

The mystery of “fairy circles”: exploring the ecology of coralligenous mesophotic rings in the Mediterranean Sea

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The origin of coralligenous rings, circular habitats with an average size of 20 m in diameter, is still unknown. Hundreds of them have been recently found off Cap Corse (Western Mediterranean Sea) in the mesophotic zone at ca 120-m depth. These rings typically show a concentric structure with a central coralligenous core surrounded by a circular halo of sediments limited by an external crown of rhodoliths. In this study, we characterized the ecology of coralligenous rings by investigating the biodiversity and ecosystem functioning in the different rings. Sediment samples were collected from the cores, halos, and crowns of different rings as well as from control sites outside of rings in two different campaigns in summer 2021 and 2023. Laboratory analyses included the biochemical composition of the sediment organic matter, the exoenzymatic activities, the quantification of viral, prokaryotic, and meiofaunal abundances, and the investigation of microbial community structure and function through metagenomic assembling. Preliminary results on the mesophotic rings highlighted the presence of microbial diversity patterns associated to the different structures of the rings and to the differentiation of organic matter quality.