

Hitch-hikers on marine debris: understanding new arrivals in an offshore island

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The accumulation of debris in the ocean is severely affecting ocean and coastal ecosystems, as its' ingestion and entanglement directly impacts marine life. Furthermore, recent research indicates that marine debris is a growing vector for both the introduction of non-indigenous species (NIS), with transoceanic rafting already likely intensifying species invasions worldwide, and also a potential cause of marine diseases, whereby plastic waste in the oceans promotes microbial colonization and transmission of pathogens. In this context and in the framework of CleanAtlantic, an Interreg Atlantic Area funded project, we recently initiated a research program to evaluate marine debris as a possible vector for introduction of NIS to Madeira Island (NE Atlantic) by engaging and establishing a cooperation protocol with stakeholders (e.g. fishermen, dive operators and whale and bird watching companies). While at sea, stakeholders photograph and record the GPS position of detected objects, and collect them for later analysis. Once ashore these items are transferred to the laboratory for classification, measuring and for biological sampling. The origin of detected items is then estimated based upon: i) Biological signature referring to the biogeographic origin of the fouling species on the object; ii) Any identification marks referring to insignia, manufacturer's marks or serial numbers, and; iii) Physical oceanography signature through Lagrangian transport modeling (using the Connectivity Modeling System - CMS v2.0) to determine the most probable origin(s) of these objects. Preliminary analyses indicate over 135 fouling taxa were recorded from more than 80 items and approximately 10% of taxa colonizing floating debris were considered NIS, reinforcing the role of marine debris as a viable vector for the introduction species in the region. In addition, an evaluation and ranking of taxa based on their nuisance/invasiveness potential, provides basis to assess the risk of marine debris promoting outbreaks of NIS.

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