

## Further investigations into biological control of gorse

### INTRODUCTION

Gorse (*Ulex europaeus* L.) was introduced into New Zealand prior to 1835 as an inexpensive, quick growing hedge material for stock containment and shelter (Moss, 1960). However, due to the lack of biological predators, the vast numbers of seeds produced and the favourable climate over much of New Zealand there was a multiplication of the number of gorse plants in a short period of time, as well as a vast seed bank.

In an attempt to curb the spread of gorse, the gorse seed weevil, *Exapion ulicis* (Förster), was imported into New Zealand from England and released in 1931. The weevil became established throughout New Zealand within 10 years (Miller, 1970). Since then it has destroyed a high percentage of spring produced gorse seed in pods in most areas (Hill *et al.*, 1991).

Weevils oviposit only in the spring and can infest up to 90% of immature pods. In many areas, the low availability of oviposition sites, coupled with intense pressure on female weevils to deposit eggs, leads to a very high percentage of weevil-infested pods in the spring. However, seed produced at other times escape attack, especially where there is abundant autumn flowering (Hill *et al.*, 1991).

Subsequently, *Cydia succedana* (Denis & Schiffermüller), (gorse pod moth) was released in New Zealand in 1992 and is now well established throughout the country. *Cydia succedana* is univoltine (one generation cycle per season) in the cooler, southern regions, e.g. Mackenzie Basin and bivoltine (two generation cycles per season) further north, e.g. Golden Bay. Research has indicated that where the gorse pod moth is univoltine, gorse tends to only produce one generation of seeds per season.

In New Zealand, *Cydia succedana* completes both generations in the gorse pods (Hill, 1990). The larvae feed on unripe seeds in the pods and move from pod to pod once all the seed have been eaten. The number of pods attacked by individual larvae differs from region to region, depending on the number of seeds in each pod. For example, pods from the Golden Bay area have an average of 8.5 seeds per pod, whereas pods from the Mackenzie Basin have an average of 5 seeds.

### REFERENCES

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- Miller, D. (1970). *Biological Control of Weeds in New Zealand 1927-1948*. Wellington: Department of Scientific and Industrial Research, 104pp.
- Moss, G.R. (1960). Gorse, a weed problem of thousands of acres of farm land. *New Zealand Journal of Agriculture*, 100: 561-567.

## DESCRIPTION of GORSE POD MOTH

Gorse pod moths have two generations per season in the warmer regions, e.g. Golden Bay and one in the cooler regions, e.g. Mackenzie Basin. Fig 1 shows the life cycle of this moth.



Green pods on a gorse bush.



Freshly laid egg on the calyx of a gorse pod.



A group of larval instars.  
Larvae enter into fertilised flowers first and then into green gorse seed pods. They consume all the seed in that pod and then enter into another.



Adult gorse pod moths, male (left) and female (right).



Gorse pod with an exit hole for larvae at the far right.

The larvae has either exited to go to another pod or it has gone to pupate. Pupation takes place in a cocoon spun in leaf-litter or the soil. Pupal stage not shown.

**Fig. 1:** Lifecycle of the gorse pod moth.

## **Investigations using the gorse pod moth**

1. The effect of temperature on the development of the gorse pod moth.
2. The effect of larval numbers on damage to gorse seeds.

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