

Écologie / Ecology

Structure et bioévaluation de l'état écologique des communautés benthiques d'un écosystème lagunaire de la côte atlantique marocaine

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Résumé

La lagune de Merja Zerga est un écosystème semi-fermé, qui fait l'objet de nombreux usages. Les habitats sédimentaires de cet écosystème ont été caractérisés et un état de référence de la qualité et de la santé de leurs peuplements macrozoobenthiques a été établi. L'inventaire faunistique révèle une diversité taxonomique de 147 taxons, à la base d'une grande diversité fonctionnelle. L'organisation trophique est conditionnée par un nombre restreint d'espèces qui dominent quantitativement, le bivalve suspensivore *Cerastoderma edule* et le bivalve dépositivore de surface *Scrobicularia plana*. Les microbrouleurs et les herbivores sont peu abondants. Le calcul des indices biotiques qualifie le site de légèrement perturbé, avec des peuplements benthiques déséquilibrés. Cependant, le système est stable à l'échelle saisonnière en termes de richesse spécifique et d'abondances, ainsi qu'au niveau des indices biotiques. **Pour citer cet article : H. Bazairi et al., C. R. Biologies 328 (2005).**

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Abstract

Structure and bioassessment of benthic communities of a lagoonal ecosystem of the Atlantic Moroccan coast. The Merja Zerga lagoon is a semi-enclosed marine ecosystem in which various types of human activities have been developed. This paper characterizes the biosedimentary units of the lagoon and defines a reference status of the quality and health of the macrozoobenthic communities that can be used as bioindicators of the quality of the global marine environment. Specific and functional diversity were high: 147 taxa were identified; they were distributed within seven main trophic groups. Trophic structure is dominated by the suspension-feeding bivalve *Cerastoderma edule* and the deposit-feeding bivalve *Scrobicularia plana*, while micrograzers and macroherbivores remain low. Biotic index values indicated that the site is moderately perturbed and that the benthic communities are unbalanced. Nevertheless, the communities showed a seasonal stability of abundances and a high specific richness all through the year. **To cite this article: H. Bazairi et al., C. R. Biologies 328 (2005).**

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Keywords: Coastal lagoon; Sedimentary habitats; Macrozoobenthos; Biodiversity; Ecological quality; Morocco

Abridged English version

Coastal lagoons are considered to be highly productive ecosystems, but are vulnerable to human disturbance as a result of their semi-enclosed situation and their proximity of the sources of terrestrial effluents. Monitoring surveys are therefore necessary to implement effective management and conservation measures. The Merja Zerga lagoon, located on the Moroccan Atlantic coast, is an example of this type of vulnerable ecosystem concerning a number of environmental issues that have been raised recently. The aim of this study was to assess the quality and the health of the ecosystem using the benthic macrofauna as a bioindicator. Two complementary approaches, based on ecological groups of species, were used here: etho-trophic groups to assess the functional biodiversity and species grouped according to their sensibility to organic enrichment (ecological groups) in order to estimate the intensity of perturbation of these communities. The study involved seasonal sampling in both intertidal and subtidal zones over one year. Sands, muddy sands and sandy muds were the three dominant sedimentary habitats in the lagoon. Among the 147 taxa sampled, most of them were identified to the species level. Eighty-six percent of these species were newly recorded for the site. The sedimentary habitats of the subtidal zone were more diversified than the intertidal, which is an original feature for this type of lagoonal environment. The macrofaunal assemblages were more diversified and structured in sandy muds habitats, both in intertidal and subtidal zones. All the trophic group types were present in the lagoon, but suspension and surface deposit feeders dominated all through the year. Within these two groups, the Bivalves *Cerastoderma edule* and *Scrobicularia plana*, respectively, were the most abundant species. The specific diversity within one trophic group is considered to be a good indicator of the potential resilience of the system.

In this study, only species that were both dominant and common were considered; this avoids taking into account the occasional marine species which are unable to develop permanent populations because they are not adapted to estuarine conditions. In Merja Zerga, the number of dominant and common species grouped by trophic guilds showed that the trophic organization of the benthic fauna was dominated by only a few species.

Such a feature is a global characteristic of lagoonal communities, which leads to their consideration as perturbed. The reduced representation of the micrograzers and the herbivores could be a weak point of the ecosystem, especially in the case of eutrophication. The disturbance of the macrobenthic assemblages was performed using biotic indices where the Hily (1984) and Borja et al. (2002) models were tested. This study was the occasion to compare these two methods in an Atlantic ecosystem located in a Southern area of the Gibraltar straight. At Merja Zerga, the two models gave the same results. No heavy pollution was identified. The values recorded in biotic indices ($Ambi = 2$) did not showed seasonality, and the opportunistic species remained at low densities all the year round: consequently the Merja Zerga lagoon can be considered as unbalanced. The values of the biotic indices recorded and the dominance of the ecological group III under natural unbalanced conditions could be characteristic of lagoonal communities, in which species must be tolerant to large variations of environmental factors, including organic matter in the sediment. The results suggest that a combined approach analysing both the variability of the relative dominance of the ecological groups and the BC and Ambi indexes could give the best evaluation of the quality of the benthic community, and in particular when surveying the temporal evolution. However, further work is needed to adjust the position of some lagoonal brackish species with the different ecological groups.

Moreover, the benthic macrofauna survey in the Merja Zerga lagoon shows that the trophic-group analyses are useful to understand the structure and the variability and could be a complementary approach for the biotic indexes, being able to identify the weak points of the community structures. These groups are good indicators of the functional diversity. By crossing the two approaches in the Merja Zerga lagoon, it can be deduced that the benthic ecosystem is of a satisfying quality, despite the human activities.

1. Introduction

Les lagunes côtières occupent 13% de la zone côtière du globe et subissent des influences d'origines na-

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