Impacts of detritivore diversity loss on instream decomposition are greatest in the tropics

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Abstract
The relationship between detritivore diversity and decomposition can provide information on how biogeochemical cycles are affected by ongoing rates of extinction, but such evidence has come mostly from local studies and microcosm experiments. We conducted a globally distributed experiment (38 streams across 23 countries in 6 continents) using standardised methods to test the hypothesis that detritivore diversity enhances litter decomposition in streams, to establish the role of other characteristics of detritivore assemblages (abundance, biomass and body size), and to determine how patterns vary across realms, biomes and climates. We observed a positive relationship between diversity and decomposition, strongest in tropical areas, and a key role of abundance and biomass at higher latitudes. Our results suggest that litter decomposition might be altered by detritivore extinctions, particularly in tropical areas, where detritivore diversity is already relatively low and some environmental stressors particularly prevalent. © 2021, The Author(s).