Conservation through DNA: Unravelling the past of the weevil genus Hadramphus

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New Zealand is home to many endemic invertebrates that have experienced range and population declines over the past 150 years with the arrival of humans, pest species and habitat modification. The weevil genus, Hadramphus, is a key example of endemic invertebrates in New Zealand in which every species is listed as endangered. Advances in molecular biology allow the use of old, even ancient specimens to answer important scientific questions. This research may provide valuable information about the evolutionary past of Hadramphus, such as the changes in genetic variation over the last century, and their current population viability. Non-destructive extraction methods were used to extract DNA from specimens of H. tuberculatus, H. stilbocarpae, H. spinipennis and H. pittsopori ranging from 1890-1995. Primers were designed to amplify short fragments of the CO1 mitochondrial gene (60bp, 100bp and 150 bp). Sequences were aligned and compared to CO1 sequences obtained from modern samples. Preliminary results suggest variation between modern and historic samples; however, testing will be undertaken to determine if this variation is a result of heterochrony. Currently, we are using next generation sequencing (454) to find single nucleotide polymorphisms for population genetic studies using both historic and modern samples of Hadramphus. This will allow for the calculation of the change in effective population size over time and the mapping of the loss of species' genetic diversity.