

## EVALUATION OF MOB STOCKING FOR CONTROL OF GRASS GRUB

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### SUMMARY

Mob stocking, at rates used in rotational grazing regimes, was evaluated for grass grub (*Costelytra zealandica* (White)) control at 14 sites in Southland during May 1987. At four sites where controls were used, stocking in mid-May with 1125-1625 ewes/ha for 1 day gave an average 31% reduction in grass grub population 3 months later. At an additional 10 sites, comparisons of grub densities in the same pasture immediately before and up to 14 days after stocking at 1200-2800 ewes/ha also showed a reduction in grass grub populations of 31%. These results confirm that mob stocking gives a low level of grass grub control.

### INTRODUCTION

The high cost of using insecticides to control grass grub (*Costelytra zealandica* (White)), the variable effectiveness of these insecticides combined with their associated environmental and human hazards, and the low returns currently being experienced by sheep farmers, have encouraged many farmers to seek alternative methods of reducing grass grub populations. Many Southland farmers heavily stock areas damaged by grass grub with either sheep or cattle in the belief this reduces the damage. However, little information is available on grass grub mortality achieved by mob-stocking in Southland.

East *et al* (1981) showed in the Waikato that winter stocking with 350-900 cows/day/ha reduced grass grub numbers by 20-40%. Kelsey (1951) showed that in Canterbury, mob-stocking can assist recovery of damaged pasture by consolidating loosened soil and permitting rerooting of plants.

The present study investigated the effect of sheep stocking in late autumn, at rates typical of rotational grazing regimes, on grass grub numbers in Southland. At this time of year the majority of grass grub are near the soil surface and have developed into third instar larvae (Stewart and Stockdill 1972). Soil moisture levels are normally near field capacity and these combined factors make this the most suitable time of year to attempt grass grub control by methods dependant on soil compaction such as heavy rolling (van Toor and Stewart 1986) and mob stocking.

### METHODS

Rotational grazing at 14 sites in the Riversdale/Balfour area in N.E. Southland was carried out between 7 and 16 May 1987. One control plot, 80 x 5 m, was set up adjacent to mob-stock plots at each of four sites enabling post treatment comparisons between stocked and unstocked areas. Because previous studies had shown that grass grub densities did not decline naturally to a large extent during May (Stewart and van Toor 1983, 1986; van Toor and Stewart 1986, 1987), 10 sites had no untreated control and grass grub densities were simply compared with pre-treatment densities. The area of mob-stocked plots ranged from 0.38 to 2 ha. Stocking rates varied from 1125 - 1625 ewes/ha at the sites with controls and 1200 - 2800 ewes/ha at the sites without controls. The stocking period in each case was 1 day. Ewe weights ranged from 57 to 64 kg.

Soil moisture was measured gravimetrically at 0-50 mm and 50-100 mm soil depths at each site during stocking. Rainfall was estimated from a rain gauge located at Ardlussa which was central to the trial sites.

Grass grub densities were estimated from 50, 100 mm diameter x 170 mm deep, soil cores/plot within 5 days prior to mob stocking and 10 to 14 days after stocking at all sites and again 13 weeks after treatment at the sites with control plots. Plots were not

*Proc. 42nd N.Z. Weed and Pest Control Conf.*

grazed during that period. In the pre-treatment sampling, cores were divided into 0-5 mm, 50-100 mm and below 100 mm sections to indicate vertical distribution of the larvae. Pre- and post-treatment cores were evenly spaced along parallel 50 m "tram lines", which were 0.30 m apart, through areas where grass grub damage was evident.

### RESULTS AND DISCUSSION

During the period when mob stocking was carried out 14.5 mm of rain fell. Mean soil moistures were 52% (SEM = 2.1) at the 0-50 mm depth and 39% (SEM 1.2) at the 50-100 mm depth which approximated the mean field capacity found at three sites in the same vicinity (van Toor and Stewart 1986; Stewart and van Toor 1986; Stewart *et al* 1987).

The overall grass grub population immediately before stocking comprised 31% second instar larvae, 68% immature feeding third instar and 1% mature third instar larvae. At the sites with controls, where densities ranged from 147 to 583 larvae/m<sup>2</sup>, there was no significant difference in grub densities between control and stocked plots in the 2 weeks after stocking, but after 13 weeks there were 31% ( $P < 0.05$ ) fewer larvae in treated plots than in control plots (Table 1). The densities of second instar larvae were not affected, possibly because 70% of these grubs were 50 mm below the soil surface at time of stocking compared with the third instar grubs, 71% of which were above 50 mm.

**TABLE 1: Effects of mob stocking with 1125 - 1625 ewes/ha in May on grass grub density (larvae/m<sup>2</sup>) at the four sites containing controls. (Data are back transformed means of log<sub>e</sub> density).**

Date	Second instar		Third instar		Total	
	Control	M stk	Control	M stk	Control	M stk
Pre-treatment	94	106	315	333	411	441
Post-treatment (1-2 weeks)	82	106	280	257	362	367
Post-treatment (13 weeks)	63	65	244	138	308	211
LSR <sub>(0.05)</sub>	1.42		1.57		1.35	

At all sites, with densities up to 934 larvae/m<sup>2</sup>, sampling within 14 days of treatment showed an overall reduction in grass grub density of 31% (Table 2) with mortalities ranging from 0 to 55%. Regression analysis comparing total grub densities before and within 15 days of treatment showed that there was no linear relationship between mortality and the size of the initial population ( $P > 0.05$ ), although the physical effects which grubs have on soil texture and their vertical distribution may be influenced by population density. There was no significant relationship between grass grub mortality and stocking rate. The level of control achieved from mob stocking alone is unlikely to have significant beneficial effects, although it can retard population build up. It can also be used in conjunction with other measures, e.g., nitrogen fertiliser (van Toor *et al* 1989), to alleviate pasture damage.

**TABLE 2: Effects of mob stocking with 1125 to 2800 ewes/ha on grass grub densities, meaned over 14 sites, measured within 5 days before and between 7 and 15 days after mob stocking. (Data are back transformed means of log<sub>e</sub> density.)**

	Second Instar	Third Instar	Total
Pre-treatment	177	396	586
Post-treatment	140	254	404
LSR <sub>(0.05)</sub>	1.17	1.21	1.16

### CONCLUSION

Mob stocking with 1125-1625 ewes/ha in mid May caused a 31% reduction in grub densities 3 months after treatment. However, there was no dramatic decrease in grub densities within 14 days of stocking with up to 2800 ewes/ha. Results confirm other findings that mob stocking gives a relatively low level of mortality, but it can be used as a cheap, easily applied and non-disruptive option for grass grub management.

### ACKNOWLEDGEMENT

Mr P. Jones, Mr K. Mitchell and all other staff who gave technical assistance, and Dr K.G. Dodds for statistical analysis of the data.

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