

First record of living specimens of *Crinophtheiros comatulicola* (Graff, 1875) (Gastropoda, Eulimidae) from the Adriatic Sea

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ABSTRACT

The presence in the Adriatic Sea of the eulimid *Crinophtheiros comatulicola* (Graff, 1875) is confirmed through the finding of living specimens at Rijeka, Croatia. The species was until now only known for the Adriatic from a few records of empty shells. The association with its elective host, the crinoid *Antedon mediterranea* (Lamarck, 1816), is also documented.

Keywords: *Crinophtheiros comatulicola*, Adriatic Sea, *Antedon mediterranea*.

INTRODUCTION

The eulimid gastropod *Crinophtheiros comatulicola* (Graff, 1875) has been described from specimens collected in the Gulf of Naples. The species is relatively widespread in the western Mediterranean: it has been recorded from along the Tyrrhenian coast of the Italian peninsula (Bacci, 1948; Cecalupo & Giusti, 1986; Gaglini, 1991; Bedulli *et al.*, 1992; 1993; 1994; Giannuzzi-Savelli *et al.*, 1999; Cossignani & Ardovini, 2011), from Sicily (Monterosato, 1878, [as *Eulima beryllina*]; Giannuzzi-Savelli *et al.*, 1999; Scuderi & Criscione, 2011), from Sardinia (Carrozza, 1977), along the French Mediterranean coastline (Locard, 1892; Changeux, 1956),

along the Spanish Mediterranean coasts (Peñas & Giribet, 2003; Peñas *et al.*, 2006), from Malta (Nicolay & Angioy, 1993; Cachia *et al.*, 1996), and from the eastern Mediterranean at Cyprus (Öztürk *et al.*, 2003) and Greece (Tenekidis, 1989; Manousis, 2012; Romani *et al.*, 2017). Some of the cited records of *C. comatulicola* may not refer to this species: Romani *et al.* (2017) point out that the records by Scuderi & Criscione (2011) and Tenekidis (1989) are probably misidentifications.

There are only three reports in the literature for the Adriatic Sea, all relating to empty shells (Vio & De Min, 1999; Cossignani & Ardovini, 2011; Chimenti *et al.*, 2016). In the past, the close symbiosis of *C. comatulicola* with the Mediterranean crinoid *Antedon mediterranea*

(Lamarck, 1816) has been observed at least three times (Graff, 1875; Bacci, 1949; Changeux, 1956). Here we report, for the first time, the discovery of live specimens of *C. comatulicola* in the Adriatic Sea, and we provide additional observations to support the hypothesis that it may be an obligatory symbiont of *A. mediterranea*.

MATERIALS AND METHODS

The individuals of *C. comatulicola*, subject of this study, were observed during two separate dives, both in Vila Nora Beach, (Rijeka, Croatia) (45°20'26.1"N 14°22'16.4"E), in about 10 m depth on 10th and 16th December 2017. The area investigated is characterized by limestone down to a depth of about 8 m, followed by a gravelly plateau that

descends to about 12 m. This plateau is characterized by the presence of numerous specimens of *Condylactis aurantiaca* (Delle Chiaje, 1825) in association with *Periclimenes scriptus* (Risso, 1822), and *Sphaerechinus granularis* (Lamarck, 1816), *Marthasterias glacialis* (Linnaeus, 1758) and *Antedon mediterranea* (Lamarck, 1816); together with *Codium bursa* Agardh, 1817 and *Eudendrium* sp.. All this species mainly colonize wrecks of small boats and other debris. In total, 11 specimens of *C. comatulicola* were counted, and all, without exception, were found on the crinoid *Antedon mediterranea*. The specimens were photographed in situ with a compact Sea & Sea 2G camera equipped with Sea & Sea YS D1 flashes and Nauticam CMC1 macro lens. Only two specimens were collected for documentation and archiving (Figure 1a, b); they are housed in the collection of the first author (catalog number M2454a and M2454b).

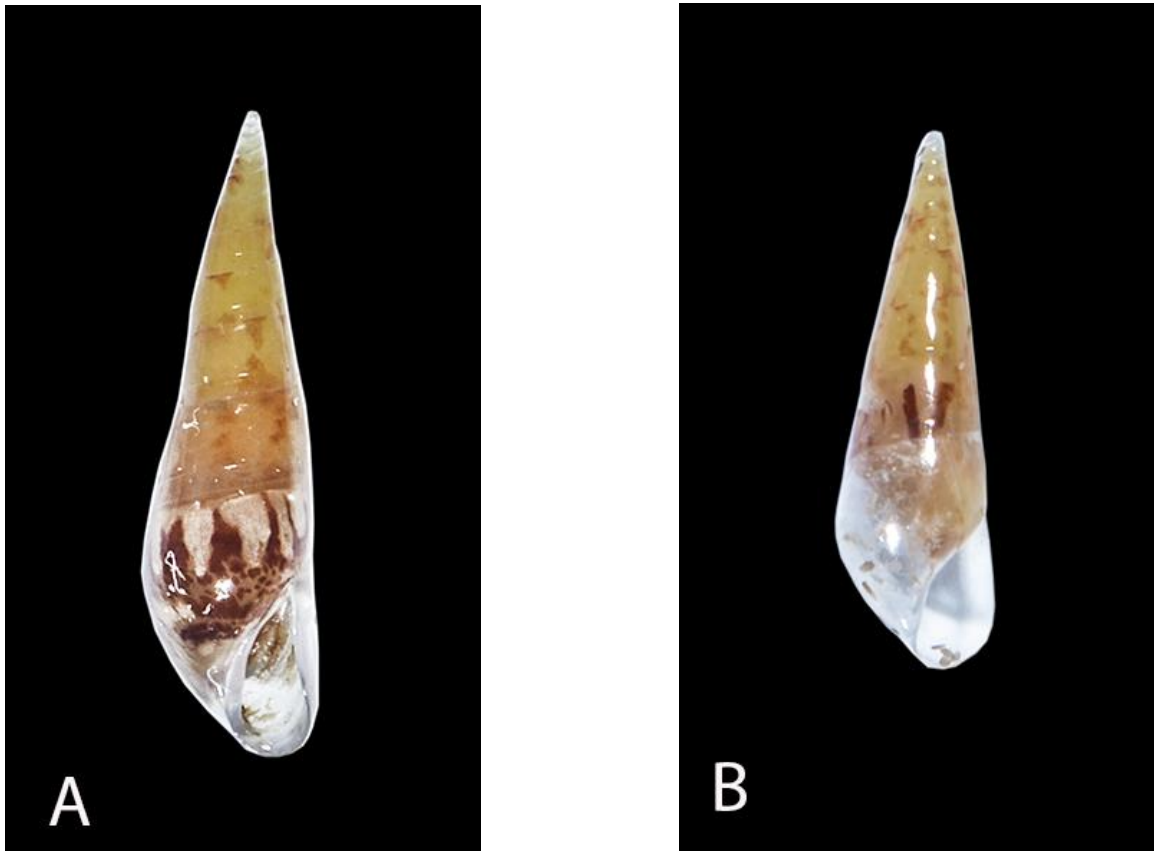


Figure 1. *Crinophtheiros comatulicola* Vila Nora Beach, (Rijeka, Croatia): a) length 4 mm, b) length 3 mm.

RESULT AND DISCUSSION

According to Waren (1984) and Bouchet & Waren (1986) there are more than 800 living species of eulimids in the world; with few exceptions, all are associated, as endo or ectoparasites, with echinoderms. These gastropods mainly parasitize, sometimes without specificity for a single host species, ophiuroids, holoturians and echinoids; however, among the genera present in the Mediterranean, only *Crinophtheiros* and *Curveulima* are known to parasitize crinoids. No other molluscs, apart from species of Eulimidae, are known to live symbiotically with echinoderms. Most eulimids live attached to the surface of the echinoderm's body, through their proboscis, which they use to feed on the tissues or fluids of the host. The proboscis penetrates more or less deeply into the bodywall of the echinoderm to reach the coelomic cavity (Waren 1984). The parasitic association with the crinoid *Antedon mediterranea* (Lamarck, 1816) was highlighted in the original description of *Crinophtheiros comatulicola* (as *Stylina comatulicola*) (Graff, 1875). Subsequently the interaction between the two species were observed and described again from the Gulf of Naples (Bacci, 1948), and from Banyuls (Changeux, 1956).

During two dives off Vila Nora Beach, (Rijeka, Croatia), on 10 and 16 December 2017, 12 and 6 specimens of *Antedon mediterranea* were examined, respectively. During the dive of the 10th, only two out of 12 crinoids examined appeared to be parasitized by *C. comatulicola*, the first with three specimens and the second with six. In the second dive of the six crinoids examined only one was parasitized, with two individuals. The gastropods varied in shell length between 0.8 to 5 mm. In all cases, the individuals *Crinophtheiros* were predominantly in the proximal part of the arms (Figures 2a, b); Bacci (1948) found the species near the anal papilla or on the soft part of the pinnules. The congener *Crinophtheiros collinsi* (Sykes, 1903), closely related to *C. comatulicola* and distributed in the north-eastern Atlantic, parasitizes the crinoid *Antedon bifida* (Pennant, 1777), on which, according to Rodríguez *et al.*

(2001), "it is found mainly on the arms or finials of the crinoid, but never near the central disk" and according Delongueville & Scaillet (2013) "on the disc zone, on the pinnulae and on the arms" Bacci (1948) pointed out that in infested crinoid pinnules, the host produced conspicuous soft swellings of the dermal tissue. In the specimens of *Antedon* we observed, a similar reaction was not evident, but it is possible that the tumefactions mentioned by Bacci (1948) are so small that they can be observed only by examining the specimens in the laboratory under magnification.

Our observations are the first of live individuals in the Adriatic, since the only three previous reports for this sea refer to empty shells. Both the checklist of the species of the Italian fauna (Bodon *et al.*, 1995) and the checklist of the flora and fauna of the Italian seas (Oliverio *et al.*, 2008), do not report *C. comatulicola* from the Adriatic Sea. However, Vio & De Min (1999) include *C. comatulicola* in a list of species found at Cervera (Parenzo, Istria), without any image or comment, except for the symbol 'C' indicating "molluscs present in the circalittoral" and without the asterisk * which, if present, would indicate live specimens. Cossignani & Ardovini (2011) illustrate two shells, one coming from the Tuscan coast, and the second with the generic indication "Adriat."; while the Tuscan specimen is without doubt *C. comatulicola*, the one indicated as coming from the Adriatic does not have the typical appearance of this species. Finally, Chimienti *et al.* (2016) supply a photograph of a shell determined as *C. comatulicola*; the specimen was not found alive as the authors write "only the bivalves *Lasaea rubra* was found living". Like the one illustrated by Cossignani & Ardovini (2011), this specimen does not correspond fully to the diagnosis of the genus and to the illustration of the lectotype (Bouchet & Warén, 1986), so that overall the presence of *C. comatulicola* in the Adriatic had not so far been sufficiently demonstrated. With the discovery of live specimens reported here, we can therefore confirm this species for the fauna of the Adriatic.



Figures 2. a) and b) *Crinophtheiros comatulicola*, living individuals on *Antedon mediterranea*.

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Prvi nalaz živih jedinki *Crinophtheiros comatulicola* (Graff, 1875) (Gastropoda, Eulimidae) u Jadranskom moru

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SAŽETAK

Prisustvo puža *Crinophtheiros comatulicola* (Graff, 1875), iz familije Eulimidae, za Jadransko more je potvrđeno nalaženjem živih jedinki u Rijeci, Hrvatska. Do sada je ova vrsta za Jadran bila poznata preko nekoliko nalaza praznih ljuštura. Asocijacija sa njegovim domaćinom, morskim ljljanom *Antedon mediterranea* (Lamarck, 1816), je takođe dokumentovana.

Ključne riječi: *Crinophtheiros comatulicola*, Jadransko more, *Antedon mediterranea*.