

Biodiversity of the fouling community on two plastic types on a sedimentary benthic and in the pelagic habitat in the Mediterranean Sea

Bachelor Thesis

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Abstract

For several decades the marine environment is facing an increasing amount of plastic litter. As every other unprotected surface plastic litter gets fouled and provides a new substrate for the majority of benthic species. Knowledge of fouling processes and the respective communities are important to evaluate the ecological impact of fouling on plastic litter. In this study plastic bags made of conventional Polyethylene and a biodegradable MaterBi® polymer were exposed on a sedimentary benthic and in the pelagic habitat in the Tyrrhenian Sea for the period of one year. Samples were retrieved every three to four months and the respective fouling community was analysed using three different methods of identification. Overall 71 taxa belonging to 10 different phyla could be identified. Bacillariophyceae, Foraminifera, Nematoda and Bryozoa were the most abundant groups of fouling organisms, forming a functional micro habitat. Several biodiversity indices were calculated including the Shannon-Index, abundance, richness and evenness. The biodiversity increased over the period of one year in with a peak in April after 9.5 months. There was no significant difference between both polymer types. The abundance and richness of fouling organisms however showed significant differences between the pelagic and benthic habitat. The fouling community showed successional as well as seasonal patterns regarding the taxa composition and the respective densities. The results of the present study indicate a similar fouling community on distinct artificial surfaces such as different plastic types as well as biodegradable polymers. The comparison to results of related studies suggests the presence of a nearly cosmopolitical fouling community.

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Prof. Dr. Jana Petermann,
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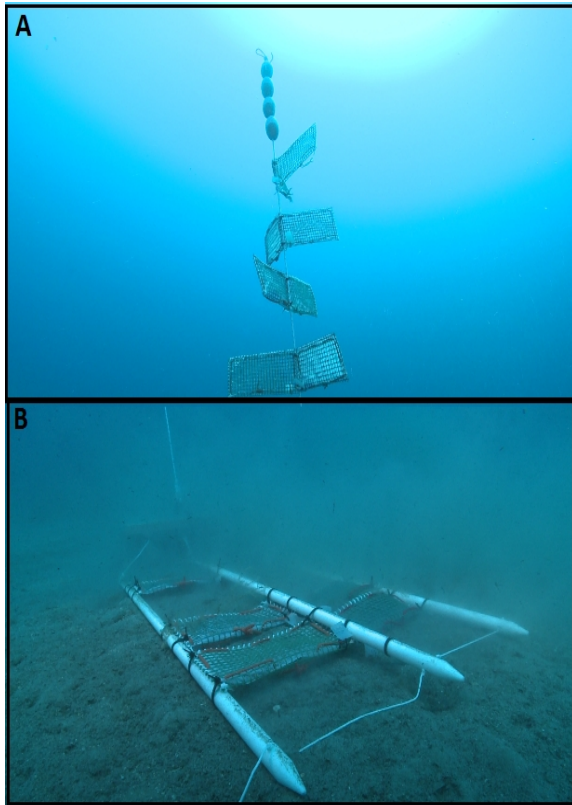


Figure 1: Experimental set-up *in situ*. A: Pelagic samples in the water column at 25m depth. B: Benthic samples on the sediment floor at 36m depth. © HYDRA/C.Lott

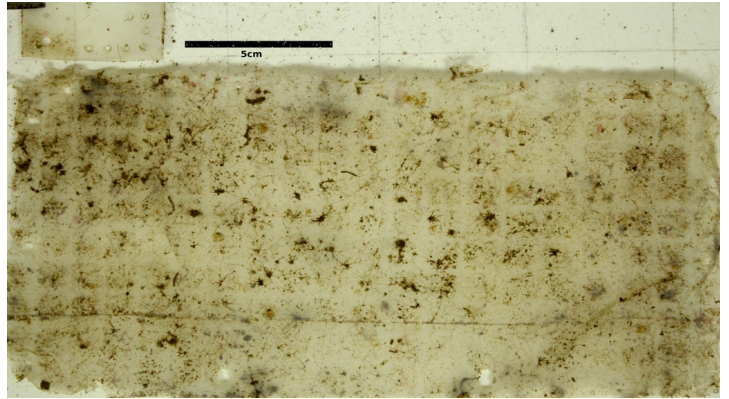


Figure 2: A pelagic MaterBi® sample. The fouling layer is clearly visible after 5.5 months of exposure. © HYDRA/N-Ch. Pauli

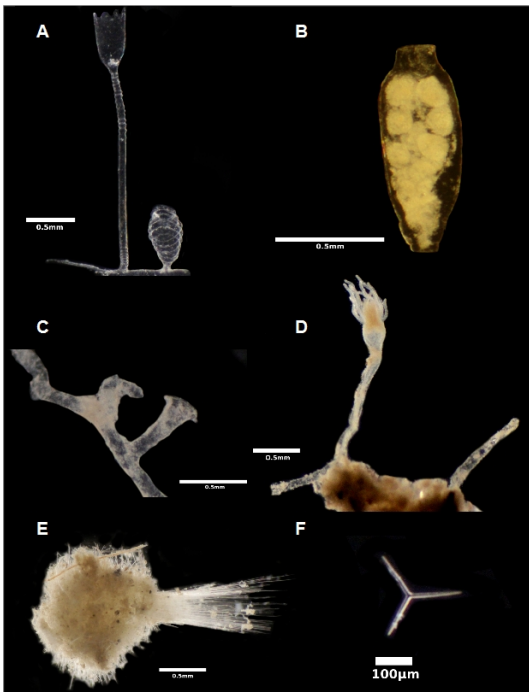


Figure 3: Selection of Cnidarians and Porifera identified on the samples: A *Clytia* sp., B Gonophore of *Clytia* sp., C Hebellidae, D Anthoathecata, E *Sycon* sp., F Spicule of cf. *Calcareia*. © HYDRA/N-Ch. Pauli

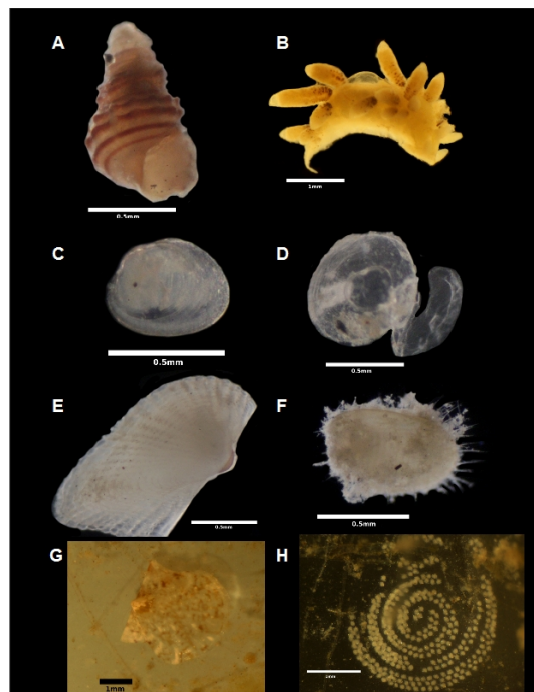


Figure 4: Selection of Molluscs identified on the samples: A *Bittium* sp., B *Cuthona genovae*, C *Musculus* sp., D *Anomia* sp., E Noetiidae, F Limoida, G *Flexopecten* sp., H Clutch of eggs. © HYDRA/N-Ch. Pauli