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Local Variation in Shredder Distribution can Explain their Oversight in Tropical Streams

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ABSTRACT

Stream shredders play an important role in the breakdown of allochthonous leaf litter—a well-known, key process in temperate headwater streams. In contrast, it has been suggested that litter breakdown in tropical streams is driven by microorganisms, shredders being scarce or absent. We propose that shredders have been overlooked in some tropical streams for two reasons: (1) assuming that tropical shredders belong to the same taxa as temperate ones, without determining the diet of tropical litter fauna; and (2) the small spatial scale of most tropical stream studies, which do not account for intra- and inter-site comparisons. We explored shredder abundance and species richness in six streams in each of two tropical regions, the Australian wet tropics (AWT) and Panama (PAN), finding 734 individuals of 12 shredder species in AWT and 391 individuals of 16 species in PAN. Shredder species richness was positively related to altitude in AWT, but not in PAN. Shredder contribution to total leaf breakdown in the field was 24 ± 3 SE percent in AWT and negligible in PAN, but this was probably due to the unsuccessful colonization of experimental cages by PAN shredders. In the laboratory, shredder contribution to total leaf breakdown was higher than in the field (35% ± 2 SE in AWT and 64% ± 3 SE in PAN) and varied with leaf decomposability. Our results support earlier indications that shredders are not scarce or functionally unimportant in the tropics, and suggest that their contribution to litter processing should be determined along altitudinal gradients.

Abstract in Spanish is available at http://www.blackwell-synergy.com/loi/btp.

Key words: altitude; Australian wet tropics; latitude; leaf litter breakdown; macroinvertebrates; Panama.