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SHALLOW RHODOLITH BEDS IN CAPO PELORO LAGOON

LETTI A RODOLITI IN ACQUE BASSE NELLA LAGUNA DI CAPO PELORO

Abstract – *Rhodoliths, known to be a relevant component of Circalittoral environments, are almost neglected in shallow waters. In this paper, brackish water rodolith beds are reported from Capo Peloro Lagoon (north-eastern Sicily), together with a preliminary species determination. In particular, patch distributed rodolith beds were found in Lake Faro, as tied to the traditional practices of clam farming which, moving sediments, hamper mud deposition, and accumulate bioclasts (shells) which act as accretion core. In the canals, instead, the rhodolith growth is supposed to be favoured by the strong tidal regime, which hampers mud sedimentation, improves water exchange, and supplies nutrients from the connected lacustrine environment. In both environments, the most common Corallinaceae morphospecies were Neogoniolithon brassica-florida (Harvey) Setchell et L.R.Mason, Neogoniolithon hauckii (Rothpletz) R.A.Townsend et Huisman and Phymatolithon lenormandii (Areschoug) W.H.Adey.*

Key-words: *brackish environments, Capo Peloro Lagoon, Corallinaceae, rhodoliths.*

Introduction - Rhodoliths (*Corallinaceae, Rhodophyta*) are unattached benthic rhodophycean algae precipitating CaCO₃. Currently they represent a relevant component of marine coastal environments, where they play a significant role both as primary producers and habitat forming organisms. Rhodolith beds are most common and, therefore, more investigated in the Circalittoral zone, since their formation is favored by low light intensity and scarce competition with green and brown algae. Conversely, shallow water rhodolith beds are little investigated, even less in brackish environments (Del Río *et al.*, 2022).

Materials and methods - In the framework of a research project (PO FEAMP SICILIA 2014-2020, Mis. 2.51) aimed to evaluate and promote the benthic biodiversity of Capo Peloro Lagoon (north-eastern Sicily), a preliminary assessment of the main lake-floor typology and associated communities was carried out. A systematic underwater visual survey was conducted and rhodolith beds were identified and georeferenced. Random samples were collected from each site for a first characterization of the beds and the identification of the composing species on a morphological basis (Bressan & Babbini, 2003). From the same samples, fragments of algal thalli were isolated and dried in silica gel for subsequent DNA barcoding analyses.

Results - In Capo Peloro Lagoon, rhodolith beds widely occur both in Lake Faro and the canals connecting the system to the sea. Eleven rhodolith beds have been identified in Lago Faro and four in the canals, showing different aspects and variously associated fauna and flora (Figs. 1-2).

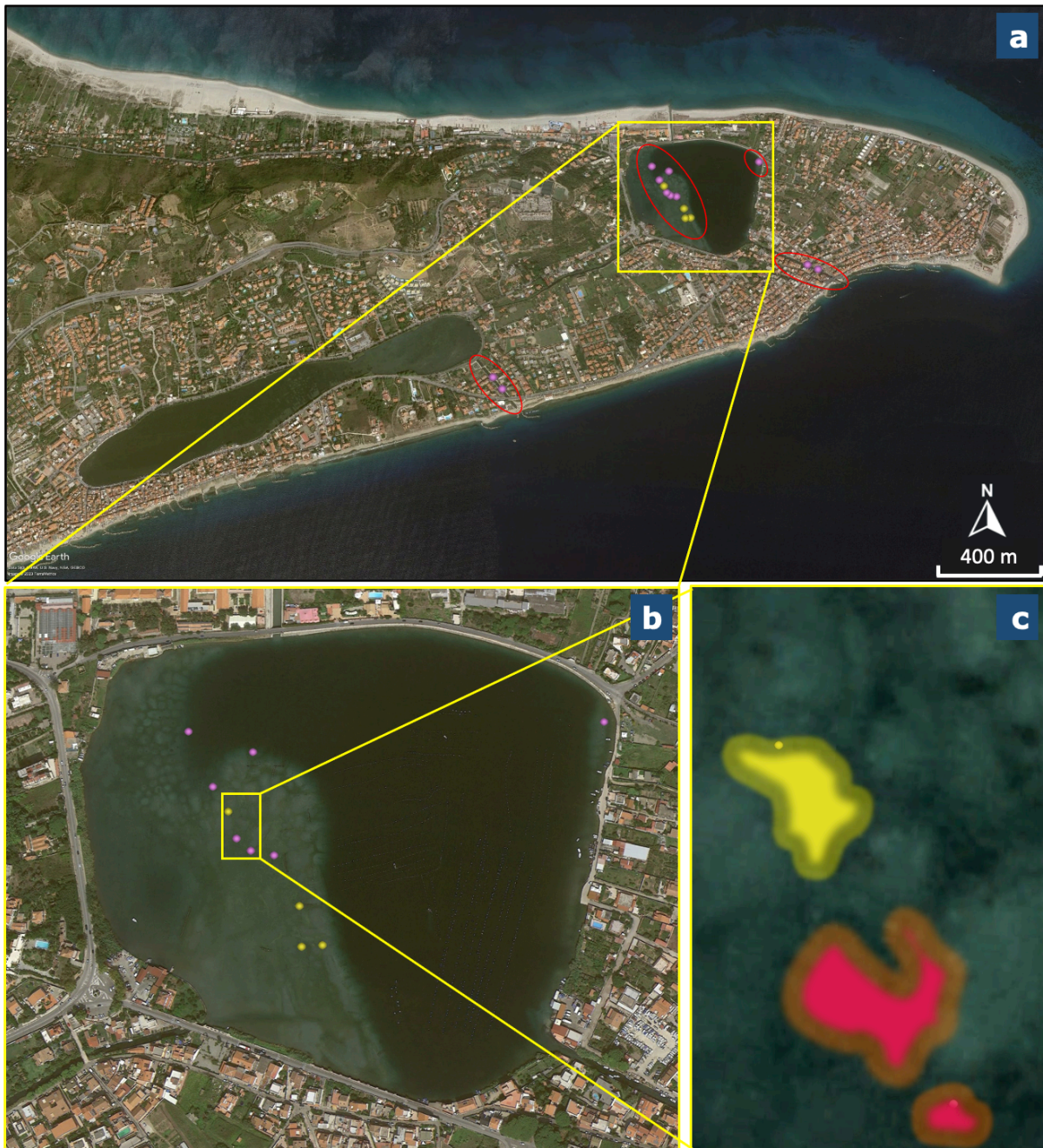


Fig. 1 - (a) Location of rhodolith beds in Capo Peloro lagoon; (b) their distribution in Lake Faro; (c) detail of the typology and extension of some of them. Magenta: rhodoliths; yellow: rhodoliths in association with *Anemonia sulcata* (Pennant, 1777).

(a) Ubicazione dei letti a rodoliti nella laguna di Capo Peloro; (b) loro distribuzione nel Lago Faro; (c) dettaglio della tipologia ed estensione di alcuni di loro. Magenta: rodoliti; giallo: rodoliti in associazione con *Anemonia sulcata* (Pennant, 1777).

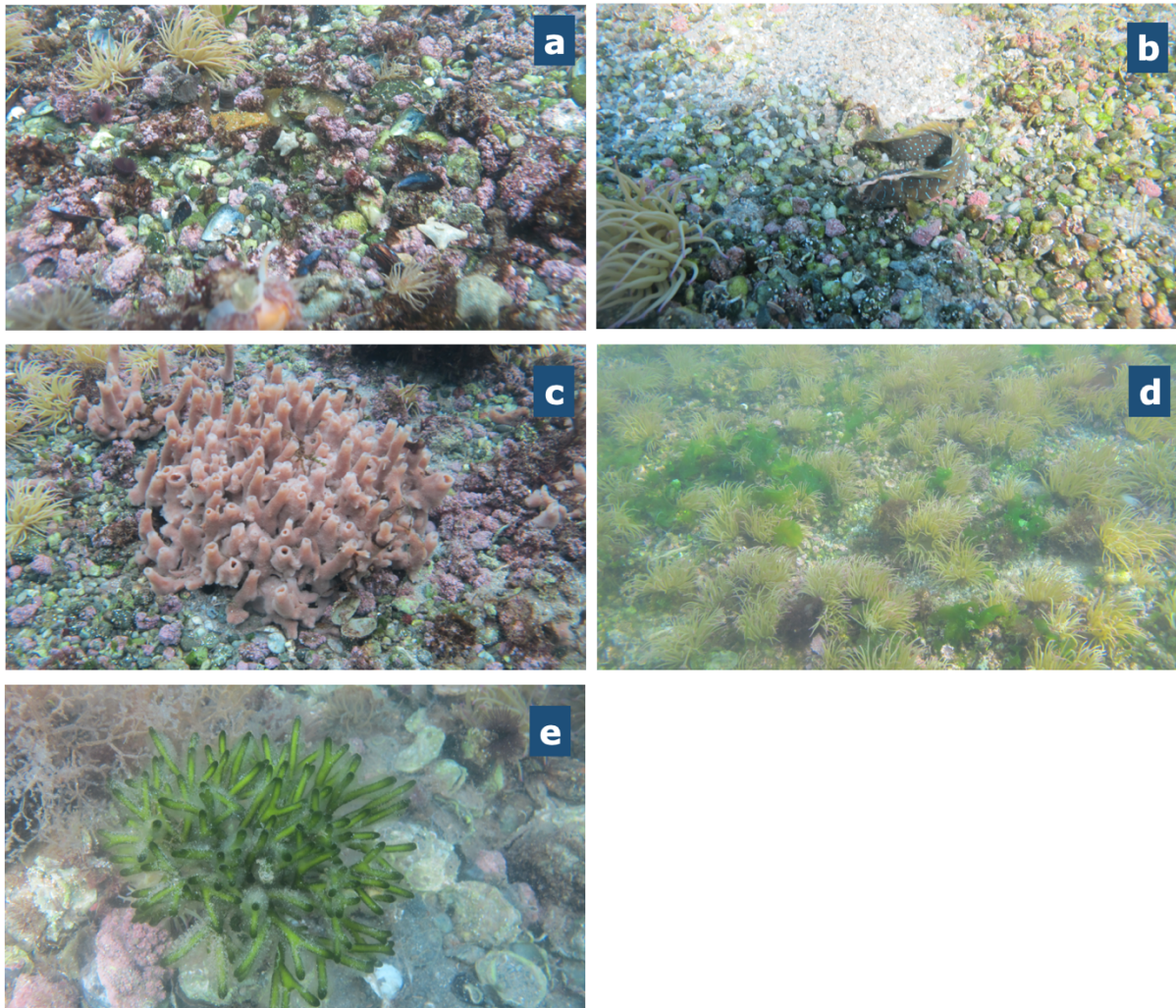


Fig. 2 - Some typologies of rhodolith beds recorded in Lake Faro: (a) most common aspect; (b) with associate ichthyofauna, i.e., *Salaria pavo* (Risso, 1810); (c) with associate poriferans; (d) with associate *Anemonia sulcata* beds (Pennant, 1777); (e) with associate green algae, i.e., *Codium* sp. Alcune tipologie di letti a rodoliti riscontrate nel Lago Faro: (a) aspetto tipico; (b) con associata ittiofauna, in questo caso *Salaria pavo* (Risso, 1810); (c) con poriferi associati; (d) con alte densità di *Anemonia sulcata* (Pennant, 1777); (e) con associate alghe verdi, in questo caso *Codium* sp.

In the canals, rhodolith beds occur in laminar waters, being favoured by the strong tidal regime, which hampers mud sedimentation, improves water exchange, and supplies nutrients from the connected lacustrine environment. In Lake Faro, differently, their settlement and distribution are strongly tied to the traditional practices of clam farming, which move sediments, hampering mud deposition, and accumulate bioclots (shells) which are profitable rhodolith accretion core.

In both environment, the most common *Corallinaceae* species were *Neogoniolithon brassica-florida*, *Neogoniolithon hauckii* and *Phymatolithon lenormandii* (Fig. 3).



Fig. 3 - Detail of most common species of *Corallinaceae*: (a) *Neogoniolithon brassica-florida* (Harvey) Setchell et L.R.Mason; (b) *Neogoniolithon hauckii* (Rothpletz) R.A.Townsend et Huisman; (c) *Phymatolithon lenormandii* (J.E.Areschoug) W.H.Adey. Scale: 1mm.

Specie di Corallinaceae più comuni: (a) *Neogoniolithon brassica-florida* (Harvey) Setchell et L.R.Mason; (b) *Neogoniolithon hauckii* (Rothpletz) R.A.Townsend et Huisman; (c) *Phymatolithon lenormandii* (J.E.Areschoug) W.H.Adey. Scala: 1 mm.

Conclusions - Rhodolith beds in transitional waters, rarely reported in literature (Basso *et al.*, 2009) and not described before now in the Mediterranean, might be widely diffused in brackish environments, probably playing a major ecological role both in benthic successional dynamics and benthic-pelagic coupling (De Araújo Costa *et al.*, 2021). In Capo Peloro lagoon, a habitat threatened by natural and anthropogenic stresses, at least three species of *Corallinaceae* concur in forming wide and articulate rodholith beds. Rodholiths confirmed to be the major actors in the lake-floor stabilization and habitat structuration, moreover, a peculiar condition consisting in close relationships with long-time persistent human activities is here reported.

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