

Invertebrate fauna and structure of a coralligène formation of the Mediterranean infralittoral

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Abstract

Within the diploma thesis a coralligène formation located at the Punta di Fetovaia (10°09'33" N; 42°43'28" E) on the Island of Elba/ Italy was observed. The area of biogenic structures, interspersed with shell-gravel sediment, is mainly located in a depth of 15 to 20 m and was sampled by SCUBA diving. Subsequently, the samples were analysed faunistically and structurally.

Cartographic mappings and depth-transects are used to show topographical and biocoenotical structures of the sampling area and the vicinities. The study field of approximately 40 x 60 m is closely associated with seagrass meadows (*Posidonia oceanica*). The biogenic boulders protrude up to 1 m (in average about 0.65 m) from the surrounding sediment. They create manifold, rounded structures, partly cleft and/or fused.

The formations are mainly formed by red algae (*Rhodophyta*) belonging to the families *Corallinaceae* and *Peyssonneliaceae*. Additionally, a distinct cover of *Rhodophyceae* and *Chlorophyceae*, dominated by *Halimeda tuna* was observed. In the cavity-rich and conglomerate-like calcareous structure as well as in the felted algae cover, small particles drifting along with the currents are caught up. This sedimentation contributes to the generation of the boulders, too.

Determinations of volume and density revealed a share of 40% of cavities, which are partially very finely structured. *In-situ* experiments showed that water is constantly flowing through these spaces. Organic particles, transported with the currents provide fundamental life necessities for various filtering organisms living in and on the biogenic boulders (e.g. sponges, polychaetes, bryozoans, tunicates). The complex structure of the formations leads to a relative illumination of 25% (to less than 1%) of the intensities close to the water surface.

An extensive algae flora dominates the boulder surfaces. Shaded areas are dominated by organisms of the phyla *Porifera*, *Cnidaria*, *Bryozoa* and *Tunicata*.

During the faunistic analyses 173 species were identified and compared to occurrences in similar Mediterranean structures. A high diversity of vagile organisms was detected whereas the endolithon was dominated by only a few species. A documentary collection of samples is deposited in the State Museum for Natural History, Stuttgart (Zoological Division, Invertebrates).

With 21,4%, polychaetes have the most important share. Smaller shares are represented by molluscs (16,2%), bryozoans (12,7%), crustaceans and fish (both 12,1%). Numerous invertebrates e.g. some bryozoans, sponges and calcareous tube-building polychaetes are involved in the generation of the boulders. Boring sponges, as well as some bivalves and sipunculid worms are often found within the endolithic fauna. They contribute to bioerosion of the structure.

On the basis of faunistic analyses, ecological conclusions can be deduced. The strong influence of sedimentation for instance is reflected in numerous particulate inclusions of some sponges (*Porifera*). Likewise, several microhabitats can be differentiated. The species richness and abundance of fish (*Pisces*) is noticeable as well. The bioherm is the basis of a comprehensive food web and nutrient turn-over.

All faunistic and structural analyses identify the boulders of Fetovaia as précoralligène, a type of coralligène, characteristic for the Mediterranean. LAUBIER (1966) refers to such a coralligène structure as *“an eco-ethological turning wheel in the frame of hard bottom populations of the littoral systems”*. The species richness of the précoralligène detected in the present study confirms this statement. Ecologically, coralligène structures belong to the most important Mediterranean biocoenoses.

For the first time, x-ray computer tomography was applied to characterize Mediterranean coralligène structures. This way, an undisturbed insight into the cavity system could be gained. It was verified that sedentary polychaetes take up a much higher share of the structure than described as yet.

This study provides the basis for further faunistic, structural, sedimentological, water-chemical and hydrodynamic studies, which could give valuable information about the genesis, growth and ecological relevance of précoralligène structures.