First taphonomic insight on a coralligenous build-up off Marzamemi (SE Sicily)

Sanfilippo R.*[1-2], Basso D.[3-2], Bazzicalupo P.[3], Bertolino M.[4], Bracchi V.A.[3-2], Cipriani M.[5], Costa G.[2], Dominici R.[5], Donato G.[1], Rosso A.[1-2], Sciuto F.[1-2] & Guido A.[5]

[1] Dipartimento di Scienze Biologiche, Geologiche e Ambientali, Università di Catania. [2] Consorzio Nazionale Interuniversitario per le Scienze del Mare, Roma. [3] Dipartimento di Scienze dell'Ambiente e della Terra, Università di Milano-Bicocca. [4] Dipartimento di Scienze della Terra, dell'Ambiente e della Vita, Università di Genova. [5] Dipartimento di Biologia, Ecologia e Scienze della Terra, Università della Calabria, Rende (CS).

Corresponding author e-mail: sanfiros@unict.it

Keywords: crustose algae, invertebrates, early diagenesis.

A discrete build-up located 33.5 m depth in an area with high coralligenous cover located off the Marzamemi village (south-eastern Sicily), has been studied in the frame of the project FISR 04543 "CRESCIBLUREEF - Grown in the blue: new technologies for knowledge and conservation of Mediterranean reefs".

The relationships among the components of the framework were examined, including the encrusting calcareous red algae representing the main builder, and the secondary builders mainly consisting of serpulids, bryozoans, foraminifera and molluscs, all having carbonate exoskeletons cementing to each other. The role of large sponges and sediments trapped inside some cavities was also investigated.

Two scraped samples were examined, one from the bottom half (sample CBR2_5_35_Gb) of the build-up and one from the top half (sample CBR2_5_32_Gt), which is more densely covered by soft algae and peyssonneliaceans.

On the top half, builders show more frequent life interactions than in the bottom one, with numerous overgrowths between encrusting calcareous red algae, serpulids and bryozoans pointing to a more active growth. Among dwellers serpulids, bryozoans and foraminifera are dominant. Sponges occupy interspaces between superimposed laminar thalli and engulf crevices between superimposed metazoans and voids inside skeletons, like the lumina of large empty serpulid tubes. The bottom half is made of mostly dead coralline algae. Cavities within laminar convolutions are colonized by numerous sciaphilic small dwellers like encrusting bryozoans, serpulids, brachiopods and foraminifera, and are often darkened by Fe-Mg oxides coatings.

Numerous cm- to mm-sized cavities inside the fruticulose framework are obvious, some empty but other partly or entirely filled with sediments. The larger ones may contain allochthonous sand and gravel including free-living coralline algae (maerl), small gastropods and shell debris deriving from organisms associated with the bioconstruction or transported from the surrounding soft bottoms. The smaller cavities can trap finer sediments. These are whitish allochthonous micrites with shell debris, or fine autochthonous micrites incorporating sponge spicules and remains of organic matter. On the bottom half, micrites from the innermost cavities at discrete distance from the surface appear locally lithified. Analogously, neighbouring calcite thalli show evidence of early diagenesis and recrystallization. The decay of the sponges would seem to enhance the inception of these taphonomic processes indirectly contributing to strengthen the primary structure. The presence of organic matter deriving from decayed sponges in some micrite sediments suggests phenomena of organomineralization of the sponge tissues and opens up future investigations on the still poorly understood mineralization processes involved in the coralligenous formation, stabilisations and preservation.