

Nutrient intake and character displacement in sympatric tree weta

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Sympatric occurrence of closely related species is expected to result from resource partitioning and a separation of ecological niches. However, distributions resulting in sympatry are not always at equilibrium. In this study, we examined diet and nutritional intake in two sympatric tree weta species, the Wellington and the Auckland tree weta (*Hemideina crassidens* and *H. thoracica* respectively). We first determined nutrient targets for these species in the lab, before analysing the crop contents of wild caught weta to determine nutrient intake during the late summer breeding season, as well as identifiable foods in the frass. We then considered whether nutrient assimilation was similar in these species. In addition, we examined longer term diet and intra and interspecific resource competition, using $^{12}\text{C} / ^{13}\text{C}$ and $^{14}\text{N} / ^{15}\text{N}$ stable isotopes. We found that tree weta diets largely overlap, and we could not detect strong interspecific differences between the species. In sympatric species, interspecific competition for non-substitutable resources such as carbohydrates and protein selects for character convergence. In this case, character displacement was not apparent, and we conclude that our evidence on resource partitioning supports similar ecological niches for these two species of tree weta, such that co-existence is likely to be short-term rather than long-term.

