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SHORT COMMUNICATION

Exploring the similarity of microplastic characteristics between amphibian larvae and their aquatic environment

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Microplastic pollution has become a pressing environmental concern globally, with its impact on various ecosystems increasingly studied. Among the affected ecosystems, aquatic environments play a crucial role, serving as habitats for diverse organisms, including amphibian larvae. This article aims to explore the similarity of microplastic characteristics between amphibian larvae and their aquatic environment. By examining the sources, distribution, ingestion and potential impacts of microplastics on amphibian larvae and their aquatic habitats, we can gain insights into the interconnectedness of these elements within ecosystems. Understanding these similarities is pivotal for devising effective mitigation strategies and safeguarding amphibian populations and their habitats.

Keywords: Microplastic, Amphibian larvae, Aquatic environment.

Introduction

Microplastics, defined as plastic particles smaller than 5mm, have emerged as a significant environmental concern due to their widespread presence in various ecosystems worldwide. Aquatic environments, in particular, serve as reservoirs for microplastics, posing risks to aquatic organisms, including amphibians. Amphibians, with their permeable skin and diverse life stages, are particularly vulnerable to environmental pollutants, including microplastics (Prata, JC. 2023). This article delves into the similarity of microplastic characteristics between amphibian larvae and their aquatic environment, shedding light on their interconnectedness and potential consequences. Microplastics originate from diverse sources, including fragmentation of larger plastic items, microbeads in personal care products and synthetic textile fibers. Once released into the environment, they undergo various processes such as fragmentation, weathering and transport, leading to their widespread distribution. In aquatic environments, microplastics accumulate in sediments, surface waters and even biota, forming complex ecosystems where interactions with organisms, including amphibian larvae, occur (Chen, M., et al., 2022).

Description

Amphibian larvae, during their aquatic life stages, are exposed to microplastics through water and food sources. Studies have demonstrated the ingestion of microplastics by amphibian larvae, either directly or indirectly through prey items. The size, shape and chemical composition of microplastics influence their ingestion rates and subsequent effects on amphibian larvae (Kolenda, K., et al., 2020). Moreover, the developmental stage of larvae and their feeding behaviors play a role in determining their susceptibility to microplastic ingestion.

Analyzing the characteristics of microplastics in amphibian larvae and their aquatic environment reveals striking similarities. Both environments harbor a diverse array of microplastic types, including fragments, fibers and microbeads. Additionally, the presence of additives and contaminants associated with microplastics mirrors those found in amphibian tissues and their surrounding aquatic habitats. This similarity underscores the potential for bioaccumulation and biomagnification of microplastics within aquatic food webs, with implications for amphibian health and ecosystem dynamics (Terzi, Y. 2023). The ingestion of microplastics by amphibian larvae can have multifaceted impacts on their health and survival. Physical effects such as gut obstruction and reduced feeding efficiency can impede larval growth and development. Moreover, the leaching of chemical additives from microplastics may disrupt endocrine function and immune responses in amphibian larvae, rendering them more susceptible to diseases and predation. At the ecosystem level, microplastic pollution can alter nutrient cycling, microbial communities and trophic interactions, with cascading effects on aquatic biodiversity and ecosystem stability (Zhang, M., et al., 2022).

Addressing microplastic pollution requires multifaceted approaches encompassing regulatory measures, technological innovations and public awareness campaigns. Strategies such as banning single-use plastics, promoting sustainable alternatives and implementing wastewater treatment upgrades can mitigate microplastic inputs into aquatic environments. Moreover, interdisciplinary research efforts are needed to elucidate the long-term effects of microplastics on amphibian populations and ecosystem dynamics (Kalčíková, G. 2023). Collaborative initiatives involving scientists, policymakers and stakeholders are essential for developing holistic solutions to mitigate microplastic pollution and safeguard amphibian larvae and their aquatic habitats.

Conclusion

The similarity of microplastic characteristics between amphibian larvae and their aquatic environment underscores the interconnectedness of these elements within ecosystems. Addressing the complex challenges posed by microplastic pollution requires interdisciplinary collaboration and concerted efforts at local, regional and global scales. By understanding the sources, distribution, ingestion and impacts of microplastics on amphibian larvae and their aquatic habitats, we can strive towards sustainable management practices that preserve biodiversity and ecosystem integrity for future generations.

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Conflict of Interest

The authors declare no conflict of interest.

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