THE EFFECT OF WINTER MOB-STOCKING ON SITONA LARVAL POPULATIONS IN LUCERNE

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SUMMARY

Mob-stocking (500 sheep/ha) of lucerne during the winter (June-July) was found to have limited effect in reducing resultant spring larval populations of *Sitona discoideus*. In view of the relative severity of treatment required before significant reductions occurred, such a technique is probably of little value for sitona control alone.

INTRODUCTION

Larvae of *Sitona discoideus* may reach densities of up to 3,800/m² in young (<4 years) lucerne stands in Canterbury and root damage to plants has caused yield losses of up to 50% (Goldson 1984). The subterranean larval stages are largely protected from surface-applied contact insecticides and Barratt (pers comm) has found that systemic insecticides applied in September are ineffective.

Sitona has a univoltine aestivatory life cycle with autumnal infestation flights into lucerne occurring between early April and late May (Goldson *et al* 1984). Consequently, the current control recommendation involves the application of a contact insecticide at the end of the flights, thereby sharply reducing the population before most of its reproductive effort is realized (Frampton submitted). While such a recommendation is valuable, it asks the grower to spray in anticipation of a problem which does not become apparent until late November. Furthermore, such an approach could interfere directly with the spread and impact of the braconid parasite *Microtonus aethiopoidea* recently released by DSIR specifically against adult sitona weevils.

As an alternative, mob-stocking has been suggested as a possible means of control during the winter months (Kain and Trought 1982). The opportunity to test this method arose as part of a larger continuing DSIR study investigating the positive and negative effects of winter trampling on stand production and longevity.

METHOD AND MATERIALS

Lucerne (cv. WL 318) was drilled on 23 October 1981 in a Templeton silt loam at a seeding rate of 10 kg/ha and was mown twice before the onset of the experiment in June 1982. By this time a population of sitona had become well established.

The experiment consisted of a randomised block design with four trampling treatments replicated four times. Trampling durations were for 0 days (control), 7 days, 14 days and 28 days. By confining three 50-55 kg sheep to the 4 x 15 m plots an equivalent stocking rate of 500 sheep/ha was maintained in all treatments. Stock was put on at staggered intervals such that all treatments ended on 20 July. The same sequence was repeated in 1983 on the same plots.

In view of the exceptional dryness of the 1982 winter, the plots were irrigated with 100 mm of water in the 8 h prior to stocking.

During the 1982 season, sitona weevil larval populations were assessed on the 8th November by removing three 190 x 190 x 250 mm randomly collected soil blocks from each plot; these were then taken to the laboratory and larvae were extracted by hand-sorting. Larval assessment in 1983 was made on 28th November using five randomly collected 140 x 140 x 250 mm soil blocks per plot. These samples were combined, wet sieved and the larvae floated off in saline solution.

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RESULTS AND DISCUSSION

In 1982 the control plots sustained a peak sitona larval population of 1053/m² compared with 628/m² in 1983. This 40% drop is consistent with the observations of Goldson and French (1983) who calculated an average decline of 40% in larval density from one year to the next as young lucerne stands age.

The effect of winter trampling of lucerne by 500 sheep/ha on these larval populations is depicted in Fig. 1. These results show that in 1982, the population was lowered by 50% after 28 days trampling compared to 61% in 1983. The data also suggest that the bulk of this activity may have occurred within the first 14 days.

In spite of this effect, the merit of mob-stocking as a means of sitona weevil control is not certain. Assuming a comparable effect on very high densities of larvae, in areas such as Darfield even a 60% reduction in the population would still result in densities well above the damage threshold. Furthermore, high populations of sitona larvae have shown marked density-dependent mortality (Goldson unpublished). A period of mortality through trampling may therefore merely reduce population loss through density-dependent factors but not necessarily reduce the resultant population markedly.

Mob-stocking of lucerne in the winter months is not a recommended practice. Close *et al* (1982) have suggested that crown damage through trampling increases lucerne susceptibility to a wide range of fungal pathogens that produce crown rot. The significance of this disease has yet to be fully ascertained and represents another important aim of this experiment (Wynn-Williams unpublished).

Fig. 1: Effect of mob-stocking (500 sheep/ha) in June-July 1982 and 1983 on subsequent *Sitona discoideus* larval populations as measured in spring.

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