Fuel for thought: Do litter-dwelling invertebrates control fine fuel loads in frequently burnt forests?

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Background
Low intensity fires are used extensively in managed sclerophyll forests in Australia, reducing fine fuel levels so as to improve the success of fire-fighting operations. Leaf-litter accumulates rapidly in many of these forest systems, with fine fuel levels representing a dynamic balance between accumulation and decomposition of dead plant material. Litter-dwelling animals (e.g. beetles, leaf-hoppers, millipedes, millipeds, springtails) are potentially important decomposers of fuel on the forest floor and also a major component of biodiversity. We know that frequent fire can impact upon the composition of these invertebrate communities, but we don’t know how this effects fuel accumulation and decomposition, nutrient cycling and associated forest productivity.

Methods
Eighteen sites are being studied that represent three fire regimes; (a) long-term unburnt (40+ years fire exclusion), (b) long-term unburnt with fire recently applied, and (c) long-term frequently burnt (fire every 3 years). By burning a set of long-unburnt sites and comparing them with frequently burnt sites we have effectively controlled for the potentially confounding effects of time-since-last-fire and differences in accumulated leaf-litter biomass (see above graph).

At each site twenty bags filled with 10 g of leaves were placed amongst the litter. Ten bags were constructed of 8 mm mesh and ten were of 0.2 mm mesh (see below).

This research will enable 2 basic questions to be tested:
1. What role do litter-dwelling organisms have in fuel accumulation and what is the effect of frequent fire?
2. What is the independent role of invertebrates and micro-organisms in litter decomposition and is the effect of fire different for each group?

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