/violet, except for a white area around the aperture. Outer lip with 10 internal plicae, inner lip crenulated. Operculum oval with latero-terminal nucleus, dark reddish-brown.

The protoconch is usually eroded, only in two specimens (paratypes A and G) a protruding protoconch is present, but both larval whorls are incomplete and their sculpture is abraded. From the remaining parts the protoconchs appear similar to those of *C. violacea*, i.e. multispiral, indicating a planktotrophic development. The teleoconch of *C. luglii* spec. nov. ranges from three to four whorls and is generally eroded.

Figs 1-5. *Coralliophila* spp. 1-3, 5, *C. luglii* spec. nov. 1, holotype, Costa Rica, Cocos Island, Chatham Bay, MZB 49885, 18.5 × 17.5 mm; a, ventral view; b, dorsal view. 2, paratype G. Panama, Chiriquí Bay, collected by SCUBA diver at 6-7 m, in the base of an unidentified coral, CSPM, 17.0 × 15.0 mm; a, ventral view; b, dorsal view. 3, Paratype F. Panama, Chiriquí Bay, collected by SCUBA diver at 6-7 m, in the base of an unidentified coral, CSPM, 12.9 × 13.0 mm; a, ventral view; b, dorsal view; c, lateral view; d, operculum external view; e, operculum internal view. 5, paratype A. Costa Rica, Cocos Island, Chatham Bay, CSPM, 16.2 × 15.1 mm; a, ventral view; b, dorsal view; c, apical view; d, detail of the aperture; e, detail of the keel; f, detail of protoconch; g, detail of spiral sculpture; h, detail of the spiral sculpture on the siphonal canal. 4, *C. violacea* (Kiener, 1836). Panama, Chiriquí Bay, collected by SCUBA diver at 6-7 m, at the base of an unidentified coral, CSPM, 24.7 × 18.2 mm; a, ventral view; b, dorsal view; c, lateral view; d, operculum, external view; e, operculum, internal view. Scale bars 10 mm.



Generally, the squamae forming the keel are clearly evident. The apertural colour pattern varies from glossy milky-white with pink flammules to dark pink/violet internally, except for a white area around the outer lip, and shows 8-10 internal plicae; the outer and inner lips are crenulated.

Coralliophila luglii spec. nov. has to be compared mainly with *C. violacea*, which is the most similar coralliophiline. These two taxa are sympatric in Chiriquí Bay and Galapagos Archipelago and may have been confused until now owing to their shell similarity. In spite of that, the two taxa are easily distinguishable on the base of the teleoconch shape and sculpture: a) *C. violacea* is clearly more elongated and rounded, and does not show the strong keel that is present in *C. luglii*; b) in *C. violacea* the initial convex whorls are visible, while in *C. luglii* the initial whorls are barely visible being covered by the last whorl; c) spiral cords of *C. violacea* are finer, more irregular and their number is larger; d) *C. violacea* shows a sinuous lip profile when observed from the side view, while that of *C. luglii* has a straight contour; e) the internal plicae of the aperture number 13-16 in *C. violacea*, and 8-10 in *C. luglii*. Furthermore, difference in the internal aperture colour can separate these two coralliophilines, being completely violet in *C. violacea*, while in *C. luglii* it is pink/violet and white near the margin. We examined a large number of *C. violacea* specimens from different localities across the entire geographic distribution and observed a great range in variability of the shells, but none of the examined shells resembles *C. luglii* in terms of teleoconch shape, sculpture and colour.

Distribution. - The species is known from the type locality (Cocos Island), Chiriquí Bay (Panama) and Santa Cruz Island (Galapagos Archipelago).

Etymology. - The species is named after Mr Lugli, a keen amateur collector from Modena (Italy) and a good friend of the first author, who provided us with some shells of the type lot.

Remarks. - *C. violacea* is one of the relatively few species (~80) that extend their range from the Indo-West Pacific to the tropical eastern Pacific. These species have very seldom differentiated into distinct subspecies or species in the eastern Pacific. This happened probably in only five cases or less (Vermeij, 1990; Reid & Kaiser, 2001; see Meyer, 2003 for the case of

Cypraea isabellamexicana). *Coralliophila luglii* spec. nov. can reasonably be hypothesised as the sister-species of *C. violacea*. Its likely planktotrophic development may on one side account for a relatively wide range in the eastern Pacific, from Cocos Island to Panama and the Galapagos Islands; on the other side it would be compatible with peripatric speciation at the edge of an ancestral Indo-West Pacific species' range. Interestingly, *C. violacea* has also been recorded for the Galapagos Archipelago (Finet, 1994; with record references therein). The present co-occurrence of the two species in two geographical areas (Chiriquí Bay and Santa Cruz Island) requires to hypothesize either sympatric speciation or a secondary contact by a range extension of at least *C. violacea*. It will require further genetic data to test these hypotheses.

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