
How much or how often? Rainfall quantity controls microbial decomposer activity, but rainfall frequency controls that of macrofaunal decomposers

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Abstract

Understanding the consequences of ongoing climate change on litter decomposition is fundamental to predicting feedbacks on atmospheric CO₂ concentrations and consequent climate change. Yet, although the increase in precipitation variability is one of the main climate changes expected, its effect on litter decomposition have received considerably less attention than the effect of changes in the mean state of climate. To date, the rare studies that focused on precipitation variability effect on decomposition considered the microbial response, leaving the responses of other groups of decomposers such as litter-feeding detritivores largely unknown. To fill this gap of knowledge, we used a full-factorial experiment to disentangle the effects of cumulated precipitation and precipitation frequency over microbial-driven decomposition, and macrofaunal-driven decomposition, using the common pill woodlouse (*Armadillidium vulgare*). After a six-weeks incubation under controlled-conditions, we found that while precipitation quantity was the only significant factor driving microbial-driven decomposition, litter consumption by isopods did not respond to precipitation quantity, but peaked when precipitation pulses were delivered at low frequency. This shows that different groups of decomposers respond differently to altered precipitation regimes, and that large soil animals may be more resistant to infrequent precipitation than microorganisms. Collectively, this suggests that under alter precipitation regimes, the relative contribution of different groups of decomposers to carbon cycling may be reshuffled.

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