

Range shifts and adaptation to local conditions in a pair of parapatric weta

Mary Morgan-Richards ^{*1}, Mariana Bulgarella ¹, Niki Minards ¹, Steve Trewick ¹

¹ Massey University

The consequence of past climate change can be used to infer possible biological responses to current rapid global warming. Evidence of changes in species' distributions are common in phylogeographic studies world wide and can be understood in terms of both environmental limitations and species interactions. We infer past population history of a pair of parapatric tree weta species (*Hemideina* spp) where competitive exclusion interactions are thought to control their distributions, and the climate is likely to be responsible for determining the winner of these interactions. We also look for evidence of local adaptation by comparing growth rates under controlled conditions of individuals that have originated from high and low altitude locations. Although measures of genetic diversity support past changes in species' distributions predicted from their current parapatric range, we have also detected convergent evolution of local adaptation in growth rates. Although 'evolve' versus 'move' are frequently regarded as mutually exclusive alternative responses to climate change, we should perhaps accommodate both into our models. In these two insect species, both range shifts and local adaptation seem likely to result from current climate warming.

