



FEATURE ARTICLE

Geographic distance, water circulation and environmental conditions shape the biodiversity of Mediterranean rocky coasts

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ABSTRACT: Ecological connectivity is important for effective marine planning and biodiversity conservation. Our aim was to identify factors important in influencing variation in benthic community structure on shallow rocky reefs in 2 regions of the Mediterranean Sea with contrasting oceanographic regimes. We assessed beta (β) diversity at 146 sites in the littoral and shallow sublittoral from the Adriatic/Ionian Seas (eastern region) and Ligurian/Tyrrhenian Seas (western region) using a null modelling approach to account for variation in species richness. The distance decay relationship between species turnover within each region and geographic distance by sea was determined using generalised linear models. Mantel tests were used to examine correlations between β diversity and connectivity by ocean currents, estimated from Lagrangian dispersal simulations. Variation in β diversity between sites was partitioned according to environmental and spatial components using a distance-based redundancy approach. Species turnover along a gradient of geographic distance was greater by a factor of 3 to 5 in the western region than the eastern region, suggesting lower connectivity between sites. β diversity was correlated with connectivity by ocean currents at both depths in the eastern region but not in the western region. The influ-



Diverse benthic assemblages on a shallow Mediterranean reef.

Photo: Lisandro Benedetti-Cecchi

ence of spatial and environmental predictors of β diversity varied considerably between regions, but was similar between depths. Our results highlight the interaction of oceanographic, spatial and environmental processes influencing benthic marine β diversity. Persistent currents in the eastern region may be responsible for lower observed β diversity compared to the western region, where patterns of water circulation are more variable.

KEY WORDS: Beta diversity · Reefs · Spatial variation · MPA · Lagrangian modelling · Connectivity

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