

SPATIO-TEMPORAL DIVERSITY OF MICROPHYTOBENTHOS IN THE LOIRE ESTUARY

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This study investigates the spatio-temporal variability of benthic microalgal assemblages in a macrotidal estuary of the European Atlantic coast. Intertidal sediments are colonized by photosynthetic microorganisms grouped under the generic term of microphytobenthos. They form transient biofilms at the sediment surface at low tide and play two major roles, representing up to 50% of the total primary production of estuarine waters and contributing to the stabilization of sediments by exopolysaccharide secretion. However, the spatio-temporal variations of the microphytobenthos biofilm composition has received much less attention in estuaries compared to coastal areas. In this work, we studied the spatio-temporal variability of biofilms specific diversity, collected on mudflats in the poly- (16 to 30 psu) and mesohaline (5 to 15 psu) regions of the Loire Estuary, France, every month from January 2011 to January 2012. The top surface 2-mm sediment was collected using the contact core method. After the removal of the microalgae from the sediment particles using the LUDOX separation technique, the identification and enumeration were performed using light microscopy coupled with scanning electron microscopy.

Observations in light microscopy revealed that the major part of the microalgal taxa belonged to diatoms, while chlorophytes and euglenids were only observed during summer. Forty diatom taxa have been identified so far, belonging to the Coscinodiscophyceae, Fragilariophyceae and Bacillariophyceae. The greatest species richness was recorded in the mesohaline mudflats, whereas in the polyhaline region, the surface sediments had the lowest diversity, with a marked decreasing gradient toward the mouth of the estuary. Dominant taxa throughout this study are epipellic microphytobenthic diatoms (moving cells) with a size <30 µm. This study also confirmed the occurrence of typical mesohaline diatom taxa, such as *Navicula spartinetensis* Sullivan et Reimer, while other marine taxa have not been recorded from adjacent coastal environment, e.g., *Navicula phyllepta* Kützing. An important proportion of small centric pelagic diatoms, such as *Thalassiosira decipiens* (Grunow) Jørgensen, *Odontella aurita* (Lyngbye) Agardh or *Cyclotella meneghiniana* Kützing, were commonly observed for all sites, as a result of strong deposition of suspended particles over the mudflats.