MULTISCALE VARIABILITY OF AMPHIPOD ASSEMBLAGES IN POSIDONIA OCEANICA MEADOWS: A COMPARISON BETWEEN DIFFERENT PROTECTION LEVELS

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Summary: Despite rapid expansion of marine protected areas (MPAs) in the Mediterranean Sea, very few studies have addressed small vagile macrozoobenthos responses to protection. Using a hierarchical sampling design spanning four orders of magnitude, we investigated whether the Tavolara-Punta Coda Cavallo MPA (Italy) affects amphipod populations associated to Posidonia oceanica meadows. This study reports spatial and temporal variability patterns of amphipod assemblages in four different protection levels and discusses potential confounding effects, in particular meadow features. The structure of amphipod assemblages was patchy at all spatial scales, but differed markedly among protection levels. The multiscale analyses also revealed lower densities and/or biomasses of several frequent taxa within the fully protected area and outside the MPA compared to partially protected areas. Meadow features account only for a low proportion of the amphipod variability. Factors likely to explain these patterns are probably multiple and may include processes dependent of protection, but also ecological traits of amphipod species (dispersion capabilities and recruitment variability). We support the hypothesis that amphipods seemed to be affected essentially by severe natural and anthropogenic disturbances. Fish predation may be a dominant regulating force of amphipod populations within the fully protected area, whereas point and diffuse water pollutions may greatly reduce several populations in the unprotected study area. Long term multiscale spatial and temporal monitoring of small macrozoobenthos assemblages (notably in P. oceanica meadows), as well as experimental manipulations (e.g. exclusion and inclusion cages), are imperatively needed to better understand potential effects of protection on macrozoobenthos in Mediterranean MPAs.

Keywords: marine protected area, seagrass, heterogeneity, macrozoobenthos, fish predation