

High sensitivity of invertebrate detritivores from tropical streams to different pesticides

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Abstract

Freshwater organisms are often sensitive to pesticides, but their sensitivity varies across different taxa and with pesticide type and action mode, as shown by multiple acute toxicity tests. Such variability hampers predictions about how freshwater ecosystems may be altered by pesticide toxicity, which is especially critical for understudied areas of the world such as the tropics. Furthermore, there is little information about the sensitivity of some organisms that are key components of stream food webs; this is the case of litter-feeding detritivorous invertebrates, which contribute to the fundamental process of litter decomposition. Here, we examined the sensitivity of three common detritivores [*Anchytarsus* sp. (Coleoptera: Ptilodactylidae), *Hyaella* sp. (Amphipoda: Hyaellidae) and *Lepidostoma* sp. (Trichoptera: Lepidostomatidae)] to three pesticides commonly used (the insecticides bifenthrin and chlorpyrifos and the fungicide chlorothalonil) using acute (48 or 96 h) toxicity tests. Our study demonstrates that common-use pesticides provoke the mortality of half their populations at concentrations of 0.04–2.7 $\mu\text{g L}^{-1}$. We found that all species were sensitive to the three pesticides, with the highest sensitivity found for chlorpyrifos. Additionally, we used the approach of species sensitivity distributions (SSD) to compare our study species with *Daphnia magna* and other temperate and tropical invertebrates. We found that the study species were among the most sensitive species to chlorpyrifos and chlorothalonil. Our results suggest that tropical detritivores merit special attention in ecological risk assessment of pesticides and highlight the need for accurate ecotoxicological information from ecologically relevant species in the tropics.

Author keywords

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