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**Aspects of the ecology of *Tyria jacobaeae*. (L.). A defoliator of  
Ragwort in New Zealand.**

A thesis presented in partial fulfilment  
of the requirements for the degree  
of

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## ABSTRACT.

*Tyria jacobaeae* L. (Lepidoptera: Arctiidae) was introduced to New Zealand as a biological control agent for ragwort *Senecio jacobaea* (L.), a poisonous pasture weed. This study investigated the diapause, pupal survival, population ecology and impact of *T. jacobaeae* on ragwort populations in the Wairarapa. Particular emphasis was placed on those aspects influencing the ability of *T. jacobaeae* to control ragwort.

*T. jacobaeae* enters obligatory pupal diapause over the winter months. The temperature requirements of *T. jacobaeae* pupae were investigated under controlled and natural conditions. Diapause development was completed after approximately 105 under field conditions and 70 days at 2°C. The minimum temperature for post diapause development indicated pupae were unlikely to enter post diapause quiescence following diapause development in the Wairarapa. The production of two generations of *T. jacobaeae* in a single season will be of little benefit, however storage of quiescent pupae for delayed release is feasible. Pupal survival was largely determined by exposure and substrate under natural conditions.

Strong density dependent mortality was detected among caged larvae, and increased larval density reduced pupal dimensions, weight and potential fecundity. No evidence of the diseases known to infect *T. jacobaeae* overseas was observed.

Natural *T. jacobaeae* populations showed no controlling influence on the ragwort population studied. High larval mortality, a patchy distribution over the host population and rapid ragwort regrowth reduced the effectiveness of *T. jacobaeae* as a biological control agent. At the most intensively studied site the *T. jacobaeae* population appears to have stabilised at a level below that required for ragwort control. The presence of *T. jacobaeae* was well synchronised with ragwort flowering in the field, and *T. jacobaeae* seems to have adapted to the climatic conditions of the Wairarapa.

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