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The Experimental Mesocosm Platform at Murighiol (Danube Delta, Romania)

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Abstract: In the context of climate change and increasing eutrophication in aquatic ecosystems, the use of mesocosms as research tools is essential. The mesocosm platform established at the Murighiol Hub is designed to investigate the synergistic effects of these phenomena on shallow lakes in the Danube Delta. Mesocosms are semi-controlled systems that allow for the simulation of natural conditions and hypothesis testing under realistic yet controlled environments. The platform includes 24 cylindrical tanks, stratified in structure and made from resin reinforced with fiberglass. These are equipped with multiparameter sensors and heating/thermostat systems to simulate various climate scenarios. Each group of three tanks contains a reference tank (natural temperature) and two tanks with regulated temperatures. Experiments will assess the effects of eutrophication, global warming, and trophic web biomanipulation on ecosystem components (e.g., phytoplankton, zooplankton, macrophytes, and benthic invertebrates, respectively). This setup allows for real-time monitoring of physico-chemical variables (e.g., pH, oxygen, conductivity, and nutrients) and the collection of high-resolution data essential for ecological modeling and adaptive management strategies. The Murighiol platform provides an innovative framework for applied aquatic ecosystem research, significantly contributing to the understanding and conservation of biodiversity in the Danube Delta.

Keywords: Mesocosms; Murighiol Hub; Eutrophication & Warming; Ecosystem Experiments; High-Resolution Monitoring

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