PEST MANAGEMENT AND MONITORING

THE FIRST DECADE OF CLOVER ROOT WEEVIL BIOCONTROL IN THE NORTH ISLAND, NEW ZEALAND

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Introduction

An Irish ecotype of the hymenopteran parasitoid *Microctonus aethiopoides* Loan was released as a biocontrol agent against clover root weevil *Sitona obsoletus* (Gmelin) in New Zealand at sites in three North Island regions (Waikato, Hawke's Bay and Manawatu) in early 2006 (Gerard et al., 2007). The parasitoid attacks the adult weevils, laying usually one to three eggs per host, and causes almost immediate cessation of oviposition by weevil females. Within six months, it was apparent that the Irish *M. aethiopoides* was going to be highly effective and a release programme was instigated to distribute the biocontrol agent to all infested North Island districts using a combination of medium (1000–2500 parasitised weevils) and mini (10–20 parasitised weevils) releases (Gerard et al., 2010). Releases ceased in early 2010 when sampling showed widespread establishment and natural dispersal at around 15 km/year.

Methods

Parasitoid and adult weevil populations were monitored regularly at four initial release sites for the first four years following release, and at two Waikato sites from 2011–14, by taking replicated suction samples along known transect lengths through the pasture using a modified blower-vac. Monitoring and collections from other sites and regions were carried out mainly in autumn and winter at time of peak parasitism levels.

Results and Discussion

Irish *M. aethiopoides* was found to have four generations/year in the North Island, to overwinter as a diapausing first instar larva in the adult weevil, to be a facultative gregarious *M. aethiopoides* biotype with 1–4 larvae maturing per weevil, and to be passively distributed to new sites as eggs and first instar larvae in its host (Eden et al., 2008; Gerard et al., 2011). The data from all three regions showed Irish *M. aethiopoides* is highly effective at reducing the damaging winter weevil larval populations (Gerard et al., 2010). While there is a bottleneck in host availability in spring, parasitism levels increase through summer and autumn to peak in winter. A delayed density dependent interaction occurs over time as each species' abundance responds to the abundance of the other species. This is most apparent following disruption due to severe drought, when *S. obsoletus* populations multiply extremely rapidly from low densities in the presence of the abundant clover typically found post-drought, but are suppressed the following year by Irish *M. aethiopoides* (Gerard et al., 2012).

Releases in the North Island ceased in early 2010 when sampling showed widespread establishment and natural dispersal at around 15 km/year. Ten years after the initial parasitoid release, clover root weevil is no longer an issue in northern NZ and current parasitism levels average around 70%.

References

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