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What do benthic macrofauna tell us about the environmental state of marine and tourist ports?

Federica Nasi¹, Larissa Ferrante¹, Rocco Auriemma¹, Federica Relitti¹, Matteo Bazzaro¹, Carmela Vaccaro², Tamara Cibic¹

¹National Institute of Oceanography and Applied Geophysics - OGS, Italy. ²Università of Ferrara, Italy

Abstract

In semi-enclosed basins, such as ports, the effects of point source and synergistic forms of contamination are emphasized. The effects of human pressure on benthic macrofaunal assemblages inhabiting marinas and tourist ports have been seldom studied, especially in the western part of the Adriatic Sea. In the framework of the project ECOMAP, in July 2019, we investigated the macrofaunal communities in two tourist ports, namely Spinut and Podstrana (Croatia). The macrofaunal abundance, diversity indices and species composition were used to evaluate the ecological status of both marinas. In each marina, sediments were sampled at five stations positioned considering the morphology of the basins (i.e. confinement gradient) and the surrounding human activities (shipyard and boathouse areas). The macrofaunal features were related to sediment physical-chemical variables (grain-size, Organic Carbon-OC, Total Nitrogen –TN and heavy metals). Both marinas were characterized by muddy sediments in their inner part, and higher sand contents at the main port entrances. Sediments in Podstrana displayed slightly higher contents of OC compared to Spinut (12.8 ± 6.6 and 11.2 ± 2.9 mgC g⁻¹, respectively). In both marinas we observed higher diversity at the main entrances than at the inner sites. Overall, the macrofaunal communities were characterized by the dominance of marine/estuarine species (e.g. the polychaete *Heteromastus filiformis* and the bivalve *Abra prismatica*). In Spinut, we observed an impoverished community nearby the boathouse area. In fact, this long-lasting activity deeply modified the sediment characteristics (we observed e.g. pieces of antifouling coating), leading to poor environmental conditions. This study indicates that the inclusion of macrofaunal community features in monitoring plans could help local managers of ports and marinas design site-specific environmental interventions to mitigate anthropogenic disturbances.

Keywords

macrofauna, tourist ports, human pressure, biodiversity