

Biodiversity associated to a floating wetland island in a freshwater pond

C.S.C. Calheiros^{1*}, M. Ilarri¹, M. Godinho², P.M.L. Castro², S.I.A. Pereira²

¹Interdisciplinary Centre of Marine and Environmental Research (CIIMAR/CIMAR), University of Porto, Novo Edifício do Terminal de Cruzeiros do Porto de Leixões, Avenida General Norton de Matos, S/N, 4450-208 Matosinhos, Portugal

²CBQF—Centro de Biotecnologia e Química Fina—Laboratório Associado, Escola Superior de Biotecnologia, Universidade Católica Portuguesa, Rua Diogo Botelho 1327, 4169-005 Porto, Portugal

*Corresponding author: cristina@calheiros.org

ABSTRACT

Floating wetland islands (FWI) are considered nature-based solutions that can be applied in different water bodies, such as lakes and rivers, in order to deliver a wide range of ecosystem services. They are recognized to promote local biodiversity, aesthetic integration and provide water quality enhancement through phytoremediation processes, although research is still needed to go deeper on the processes underlying the performance of these systems.

The aim of this study was to assess the biodiversity associated to a FWI made of cork agglomerate, set up in 2018 in a freshwater pond. A polyculture comprising the plant species *Iris germanica*, *Acorus gramineus*, *Caltha palustris*, and *Typha latifolia* was considered.

The culturable bacterial communities associated to the floating platform biofilm and to the plant rhizosphere were analyzed. The bacterial isolates were identified by 16S rRNA and characterized for their ability to produce plant growth promoting substances (e.g., indole-acetic acid, siderophores). The diversity of macroinvertebrates associated to FWI was also assessed. Water analysis of the pond were conducted. Preliminary data shows that there is a high bacterial diversity associated to this system and the ability to produce plant growth promoting substances has been shown. The bacterial strains with outstanding growth promoting traits can be used in the future to support phytoremediation strategies or plant resilience to climate change abiotic stresses. Regarding the biodiversity of macroinvertebrates associated with FWI they were mainly from the order Odonata. The FWI attracted mainly individuals of the genus *Coenagrion* (represented more than 80% of the fauna).

These systems had proven to be a hotspot of biodiversity supporting water management plans and landscape and aesthetics integration. This study gives new insights into broadening the FWI applications in freshwater or polluted water.

Keywords: nature-based solutions, water management, plant growth promoting bacteria, phytoremediation, macroinvertebrates

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