A closer look at an accidentally-introduced biological control agent for broom

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The broom twigminer, *Leucoptera spartifoliella*, a host-specific moth of European origin, is very common on broom (*Cytisus scoparius*) in New Zealand. It was first recorded in 1950 as an accidental introduction. Since then it has spread unaided to broom infestations throughout most of New Zealand. The rate of spread has been measured as 45 km over seven years in South Island. Larval mining can kill branches and sometimes whole bushes. In the last few years we have received many reports of high levels of damage caused by the broom twigminer resulting in large areas of dead and dying broom. The accidental occurrence of the broom twigminer in New Zealand prompts us to ask: where does the New Zealand strain of broom twigminer come from and how does its biological performance compare with strains from other areas? Work is planned to investigate these questions. Molecular techniques will be used to compare populations in New Zealand with others in Europe and North America. Fecundity will be compared among populations from within New Zealand and elsewhere.

Parasitism of *Trichilogaster acaciaelongifoliae*

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Acacia longifolia in the eastern Cape Province of South Africa in 1994 produced a large crop of pods and seeds in spite of the biological control agent, the pteromalid gall wasp *Trichilogaster acaciaelongifoliae*. Findings so far show that the rate of parasitoid attack is higher than that recorded originally in the Western Cape. In addition, we are testing the hypothesis that a major factor is that after a bad season for the trees the wasp population crashes owing to lack of buds for galling, and that on improvement of conditions, the relatively gall-free trees produce large numbers of unscathed buds.

Density-dependent mortality during larval development of *Galerucella calmariensis* and *G. pusilla* (Coleoptera: Chrysomelidae)

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As part of ongoing research on the adaptation of insects to new environments during invasion and establishment, we looked at factors regulating populations of *Galerucella calmariensis* and *G. pusilla*, after their introduction into the United States of America for biological control of purple loosestrife (*Lythrum salicaria* L.), an exotic wetland-weed. We conducted field experiments which demonstrated density-dependent mortality at the beginning and at the end of larval development. The difference in density-dependent mortality rates between the two species and their within-plant larval movement patterns during development suggest differences in the utilization of host-plant resources.