Analysis of morphological characteristics of rhodoliths as indicator of habitat complexity and fishing effects

Carmen Barbera[a], Natalia Comalada[b], Sergi Joher[b], Maria Valls[a], Marta Díaz-Valdés[a], Joan Moranta[a]

Rhodoliths are unattached coralline red algae that roll on the seafloor and adopt spherical and/or branching morphologies. At high densities, these free-living algae form rhodolith or maërl beds, which constitute communities of high diversity in Mediterranean Sea which can be severally damaged by fishing activities. In the present study, we analyzed the morphological characteristics of rhodoliths as potential indicators of habitat complexity and fishing disturbance caused by bottom trawling.

The study was carrying out in Menorca Channel, where maërl beds cover more than 50% of continental platform between 50-100 m depth. Changes in rhodoliths morphology and size structure were tested analyzing the relationships with habitat complexity, comparing habitats with different structure (sand, maërl beds and soft algae beds) and comparing locations with different level of fishing pressure. Epibenthonic algae were sampled using a beam trawl of 2m width. A subsample of approximately 100 randomly chosen rhodoliths was photographed, identified and classified in different morphotypes. Measures of these rhodoliths (length of axes, diameter, perimeter, area, aspect and roundness) were obtained applying image analysis. Fishing pressure in maërl beds was defined from satellite-based Vessel Monitoring System data, defined as percentage of trawled area per year in the selected locations.

Morphotypes composition was notably different between habitats but was not significantly different between the different levels of trawling intensity in maërl beds. Size and morphological parameters were different between habitats and locations with different trawling effort, but only for the most abundant species, *Spongites fruticulosus* and *Lithotamnium coralloides.* Diverse factors may affect the growth rate and morphology of the maërl species: light, nutrients, temperature, hydrodynamic, and species composition. The results of the present study showed that changes in size and morphology of deep-water rhodoliths in this area are better explained by the current velocity, depth and rhodoliths coverage more than the trawling intensity. However, the results also suggest that the reduction of the complexity of size and morphologic structure could be related with the incipient effects of fishing intensity in an area where the fishing impact were not detected by changes in algal biomass and mega-faunal species composition.

[1]*Instituto Español de Oceanografía, Centre Oceanogràfic de les Balears, Moll de Ponent s/n, 07015 Palma, (carmen.barbera@ba.ieo.es).*
[2]*Universitat de Girona, Departament de Ciències Ambientals. Facultat de Ciències, Campus Montilivi, 17071 Girona*