

Linking water column perturbations to soft-bottom biological element descriptors: the response of macroinvertebrates

M. Pinna, I. Rosati, G. Marini, F. Vignes, M. Renzi, A. Basset

Department of Biological and Environmental Sciences and Technologies,
University of the Salento, SP Lecce-Monteroni, 73100 Lecce, Italy

E-mail: maurizio.pinna@unisalento.it

Mediterranean lagoons are exposed to natural and anthropogenic disturbances, and the most unlikely conditions are the dystrophic and hypoxic events. These events determine dis-equilibrium conditions along temporal and spatial scales, which are linked to metabolism and life cycle of the biotic components. In summer 2008, Lesina lagoon (SE Italian coastline) was interested by a geographically localized dystrophic crisis which affected up to 8% of the total lagoon surface.

Temporal dynamics of principal descriptors of abiotic (water, sediment) and biotic (phytoplankton, benthic macroinvertebrate) compartments have been followed during the 2008 by collecting data inside stressed and control lagoon areas before a dystrophic event and in the six months after the dystrophic event. The aim of the study was to analyse the pathways of ecosystem responses to dystrophic stress, searching for the characteristic scales of ecosystem compartment resistance and resilience. The characteristic time-scale of abiotic and biotic component time responses varied from days, for the selected markers of the water column, to year, for the benthic ones. Short-term biotic and abiotic responses in the water column were strongly coupled while biotic and abiotic responses at the sediment level were remarkably un-coupled. Dynamics and recovery time of water column and benthic components do not match in Lesina following the dystrophic crisis, highlighting an intrinsic individualistic behavior within the lagoon community driving ecosystem processes and ecosystem level responses. Taxonomic and non-taxonomic descriptors of benthic macroinvertebrates showed different response patterns as early warning signals and overall resilience. The emphasized differences in the stability components, i.e., resistance and resilience, of water column and sediment abiotic and biotic characteristics as well as of taxonomic and non-taxonomic descriptors has key implication in planning monitoring strategies and programs for transitional waters in the Mediterranean EcoRegion