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A Mediterranean mesophotic coral reef built by non-symbiotic scleractinians

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This is the first description of a Mediterranean mesophotic coral reef. The bioconstruction extended for 2.5 km along the Italian Adriatic coast in the bathymetric range $-30/-55$ m. It appeared as a framework of coral blocks mostly built by two scleractinians, *Phyllangia americana mouchezii* (Lacaze-Duthiers, 1897) and *Polycyathus muelleriae* (Abel, 1959), which were able to edify a secondary substrate with high structural complexity. Scleractinian corallites were cemented by calcified polychaete tubes and organized into an interlocking meshwork that provided the reef stiffness. Aggregates of several individuals of the bivalve *Neopycnodonte cochlear* (Poli, 1795) contributed to the compactness of the structure. The species composition of the benthic community showed a marked similarity with those described for Mediterranean coralligenous communities and it appeared to be dominated by invertebrates, while calcareous algae, which are usually considered the main coralligenous reef-builders, were poorly represented. Overall, the studied reef can be considered a unique environment, to be included in the wide and diversified category of Mediterranean bioconstructions. The main reef-building scleractinians lacked algal symbionts, suggesting that heterotrophy had a major role in the metabolic processes that supported the production of calcium carbonate. The large amount of available suspended organic matter in the area could be the main nutritional source for these species, as already suggested in the literature referred to Mediterranean cold-water corals.

The most important marine bioconstructions are coral reefs, which are well known as biodiversity hot spots^{1,2}. Coral reefs mainly occur in the oligotrophic waters of the western Atlantic and Indo-Pacific regions, within the latitude of 30°N and 30°S^{3,4}. They are mainly composed of stony corals, helped in the bioconstruction by several species of invertebrates with carbonate skeletons and coralline algae. Coral reefs form through successive stages of growth involving the deposition and consolidation of the remains of these reef-building benthic organisms⁵, being the carbonate deposition, typical of these habitats, enhanced by the close mutualistic symbiosis of corals with microalgae^{6,7}.

Therefore, the vertical distribution of a reef is primarily affected by light availability⁸, even though coral reefs that live close to the surface are only a small portion of the complete coral reef ecosystem. Indeed, it is now known that mesophotic coral reefs (MCRs) are widespread and diversified worldwide. They are found at depths ranging from 30–40 m and extending to the limit of the photic zone, which may be up to 200 m in adequate environmental conditions^{9,10}. MCRs are usually built by light-dependent corals whose photosynthetic symbionts tolerate middle- to low-light conditions^{11,12}. Other taxa that provide structural habitat, include sponge and algal

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