
Microphytobenthos spatial distribution around oyster reefs: a remote sensing approach

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Résumé

Interest in the role of benthic microalgae and cyanobacteria assemblages – commonly referred to as microphytobenthos (MPB) – within intertidal mudflat ecosystems has increased during the last decade. In aquaculture-dominated ecosystems, they can represent the main food resource for many organisms (e.g. shellfish); however feedback processes between macrofauna communities and MPB are poorly known. In this study, we investigated the hypothesis of a top-down control between MPB and oyster communities in Bourgneuf Bay (Atlantic coast, France). Emphasis was placed upon the analysis of a Before After Control Impact experiment, which consisted in the removal of oysters from a natural reef. MPB spatial distribution and response to the experiment were analysed using satellite remote sensing. High spatial resolution (30m) time-series were built using Landsat and SPOT multi-sensor data (1985-2015). Using the Normalized Difference Vegetation Index as a proxy of chlorophyll a concentration, it was analysed to 1) characterize MPB seasonal variability and 2) estimate the impact of oyster removal on the spatial distribution of surrounding MPB biofilm. MPB showed marked seasonal variations with higher NDVI during spring and fall, in accordance with other studies on European mudflats. MPB biomass was generally higher around oyster reefs, forming clearly identified patches. However, MPB biomass around the reef where oysters were removed was significantly lower after the perturbation compared to a control reef. A few months after the experiment, MPB spatial distribution was also altered, therefore strengthening the hypothesis of the influence of oyster reefs on MPB development.

Mots-Clés: Microphytobenthos, remote sensing, oysters, NDVI, spatial distribution, benthic microalgae, BACI, time series

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