INVASION OF WOODY SPECIES INTO WEED INFESTED AREAS

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Patch of broom-dominated vegetation with Mount Tongariro and Mount Ngauruhoe in the distance.

"I'm planting a haycorn, Pooh, so that it can grow up into an oak tree, and have lots of haycorns just outside the front door instead of having to walk for miles and miles, do you see Pooh?"

"Well," said Pooh, "if I plant a honeycomb outside my house, then it will grow up into a beehive."

But Piglet wasn't quite sure about this...

A.A. Milne 1928. The House at Pooh Corner.

ABSTRACT

When studying plant dynamics and succession, it is important to determine potential limiting factors affecting recruitment (Crawley 1990). The purpose of this study was to investigate factors affecting the establishment and survival of woody species in weed infested areas around the central volcanic plateau. This was achieved by first describing these communities, and quantifying the number of native seedlings and saplings found in both forested and non-forested (weedy) areas. Seed input was measured with seed traps, and factors affecting recruitment of seedlings were investigated by manipulative field experiments.

Although some native woody species were dispersed into weedy areas, both seed and seedling densities of most species declined rapidly with increasing distance from the forest margin. Sowing seeds at densities equivalent to 625 per m^2 significantly increased seedling establishment of *Griselinia littoralis* and *Coprosma* 'taylorii' but not *Pittosporum tenuifolium* var. *colensoi*. Removal of exotic grasses (clearing treatment) that dominated in non-forest areas resulted in much greater establishment of all woody seedlings, including introduced broom (*Cytisus scoparius*) and several native species that had dispersed naturally. Most species also showed greater establishment in plots that were caged to prevent predation. However, the effects of clearing and caging treatments on survival of seedlings were not as apparent as they were for establishment. In addition, experimental clearing increased the growth of transplanted *G. littoralis* seedlings. Overall, most native species had much lower seedling establishment and survival in weedy areas compared with native forest. This is explained by a combination of both seed and microsite limitation in weedy areas.

In another experiment designed to test the effects of bird consumption on seed germination, bird dispersers increased germination percentages of native species by removing fruits from seeds. All species examined (*G. littoralis, Coprosma robusta, Pseudopanax crassifolius,* and *P. tenuifolium* var. *colensoi*) showed very low germination of seeds within fruit, and much greater germination of seeds that were cleaned either by passage through birds or by hand. For *C. robusta, G. littoralis*, and *P. tenuifolium* var. *colensoi*, passage through birds also significantly increased germination of seeds compared with those cleaned by hand. The rate of germination was less affected by different treatments than the absolute

percentage germinating, but was generally faster in bird-voided compared to hand-cleaned seed. Seeds in both of these latter treatments germinated considerably faster than seeds within fruit.

Invasion of native woody plants in weedy areas appears to be constrained by a combination of low rates of seed dispersal for most species, and low probabilities of seedling establishment and survival in areas without disturbance. The most likely future scenario for the majority of weedy areas studied is continued dominance of exotic species in the short term, with slow succession to native shrubland as well-dispersed, frost-resistant native species such as manuka (*Leptospermum scoparium*) establish after disturbance. Management options are discussed with the aim of accelerating the rate of succession in weedy areas to native forest.

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