leaves and infrequently eat other invertebrates. In contrast, ground w t (Hemiandrus; Johns 2001) are primarily predators and scavengers (Cary 1983), although there are records of one species eating apricot fruits (Wahid 1978 cited by Cary 1983). The ground w t species Burns studied is primarily a carnivore, and adults and juveniles eat a range of invertebrates (beetles, moths, fies) throughout the year (Cary 1983). Although 20% of the ground w t examined contained plant material in their crops, this was interpreted as being the remains of the gut content of their moth and beetle larvae prey (Cary 1983). There are at least 40 species of New Zealand ground w t (Johns 2001), and another eight Hemiandrus species in Australia, but only seven species of the endemic genus Hemideina (tree w t). The other major orthopteran group also referred to as w t in New Zealand is the Rhaphidophoridae or cave w t (camel crickets or cave crickets in other parts of the world). The sizes, shapes and habits of these insects are diverse, although all are small-mouthed (Richards 1954, 1962). Reference to hypothesised evolutionary and ecological relationships involving w t needs to avoid confounding inferences drawn from phylogenetically and ecologically to ground w t (potential seed dispersers) that are not shared by their phylogenetic relatives? For example, the size of the seed that a ground w t can swallow is important and a reduction in seed size would be predicted to facilitate ground w t seed dispersal. However, the diff culty arises that ground w t species are found all over New Zealand, so it might be argued that a forest Melicytus species might suit one ground w t species and a shrubland Melicytus might suit another. To avoid this problem, plant genera that have representatives outside New Zealand should be examined, while avoiding locations where ground w t also occur (in this case, eastern Australia). Phylogeny leads to non-independence of characters, such as the traits recognised by Duthie et al. (2006) as a syndrome of fruits associated with [tree] w t seed dispersal. The fve plant species in which seeds survived intact in the gut of tree w t represent only three genera (Fuchsia, Pratia, Gaultheria). The small seeds of Fuchsia are ancestral within the group (Berry 2004), providing no evidence for adaptive reduction of seed size unique to New Zealand. However, Anostostomatidae w t have a distribution widely overlapping with Fuchsia and thus a search for evidence of mutualism may need to be much wider.

(2) Species distributions: Do distributions of

depressa seeds in three faeces from one ground w t . As *Gaultheria depressa* fruits contain 200–240 seeds each (pers. obs.) the seeds Burns collected represent less than 20% of the seeds likely to have been present in a single fruit. This indicates that the fruit of *Gaultheria depressa* and *G. antipoda* are not well adapted to use ground w t as seed dispersers.

(6) W t food choice: Is there evidence that ground w t selectively consume fruits containing ingestible seeds (i.e. seeds small enough to swallow intact)? We predict that coevolution of ground w t as dispersers of feshy-fruit plant species would lead to ground w t preferring to eat fruits with seeds small enough to ingest rather than fruits with larger seeds. Our null hypothesis is that when a w t eats fruit it does so at random with regard to seed size.

We collected ripe feshy fruit from all available native species at the same time and place as our sample of seven ground w t were collected (Table 1). Seed sizes were obtained from Webb & Simpson (2001). Three *Gaultheria* species bore fruit with seeds likely to be small enough to be eaten whole by ground w t (<1 mm). Fruit from seven other species had seeds >2.4 mm long and probably could not be swallowed whole (Table 1). In our choice-experiments we gave each w t a fruit from each of two plant species for a single night, taking care to match as far as possible fruit of similar size and colour. Each choice-experiment used one small-seeded fruit versus one large-seeded fruit as follows:

(1) White *Gaultheria antipoda* (capsule containing many seeds, each 0.5–0.65 mm long; fruit a feshy calyx) or white *Muehlenbeckia complexa* (single large seed, $2.5-3.3 \times 1.5-2.3$ mm; fruit consisting of swollen feshy tepals).

(2) Red Gaultheria antipoda or orange Leucopogon fraseri (single seed, $2.5-4.0 \times 2.0-2.7$ mm, in a drupe).

(3) Pink *Gaultheria macrostigma* (capsule contains many seeds, each 0.5-0.9 mm long, fruit is feshy calyx), or white *Coprosma propinqua* (two large seeds, $4.0-6.0 \times 2.5-3.5$ mm, in a drupe).

All seven ground w t ate fruits from one or more of the *Gaultheria* species while in captivity, most often (6/7) when they had no other choice of fruit to eat. Three species of large-seeded fruit were eaten (*Muehlenbeckia complexa, Leucopogonfraseri, Coprosma propinqua*) but in all cases the seed was left uneaten and intact. When given a choice of fruit, no fruit was eaten on 38% of w t - nights (8/21). Fruits with large seeds were eaten and fruits with small seeds were untouched on 9/21 w t -nights. During four w t -nights both fruits were eaten, but on no occasion were small-seeded fruits the only fruit eaten by the captive ground w t . A signif cant variation from random eating with respect to seed size was found with more large-seeded fruit being eaten ($\chi^2 = 13$. 764, P <

of feshy fruits in New Zealand will provide scope for many future studies.

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