Nematodes and macrofauna communities associated with different recovery stages of *Zostera noltii* beds in an estuarine system

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ABSTRACT

Seagrass beds are one of the most productive marine ecosystems, providing services, such as food source, shelter areas and nursery habitats for a variety of species. These ecosystems are efficient carbon fixators fueling the food webs, while regulators of the carbon cycle and sea floor stabilizers. However, numerous reports of their decline worldwide indicate that seagrass habitats are undergoing a global crisis with important consequences for coastal biodiversity, environmental status and economy, raising concern towards its conservation.

In the last decades, unprecedented decline of *Zostera noltii* meadows has been reported for Portuguese estuaries and particularly for the Mira estuary (SW Portugal). After a complete disappearance of *Z. noltii* in the Mira estuary in 2008, early symptoms of a natural recovery were observed, characterized by growth pulses with an irregular spatial and temporal distribution of small-sized seagrass patches. This study was designed to investigate the response of nematodes and macrofauna communities to different stages of recovery of *Z. noltii*. Four areas under different stages of development/recovery (from low and sparse *Z. noltii* distribution - stage 1- to a dense coverage - stage 4) were selected. Macrofauna and nematodes were sampled simultaneously and the relationship between community structure and *Z. noltii* coverage, photosynthetic efficiency and sediment physico-chemical characteristics was examined.

Different nematode and macrofauna communities were associated to stages 1 and 4, while communities associated to the intermediate stages were not so easily distinguished from each other. Although infauna communities and *Z. noltii* coverage followed similar distribution patterns, sediment grain size and nutrients were the main factors related to the benthic community structure, superimposing its contribution to that of *Z.noltii* descriptors. Therefore, in spite of the recognized importance of seagrass beds as service and goods provider, it seems that *Zostera noltii* distribution presents an indirect impact on the nematode and macrofauna communities.