

COPEPODS BEHAVIOR REDUCES THE RISK OF ENTRY OF MICROPLASTICS IN MARINE FOOD WEBS

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Abstract

The entry of microplastics (MPs) into marine food webs is a major environmental concern. We investigated how planktonic copepods behavior influences the risk of MPs to enter marine food webs, by applying a trait-based approach and by combining experiments with biogeographical analyses. We aim to evaluate which type of feeding behavior is most risky in terms of MP ingestion, and which marine geographical areas are more susceptible to MP ingestion by planktonic copepods. We used different planktonic copepods as models of the main foraging behaviors in planktonic copepods: feeding-current, cruising, ambush and mixed behavior feeding. All the behaviors show a similar low risk of MP ingestion, up to one order of magnitude lower than for similar sized microalgae. No influence of the prey type or MP size (8 μm and 20 μm) was observed on MP ingestion for any of the behaviors. By estimating the global distribution of feeding behaviors, we demonstrated that feeding current feeding is the most common behavior. However, the risk of MP ingestion remain similarly low across the global ocean, independently of the predominant behavior. Overall, our results suggest low risk of MP ingestion by marine planktonic copepods and therefore a minimal risk of MP trophic transfer via copepods or fecal pellets in marine ecosystems.

Key words: microplastics, copepods, trait-based approach, feeding behavior, ingestion.