The response of small mammals to the invasion of coast wattle (*Acacia longifolia* var. *sophorae*) in a fragmented heathland, south-west Victoria

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Abstract

This study aimed to assess the impact of the environmental weed, *Acacia longifolia* var. *sophorae* (Labill.) Benth. on small mammal communities in fragmented coastal heathlands. The study was undertaken near the Portland Aluminium Smelter in south-west Victoria, within an area considered to have high plant diversity and several rare and threatened fauna species. Fauna surveys for small mammals were conducted between 1979 and 2004 using a combination of cage and Elliott traps in grid and line formations. The results of the small mammal fauna surveys and several vegetation surveys conducted were analysed. Significant changes in vegetation composition were the loss of wet heathland areas, decline in native species and the increase in cover of environmental weeds, *A. longifolia* var. *sophorae* (coast wattle) and *Leptospermum laevigatum* (Sol. ex Gaertn.) F.Muell. (coast tea-tree). Vegetation analysis found a strong negative correlation between *A. longifolia* var. *sophorae* cover and plant species richness. A 50% loss in the floristic species present significantly altered the vegetation structure and composition. Vegetation communities have changed from short open heathlands to shrublands with a dense overstorey. This has had a significant effect on the small mammal populations as preferred habitat is no longer available and several threatened habitat specialists, including *Pseudomys shortridgei*, have disappeared.

Rabbits, foxes and feral pigs – how do they impact on weeds?

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Background

The impact pest animals have on the economy is around $420 million per year. These loses are mainly related to agricultural production as environmental loss and long-term land degradation is difficult to estimate. Around $60 million per year is spent by landholders and governments to control pest animals and a further $20 million per year is spent on research (Bomford and Hart 2002). The impact weeds have on the economy is over $4 billion dollars every year due to lost production and control effort (CSIRO 2006). Since the arrival of the first Europeans, more than 28 000 exotic plants have been brought into Australia, a few accidentally but most deliberately. Now, more than 2500 species of introduced plants are established in the wild (CSIRO 2006). Plant invasion involves two essential stages: first, transportation of organisms to a new location; and second, establishment and population increase in the invaded locality (Chase and Chesson 2002). But a third worrisome stage is the regional spread from initial successful site of invasion. Pest animals can assist in the spread of seeds into regional areas by creating conditions that suit weed invasion and provide a continued source of viable seeds and plant material capable of maintaining the invasion.

To tackle the impacts of invasive species, conservation agencies usually rationalize their resources by establishing management teams that specialize in the different plant or animal species. This can mean that single species are managed in isolation as single identities. The consequences of removing an invasive species from a complex ecosystem can have unexpected or undesirable affects. This paper is not a review of the topic, but provides examples of the impact pest animals can have on ecosystems and the consequences of removing pest animals from complex ecosystems.

Pest animals role in changing the landscape

Impact of rabbit grazing on the weed component of pasture

Several studies (Fenton 1940, Myers and Poole 1963) observed that rabbit grazing can produce floristic changes to sown pasture. A more recent study, carried out at Cowra in eastern NSW, by Croft *et al*. (2002), demonstrated that rabbits grazing pasture at a high-density reduced the valuable pasture content and increased the weed content in the pasture. Pasture composition was monitored in grazing plots, stocked at the district average of eight merino wethers per hectare and then supplemented with 0, 24, 48 and 72 rabbits per hectare. Major changes in pasture composition occurred after three years. The proportion of weeds such as barley grass increased and proportion of beneficial pasture such as sub-clover decreased in the grazing plots with the highest rabbit density (Figure 1). The change in pasture