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Rhodolith Beds Heterogeneity along the Apulian Continental Shelf (Mediterranean Sea)

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Abstract: Rhodolith beds represent a key habitat worldwide, from tropical to polar ecosystems. Despite this habitat is considered a hotspot of biodiversity, providing a suite of ecosystem goods and services, still scarce quantitative information is available thus far about rhodolith beds occurrence and ecological role, especially in the Mediterranean Sea. This study reports the composition and patterns of distribution of rhodolith assemblages found in four study areas along ca. 860 km of coast in the Central Mediterranean Sea. These rhodolith beds were studied for the first time and significant differences at all spatial scales have been highlighted, documenting the high variability of this habitat. Rhodolith species composition, morphology and distribution have been discussed considering the potential role of environmental factors in driving these patterns. The need for improving their protection is discussed to complement present conservation and management initiatives, particularly in the frame of the EU Marine Strategy Framework Directive.

Keywords: rhodolith bed; maërl; coralline algae; rhodophyta; habitat mapping; biogenic habitats; conservation; Marine Strategy; Mediterranean Sea

1. Introduction

Human activities largely affect natural systems, but their cumulative effects on ecological communities remains largely unknown [1]. A low diversity of species can affect ecosystems sensitivity to multiple stressors and enhance the impacts on ecosystem functioning [2]. For this reason, understanding patterns of distribution of species, communities and habitats is a priority to tease apart natural patterns from those driven by human disturbances [3]. Biodiversity in marine ecosystems is related to habitat heterogeneity [4], which is enhanced by ecosystem engineers, i.e., organisms that modify, maintain or destroy habitats [5–7]. Rhodolith-forming algae grow as unattached nodules, often acting as ecosystem engineers and forming aggregations known as Rhodolith Beds (RBs) on flat or gently-sloped seabed [5,6,8]. RBs provide habitat for several associated species from the tropics to polar latitudes [6,9–12], as well as a suite of ecosystem goods and services whose economic importance