Lessons from the diet of a native pest, the grass grub beetle - host shift or host range expansion?

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Understanding the mechanisms underpinning the process of biological invasions is nowadays recognised as a challenge. The particular status of ‘pest’ and ‘invasive’ given to some native insects holds potential as an approach to unravel fundamental aspects of the biological invasion phenomenon. With more than 60 native insect species in New Zealand that have become prominent for the environmental and economic damage that they induce, there are many opportunities to investigate the characteristics that enable an organism to become invasive. One such opportunity is given by investigating the diet of the pest Costelytra zealandica (White) (Coleoptera: Scarabaeidae), also known as ‘grass grub’, and by clarifying the relationship between an emerging invasive phytophagous insect and the dietary component of a changing environment. In this study, we investigated the fitness response of different populations of C. zealandica, to several feeding treatments involving native and exotic host plants under different temperatures. The results of this experiment suggest that C. zealandica, occurring in exotic pastures, might have experienced a host-shift (loss of fitness on ancestral host) rather than a host-range expansion (ability to equally use both ancestral and new host). This statement is currently under further investigation, and subsequent results will also be presented. Ultimately, the combined results of this series of experiments, will increase understanding of biological invasions.