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Marine and coastal vegetation may act as barriers for microplastics

Marine and coastal vegetated ecosystems such as seagrass meadows, macroalgae beds, saltmarshes or mangroves can act as potential barriers for microplastics. These fragile ecosystems should be considered priority habitats for assessing microplastic exposure and impact on coastal areas.

Microplastics (particles less than 5mm) are probably the most abundant plastic debris polluting our oceans. They impact every level of marine food chains and contribute to environmental damage by releasing their harmful chemical additives into the environment. To combat the negative effects of these particles, it is vital to understand how they behave in marine and coastal environments.

A new study by researchers from Portugal, Sweden and Norway is the first to demonstrate, under experimental conditions, that marine and coastal vegetated ecosystems can act as potential barriers for microplastics. The research was supported by a Transnational Access grant from the EU Horizon 2020 project, ASSEMBLE Plus.

The researchers created a model coastal habitat using a species of seagrass, *Zostera marina* as the vegetation and different types of industrial pellets to represent particles of microplastics.

"Our goal was to identify which type of microplastics are most likely to be trapped in seagrass meadows, which seagrass densities are more likely to retain microplastics, and under which hydrodynamical conditions (flow velocity) trapping is more likely to occur", explains researcher Eduardo Infantes from the University of Gothenburg.

The results showed that the model seagrass habitat can retain microplastic particles, but the amount of particles retained depends on the tested densities and flow velocity.

As lead author, Carmen Santos, from the Centre of Marine Sciences (CCMAR) in the Algarve highlighted: *"these ecosystems can retain particles and this capacity of retention is higher when the canopies are very dense and the velocity of the currents is low, yet it varies with the type of microplastic polymer".*

The results add to previous findings from a CCMAR research team which demonstrated that the plastic particle size, specific vegetation type and the tidal position all influence the amount of macro and microplastics that accumulate in natural habitats.

Published in the scientific journal, *Environmental Pollution,* the new results provide the first experimental evidence that marine and coastal vegetated ecosystems can act as natural filters to help trap microplastics and therefore decrease the concentration of microplastics in open water. At the same time, high concentrations of microplastics within seagrass meadows and other aquatic canopy-forming ecosystems such as saltmarshes and mangroves can pose dangers to the many creatures that depend on these fragile habitats.

The researchers highlight the need for environmental protection and conservation agencies to prioritise these vegetated habitats when assessing the impact of microplastics and developing strategies for preventing, controlling and removing microplastics from aquatic environments.

Fig 1 – Seagrass under controlled bio-physical conditions in a hydraulic flume.

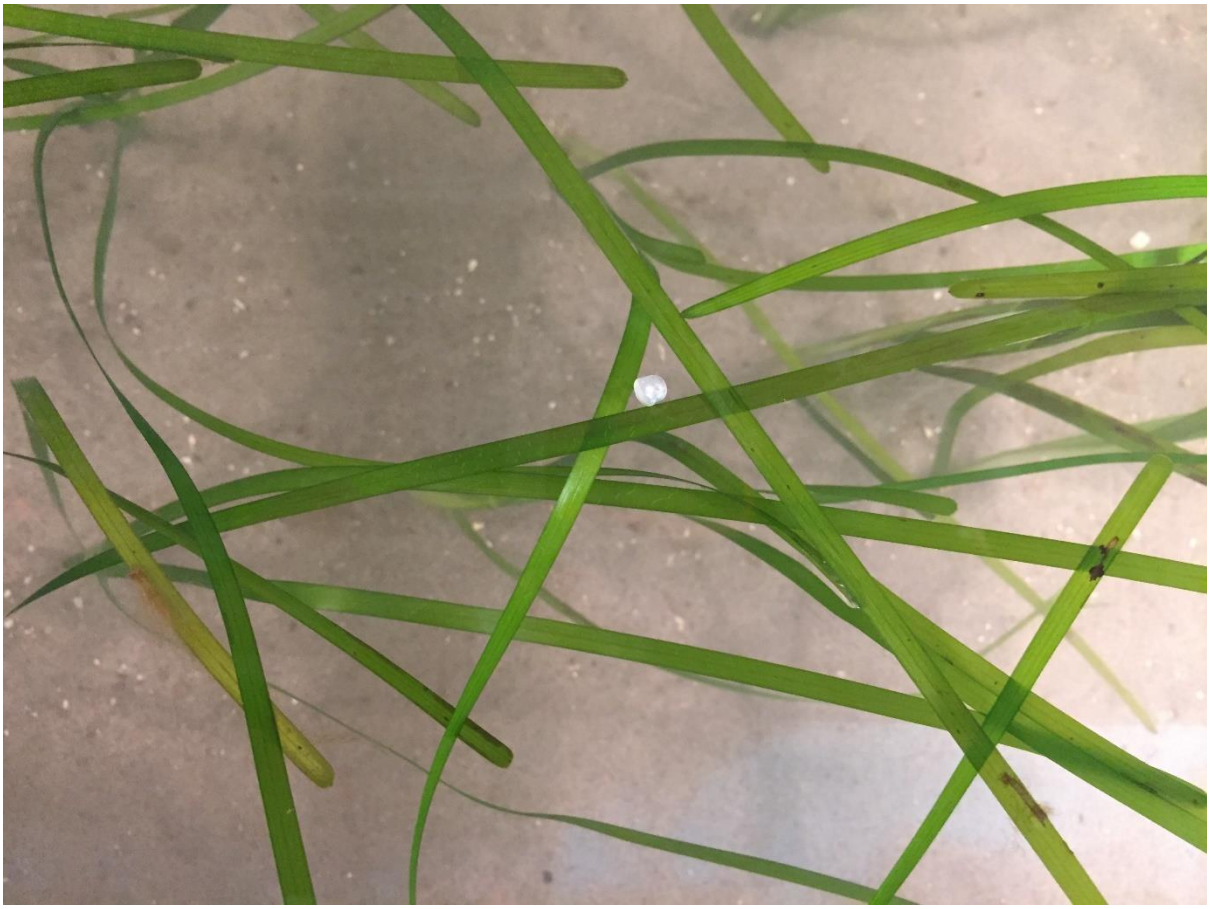

Fig 2 - Microplastic particles that were trapped on the surface of the seagrass meadow.

Notes for editors.

Full paper

de los Santos, Carmen B., Krång, Anna-Sara, Infantes, Eduardo (2021). **Microplastic retention by marine vegetated canopies: Simulations with seagrass meadows in a hydraulic flume.** *Environmental Pollution* (269), https://doi.org/10.1016/j.envpol.2020.116050

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The Centre of Marine Sciences – CCMAR - is one of the foremost marine science research centres in Portugal. CCMAR is an independent non-profit research organization within the University of the Algarve system and has the Portuguese Institute for Sea and Atmosphere (IPMA) as a strategic partner. Promotes multidisciplinary research and education related with the marine environment, with emphasis on the processes of environmental change that affect marine ecosystems. For more information visit https://www.ccmar.ualg.pt/en

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