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COMMENTARY

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Study on Consumption of Marine Micro Plastics by Deep-Ocean Organisms

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Description

A recognizable sign of the global influence of anthropogenic activity is plastic garbage. The abundance of macro- and micro-plastics in the sea is alarming, but little is known about their long-term fate or how they impact marine ecosystems. In this study, researchers offer the first proof that deep-water organisms are already absorbing microplastics. By examining organisms that live on the deep sea floor, researchers demonstrate that members of at least three major phyla consume and internalise plastic microfibers using a variety of feeding strategies. This study demonstrates that despite its isolation, the deep sea and its fragile habitats are already exposed to human waste to the point where numerous animals are ingesting microplastics. There doesn't seem to be a place on Earth that hasn't been polluted by plastic. In fact, plastics are commonplace in isolated maritime ecosystems, including Polar Regions, despite being far from shore. It is well recognised that these polymers have macro and micro scale effects on terrestrial and marine ecosystems. For instance, entanglement or ingestion of plastic waste has been observed in 44%-50% of all seabirds, sea snakes, sea turtles (of all species), penguins, seals, sea lions, manatees, sea otters, fish, and crustaceans, as well as half of all marine animals. Starvation can result from consumption because it can obstruct the digestive tract, harm the stomach lining, and reduce feeding.

Micro plastics, generally greater than 5mm in size, are a rising source of concern. Micro plastics concentrate persistent organic pollutants that can be up to six orders of magnitude more polluted than ambient seawater and absorb metals due to their huge surface area to volume ratio when compared to macro plastics. In controlled laboratory circumstances, the subsequent transmission of these contaminants and additives from micro plastics to marine species has been demonstrated. The ecological impacts on marine creatures in the wild, however, have not yet been thoroughly investigated. Large pelagic marine creatures like tuna, whales, which feed by filtering have already been found to consume micro plastics. Yet, very few observations, mostly in shallow coastal waters-have shown that benthic creatures are consuming micro plastics in natural environments. Several feeding techniques are used by the creatures in these observations. Micro plastic is likely passively consumed by organisms like the predators and detritivores lobster and shrimp, which may also ingest it in their prey. Both suspension- and filter-feeding mussels presumably ingest plastics suspended in sea water, as do deposit-feeding lugworms, which likely eat micro plastic found in sediment. Micro plastics have been discovered in natural environments in shallow-water animals' stomachs, mouths, and ventilation regions, as well as on the exterior surface of deep-water octocorals. According to laboratory research, micro plastics will be ingested by benthic and invertebrate species such as corals, copepods, zooplankton, crabs, molluscs, sea cucumbers, scallops, barnacles, oyster, lugworms, and polychaetes if they are introduced in an experimental setting. For this variety of organisms, the impacts included decreased fertility, decreased feeding rates, increased vulnerability to oxidative stress, diminished capacity to eliminate pathogenic microorganisms, decreased feeding activities, decreased energy reserve balance, and impaired lysome stability. These studies' findings are not yet definitive, but the aggregate of past laboratory studies, the majority of which use microbeads rather than microfibers-highlights the negative effects of micro plastics on a variety of benthic taxa and the significance of taking organism biology, such as low metabolism, feeding method, and behaviour, into account. Also, there is less knowledge about the long-term destiny of micro plastics in deep seas than there is in shallow areas.

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