

Fauna

Litter – the good sort

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Forests generate large volumes of litter as they grow. Much of the waste material is concentrated in fallen stems, but there's always a wide scattering of bark fragments, twigs and dead leaves on the forest floor.

In the absence of fire, all of this litter is slowly converted to soil organic matter and waste gases. The job is done by a complex community of bacteria, fungi and tiny invertebrate animals. I like to call the litter fauna the 'Dead Plants Society'. The DPS is very different from the community of animals that feeds directly on living leaves and other plant bits, the 'Green Feeders Guild'. Green Feeder invertebrates are often plant-specific and they usually have wings, so they can find their favourite foods efficiently. DPS animals rarely have wings and the litter-eaters among them aren't very particular about their food. If it's rotting nicely, they'll eat it.

Johnny-come-latelys. Long, long before the first winged insect took off, there were snails and millipedes quietly munching through the litter, and spiders and centipedes hunting them.

Tasmanian forests have a rich and busy community of litter invertebrates, and they're very good at what they do. Walk into an old-growth rainforest on a fertile site and have a close look at the ground. Beneath a thin layer of rotting twigs and leaves you'll see mineral soil. Several hundred years of litter production has vanished without a fire, courtesy the DPS. Litter invertebrates are particularly abundant in older

wings can quickly recolonise a burned forest from source areas several kilometres away, but it's a different story for slow-dispersing DPS animals. If litter invertebrates haven't survived a burn in shelters (such as rotting logs and *Gahnia* bases) and if recolonisation routes (such as streamside reserves, wildlife habitat clumps and strips) are few or burned too hard, the lost DPS populations will remain lost for the foreseeable future.

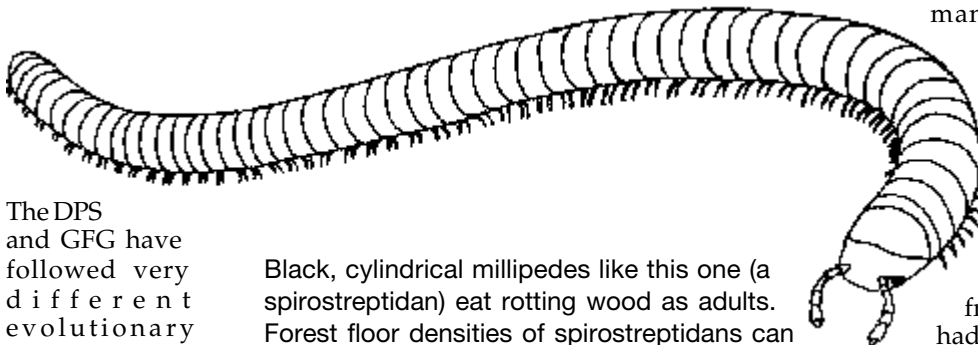
Some good news is that litter fauna seems to be happy in some plantations. I recently surveyed first- and second-rotation *P. radiata* in the Northwest and saw a remarkable range of native snails, millipedes, velvet worms and

many other creatures in rotting pine stems, stumps and needles. Particularly rich communities were living in 15-25 year-old *Eucalyptus* plantations. In each of these cases there was native bush nearby from which the DPS mob had invaded the new forest.

Near the Dial Range I found good evidence that planting eucalypt and pine on farmland with bush remnants had positively benefited the local litter community: litter populations had expanded from the remnants to occupy large areas of former grassland.

Nevertheless, more research work needs to be done on conserving litter fauna in plantation areas, especially where site preparation involves heaping and burning residues. It's a practice that hits litter invertebrates right where they live.

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The DPS and GFG have followed very different evolutionary pathways. The earliest DPS fossils are of springtails, mites and millipedes and they're more than 400 million years old. The only land plants around then were mosses and other ground-huggers; forests hadn't evolved yet. The first evidence for feeding on live green plants (early insects with spores in their guts) appears in the fossil record a long time later, in the coal swamp deposits. It wasn't until the flowering plants began diversifying, about 100 million years ago, that the GFG really expanded and developed the many lineages of beetles, bugs, flies, ants and wasps, butterflies and moths that we know today, and that make up the bulk of forest animal biodiversity. These creatures are all

Black, cylindrical millipedes like this one (a spirostreptidan) eat rotting wood as adults. Forest floor densities of spirostreptidans can average 100 per square metre.

eucalypt regrowth, which produces many more tonnes of litter per hectare per year than rainforest. More litter, more litter bugs.

The rule for conserving litter invertebrates is 'keep it shady and moist'. DPS fauna is always more abundant on the south side of hills, where litter doesn't get dried out by the sun and where fires are less likely to be hot. On all aspects, rotting logs are important as shelters and nurseries. The worst possible forest management for litter invertebrates is frequent fuel-reduction burning. Without litter, the base of the DPS food pyramid is destroyed, and litter invertebrates become locally extinct. Green-feeding insects with