leaves and infrequently eat other invertebrates. In contrast, ground wētā (*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 wētā species Burns studied is primarily a carnivore, and adults and juveniles eat a range of invertebrates (beetles, moths, flies) throughout the year (Cary 1983). Although 20% of the ground wētā 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 wētā (Johns 2001), and another eight *Hemiandrus* species in Australia, but only seven species of the endemic genus *Hemideina* (tree wētā). The other major orthopteran group also referred to as wētā in New Zealand is the Rhaphidophoridae or cave wētā (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 wētā needs to avoid confounding inferences drawn from phylogenetically and ecologically

to ground wētā (potential seed dispersers) that are not shared by their phylogenetic relatives? For example, the size of the seed that a ground wētā can swallow is important and a reduction in seed size would be predicted to facilitate ground wētā seed dispersal. However, the difficulty arises that ground wētā species are found all over New Zealand, so it might be argued that a forest *Melicytus* species might suit one ground wētā 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 wētā 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] wētā seed dispersal. The five plant species in which seeds survived intact in the gut of tree wētā 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 wētā 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 wētā. 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 wētā as seed dispersers.

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

We collected ripe fleshy fruit from all available native species at the same time and place as our sample of seven ground wētā 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 wētā (<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 wētā 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 fleshy calyx) or white *Muehlenbeckia complexa* (single large seed, 2.5–3.3 × 1.5–2.3 mm; fruit consisting of swollen fleshy tepals).

(2) Red *Gaultheria antipoda* or orange *Leucopogon fraseri* (single seed, 2.5–4.0 × 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 fleshy calyx), or white *Coprosma propinqua* (two large seeds, 4.0–6.0 × 2.5–3.5 mm, in a drupe).

All seven ground wētā 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*, *Leucopogon fraseri*, *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 wētā-nights (8/21). Fruits with large seeds were eaten and fruits with small seeds were untouched on 9/21 wētā-nights. During four wētā-nights both fruits were eaten, but on no occasion were small-seeded fruits the only fruit eaten by the captive ground wētā. A significant variation from random eating with respect to seed size was found with more large-seeded fruit being eaten (^{2} = 13. 764, P <

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

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