

FORUM ARTICLE

Possums as seed dispersers in New Zealand: A response to Williams (2003)

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Abstract: We agree with Williams' (2003) response to our previous paper (Dungan *et al.*, 2002) whereby data is presented in support of the contention that we overstated our argument that possums may be the only dispersal vector for large-seeded native New Zealand species. We contend that this does not alter our overall conclusions, but agree that additional work is needed to balance any potential positive effects of possums as seed dispersers against their significant negative impacts on forested ecosystems.

Keywords: ecosystem processes; possums; seed dispersal.

In his rejoinder to our previous paper (Dungan *et al.*, 2002), Williams (2003) contends that we have overstated our argument that "in many areas possums may be the only potential dispersal vector for large seeded native species". In light of Williams' well reasoned argument, we are happy to concede the point, and accept his concluding statement that possums "may be of particular importance to native species with *large-seeded* fruits". We submit that this concession does not alter the conclusions of our previous study, nor does it reduce the potential importance of possums as seed dispersers in the New Zealand flora; in the two studies where the direct contribution that possums make to total seed rain is able to be calculated, possums were responsible for nearly 20% of the total seed rain, and up to 75% of the seed rain of individual species (Burrows, 1994; Dungan *et al.*, 2002).

We agree that any positive effects of possums through seed dispersal need to be weighed against their large number of often substantial negative effects. We restate our comment that our results do not provide justification for disregarding possums as pests. However, the balance of positive and negative effects is difficult to quantify given our current understanding of processes in ecosystems where possums are present. For instance, we cannot say whether possums are more or less effective (*sensu* Schupp, 1993) seed dispersers than native or introduced frugivores, because disperser effectiveness, including quantitative as well as qualitative aspects, has so far been quantified for only one New Zealand seed disperser (Wotton, 2002). Nor are we able to quantify the benefits of seed dispersal to future plant reproductive

success, relative to the negative effects of foliage browsing.

We further suggest any positive effects of seed dispersal by possums are likely to be greatest in areas not currently managed for their biodiversity conservation values. For example, areas that have been retired from active agricultural production, such as our study site in Hoon Hay valley (Dungan *et al.*, 2001), present an amalgam of successional vegetation types, from those dominated by introduced grasses, to others that are virtually indistinguishable from native secondary vegetation. There is a broad literature demonstrating the importance of effective seed dispersal in accelerating succession in such environments (e.g. McClannahan & Wolfe, 1993). Our data (Dungan *et al.*, 2002) show that possums are potentially important seed dispersal vectors in successional vegetation in lowland New Zealand.

Whether we like it or not, it is highly unlikely that possums will be eradicated from mainland New Zealand in the foreseeable future. They will thus continue to play a part in the dynamics of forested ecosystems. It behoves us to consider their possible positive contributions, together with those that are undisputedly negative, to ecosystem processes.

References

- Burrows, C.J. 1994. Seed trapping in Ahuriri Summit Bush Scenic Reserve, Port Hills, western Banks Peninsula, 1985-1986. *New Zealand Journal of Botany* 32: 183-203.

- Dungan, R.J.; Norton, D.A.; Duncan, R.P. 2001. Seed rain in successional vegetation, Port Hills Ecological District, New Zealand. *New Zealand Journal of Botany* 39: 115-124.
- Dungan, R.J.; O'Cain, M.J.; Lopez, M.L.; Norton, D.A. 2002. Contribution by possums to seed rain and subsequent seed germination in successional vegetation, Canterbury, New Zealand. *New Zealand Journal of Ecology* 26: 121-128.
- McClannahan, T.R.; Wolfe, R.W. 1993. Accelerating forest succession in a fragmented landscape: the role of birds and perches. *Conservation Biology* 7: 279-287.
- Schupp, E.W. 1993. Quantity, quality and the effectiveness of seed dispersal by animals. *Vegetatio* 107/108: 15-29.
- Williams, P.A. 2003. Are possums important dispersers of large-seeded fruit? *New Zealand Journal of Ecology* 27: 221-223.
- Wotton, D.M. 2002. Effectiveness of the common gecko (*Haplodactylus maculatus*) as a seed disperser on Mana Island, New Zealand. *New Zealand Journal of Botany* 40: 639-648.

Editorial Board member: David Wardle