INSECTICIDES FOR CONTROL OF SOD WEBWORM

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Summary

Seven insecticides were evaluated in one laboratory and two field trials for their activity against sod webworm (*Eudonia sabuloseella*). Chlorpyrifos gave best results, but this amounted only to 62% control at an application rate of 600 g insecticide/ha.

INTRODUCTION

During autumn 1977 and in May 1978, infestations of a sod webworm caused visible damage to pasture on a hill country sheep farm at Ngaruawahia. Damage was confined mainly to the shaded southern faces on inter-track surfaces, where feeding of the larvae at the base of plants had killed off the foliage. The sward did regenerate in the following spring.

Quinlan (1972) reported from Queensland, Australia that 10 webworm/m² caused a reduction in dry season pasture production of about 91 kg of dry matter /ha. Many species of sod webworm occur in New Zealand pasture and, according to Gaskin (1975), may be responsible for measurable destruction in improved grasslands.

As no insecticide has as yet been registered in New Zealand for the control of this pest, and because sod webworm has certain similarities to porina caterpillar (i.e., same order, habitat and feeding habits) it was decided to evaluate the insecticides registered for porina (*Wiseana* spp) control against sod webworm larvae in a laboratory experiment and on the infested site.

METHOD

The compounds investigated in the laboratory trial were fenitrothion, chlorpyrifos, cypermethrin and Hoe 26417. These insecticides were topically applied to larvae with a mean mass of 33.7 mg at the dosage rates given in Table 1. The procedures followed were those described by du Toit (1979) for contact insecticidal activity. After application, larvae were held on damp moss in ice cube trays, and mortality of test insects was registered if they did not respond to touch. Larvae were collected from the Ngaruawahia hill farm which was also the site of the field trials.

In each of the field trials fenitrothion emulsifiable concentrate (EC), fenitrothion granules (G), chlorpyrifos EC, Hoe 26417 EC, diazinon EC, diazinon G, trichlorfon G and trichlorfon sprayable powder (SP) were evaluated. Pest infestations, obvious from areas of damaged pasture, were located on inter track surfaces on south-facing slopes and these areas were selected for experimental plots. Plot size was 1 m² and to enhance the reliability of results, an untreated control plot of 1 m² was located adjacent to each treated plot. Each treatment in both experiments was replicated five times. Sprayed treatments were applied with a Fyn Spray

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Apollo hand sprayer calibrated to deliver 1800 litres of spray mix per ha. Granules were applied with a hand shaker. Rates of application are given in Table 2.

Plots were sampled 11 days after treatment by digging one 140 mm spade square of turf, 50 mm deep from each plot and one turf from its adjacent control area. The turf squares were placed for 15 min. on a heating mantle in the laboratory and the numbers of larvae counted as they were driven to the surface.

RESULTS AND DISCUSSION

From the results of the laboratory screening trial presented in Table 1, chlorpyrifos appears to be the most effective insecticide screened. Fenitrothion at 1.0 µg per insect gave only 21 per cent mortality after 5 days. In a similar topical application test (du Toit *et al* 1978), the same rate of this insecticide gave 100% mortality of porina caterpillar after 4 days. The potency of cypermethrin against sod webworm appears unexpectedly low and only at the highest rate (10 µg) does this synthetic pyrethroid produce similar effects to that obtained with the middle rate (1.0 µg) of the best organophosphate, chlorpyrifos.

Table 1. Percentage of larvae affected at various times after topical treatment with three rates of different insecticides. Laboratory trial.

Insecticide	Rate µg/insect	Time after Treatment			
		1 hour	1 day	3 days	5 days
Chlorpyrifos	10	96	96	100	100
	1.0	25	36	86	93
	0.1	0	0	4	4
Hoe 26417	10	93	96	96	100
	1.0	54	71	68	71
	0.1	0	0	0	0
fenitrothion	10	25	36	68	82
	1.0	7	7	14	21
	0.1	4	7	4	18
cypermethrin	10	46	61	79	82
	1.0	0	0	0	0
	0.1	0	0	0	4
control (acetone only)		0	0	0	0

As the design and treatments of the two field trials were similar, it was decided to combine the results obtained to give ten replicates of each treatment. Data was subjected to an analysis of variance of log transformed numbers with covariable adjustment for the control populations. The figures presented in Table 2 are the original (arithmetic) mean numbers of larvae extracted from each treatment plot eleven days after insecticidal application. Results show that chlorpyrifos is significantly better ($P < 0.001$) than the rest of the treatments. There is no statistical evidence of any differences amongst the other treatments.

Actual control achieved (Table 2) was generally poor and ranged from 62% (chlorpyrifos) to an apparent increase in numbers (diazinon EC and trichloronat).

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Table 2. Mean number of larvae alive per sample 11 days after application of insecticide, and percentage control achieved. Field trials.

Insecticide	Rate g/ha	Treated	Control	% Control
chlorpyrifos EC	600	4.3	11.2	62
trichlorfon SP	900	5.1	8.9	43
fenitrothion G	600	8.1	10.2	21
fenitrothion EC	600	6.8	8.5	20
diazinon G	800	7.4	8.1	9
Hoe 26417 EC	400	7.1	7.1	0
diazinon EC	800	7.6	7.2	-6
trichloronat G	800	9.6	7.3	-32

Multiplicative s.e. of means = 1.31

It is believed that the rates required for effective control of sod webworm are appreciably higher than those needed for control of porina caterpillar and field trials evaluating at least chlorpyrifos at around 1 kg/ha and trichlorfon at around 2.2 kg/ha are recommended.

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