How fresh is that frass?

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Many insects inhabit concealed locations, such as within timber, but leave outward signs of their presence, such as frass. Deposits of fresh frass on the outside of infested material would indicate a high probability of live insects being present within. A method for estimating the age of frass could therefore be useful for assessing treatment efficacy. For example, the success of termite eradication could be monitored by regularly checking for the presence of fresh frass near old colonies. Similarly, the presence of fresh frass in borer holes in fumigated timber would raise concerns that the fumigation had been ineffective. This study examined whether the age of frass could be estimated from levels of esterase enzyme activity in frass of four species; the termites *Stolotermes inopinus* and *Kalotermes brouni*, and the weevils *Sitona lepidus* and *Listronotus bonariensis*. With the termites, active esterases were found in 1-day-old frass, but not in 1-month-old frass, indicating clear potential for development of a test. With the weevils, esterase activity occurred both in 1-day-old frass and in 1-month-old frass, so development of a method for these species requires a faster degrading enzyme.

Grass grub distribution on the upper West Coast defined by soil sampling and pheromone trapping

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The New Zealand grass grub (*Costelytra zealandica*) is distributed throughout the South Island but, surprisingly, has not been recorded west of Reefton. In 2006, pasture damage from root-feeding scarab larvae on the West Coast, initially attributed to grass grub, was found to be caused by manuka beetles, *Pyronota* spp. Winter surveys during 2008-2012 between Karamea and Hokitika confirmed that most damage patches were caused by manuka beetle larvae, but there was a small, localised population of *C. zealandica* associated with Westport airport and golf course. In 2012 a network of phenol-baited pheromone traps was established around this epicenter during the grass grub flight season, with traps spaced at approximately 0.5 km intervals. Traps within the identified zone of grass grub infestation caught 1-5 beetles per night. Single male beetles were trapped up to 7.5 km from the epicenter but with no evidence of established populations from larval sampling. It is likely that the localised grass grub population became established after an accidental introduction of insects with soil or plant material to the modified, and drained, airport and golf course environments and may act as an infestation source for other areas. Pastures on the nearby, newly-flipped land of Cape Foulwind may also be suitable for grass grub and should be regularly inspected to anticipate and prevent outbreaks.