Alkaloid chemistry, not phylogeny, predicts insect herbivores associated with *Senecio* plant species in New Zealand

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Senecio is a large genus of perennial herbs. Species within the genus typically produce a suite of pyrrolizidine alkaloids (PAs) which play a role in defence against specialist and generalist insect herbivores. Variability in insect host-plant specificity has led to different ways in which insects respond to PAs. Similarly, the variety of insects on *Senecio* may select for the synthesis of specialist PA derivatives, or maintain more generalist PAs. Previous research on some *Senecio* species has also shown differences between the PAs of species in their native and introduced ranges, perhaps as a response to changes in selection pressure. Here, we assessed intraspecific PA variation between New Zealand populations of six introduced and six native *Senecio*s within the context of the enemy release hypotheses. Intraspecific variation in PAs was greater for native *Senecio*s than for introduced ones. Interspecific variation in PAs across all 12 species correlated with the recorded presence of insects, but not with plant phylogeny. Insects that associate with novel invasive plants are better predicted by plant chemistry than plant phylogeny. Using PAs as a surrogate for shifting energy resources, this study provided some support for the enemy release and evolution of increased competitive ability hypotheses. Further research is required to elucidate the processes driving diversity patterns in PAs.