

The role of abiotic and biotic environmental factors in shaping epiphyton on common reed in shallow, hydrologically transformed, temperate lakes

Epiphytic algae are an important group of organisms involved in primary productivity, nutrient cycling, and energy transfer in littoral food webs. However, multifactorial studies conducted on epiphyton on the same substrate across a spectrum of environmental parameters are very limited. Here, we present first complex field study on the role of abiotic and biotic factors in shaping the species richness, diversity, abundance, and biomass composition of epiphyton on common reed in four shallow lakes with different trophic status, water and fish management, and the abundance and structure of potential algal grazers: littoral crustaceans and fish. The obtained results revealed that the algal taxa richness was the lowest in the hypertrophic lake and the highest in the meso-eutrophic lake. Epiphyton abundance (predominated by pennate diatoms) and biomass were found to be the highest in eutrophic water bodies. Biomass consisted primarily of diatoms, but we found the seasonal predominance of filamentous Chlorophyta (in the eutrophic lakes) and Chlorophyceae (in the meso-eutrophic lake). Redundancy analysis (RDA) showed that the frequency of water level fluctuations was the most significant variable in the composition of epiphyton. RDA also revealed the importance of grazing pressure of fish. Thus, in hydrologically transformed lakes, man-made factors may be of great relevance in the development of epiphytic algae.

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Obtenir le document : EDP Sciences

Mots clés : Epiphyton abundance, biomass, diversity, algal grazers, TSI index, Abondance de l'épiphyton, biomasse, diversité, brouteurs d'algues, index TSI

Date : 2018-03-27

Format : text/xml

Source : <https://doi.org/10.1051/kmae/2018005>

Langue : Anglais

Télécharger les documents : <https://www.kmae-journal.org/10.1051/kmae/2018005/pdf>

Permalien : <https://www.documentation.eauetbiodiversite.fr/notice/the-role-of-abiotic-and-biotic-environmental-factors-in-shaping-epiphyton-on-common-reed-in-shallow-0>

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