

## Negative effects of litter richness on root decomposition in the presence of detritivores

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Roots form a major source of organic material in the soil and thus represent a key driver of soil carbon and nutrient cycling. Over the last decade, an increasing number of studies have aimed to unravel the role of roots and root traits in the functioning of ecosystems. Here, we investigate how changes in species richness of root litter affect the decomposition of root material. We established a litterbag experiment in a subtropical forest of southeastern China. Litterbags with roots of one, two, four, and eight plant species were deployed in the soil for nearly three years. During the decomposition process, some of litterbags were invaded by detritivores, allowing us to test the effect of detritivores on root mass loss and their interaction with root diversity. We found that root diversity did not change root mass loss in the absence of detritivores. However, all litter types decomposed faster in the presence of detritivores. Notably, the detritivores increased root litter decomposition more at low root diversity (especially single species) than at high root diversity. Detritivore effects were most pronounced during the early stages of decomposition. This differential effect of detritivores on decomposition might depend on the presence and proportion of easily-degradable plant species (i.e. *Pinus massoniana* and *Syzygium buxifolium*) in the root mixture, because they might be more attractive to detritivores. Our results



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highlight the importance of detritivores in decomposing root litter in systems containing different combinations of plants.