Reproductive behaviour of *Microctonus aethiopoides* Loan (Hymenoptera: Braconidae) parasitising *Sitona lepidus*

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Parasitoid host discrimination and the effect of superparasitism on weevil survival and emergence of parasitoids were investigated for the braconid parasitoid *Microctonus aethiopoides*, introduced for control of *Sitona lepidus* Gyllenhal (Coleoptera: Curculionidae). The quarantine-based study compared Irish, Welsh, Norwegian and French strains of the parasitoid. All strains were similar in their ability to parasitise *S. lepidus*, but Welsh, Norwegian and French strains did not discriminate between parasitised and unparasitised hosts. In comparison, oviposition in the Irish strain was biased towards parasitised weevils. Furthermore, in the Irish strain, where more than one egg was laid in a host, supernumerary larvae were able to survive and emerge from the weevil. The gregarious oviposition behaviour displayed by the Irish strain has not been observed in other *M. aethiopoides* biotypes parasitising *Sitona* or *Hypera* species.

Preformulation characterisation of zeolite core materials in biocontrol products

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Bioshield™ is a unique biocontrol agent that is used for control of the New Zealand grass grub (*Costelytra zealandica*). It consists of a core of zeolite with a biopolymer coating containing the bacterium *Serratia entomophila*. Assessments of various zeolites (Z1-BC, Z1-BDW, Z1-CG and Z1-BI from New Zealand (NZZs) and AU-FM 4/1 and AU-ZB from Australia (AZs)) were carried out prior to formulation. Physical characteristics, such as friability and water absorption and sorption, were measured and success of bacterial coating was assessed by light microscopy and differential staining, scanning electron microscopy (SEM) and cell loading (cfu/g). Friability assessment of NZZs found approximately 5% mass loss while AZs did not lose any mass. NZZs absorbed approximately 30% w/w while AZs 10% w/w water. Water sorption to zeolites appeared to monolayer in nature, although NZZs and AZs monolayer adsorption isotherms appear to differ, being type II and type I respectively. SEM analysis showed the surface of NZZs to be porous and populated by colloidal particles while AZs appeared very smooth and lacking in surface features. Success of coating *S. entomophila* onto NZZs and AZs was confirmed by SEM, enumeration and live-dead staining.