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Control of Oncopera mitocera (Turner) (Lepidoptera: Hepialidae) with diazinon granules

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Summary

On the Atherton Tableland of north Queensland, 5% and 10% granular formulations of diazinon, broadcast at 1.12 and 0.56 kg a.c. ha^{-1}, effectively controlled flat-headed pasture webworms (*Oncopera mitocera* (Turner)) in a dense sward of setaria (*Setaria sphacelata* var. *sericea* cv. Nandi) and pangola grass (*Digitaria decumbens*) approximately 10 cm high. Larval populations were reduced from a site mean of 130 m^{-2} before treatment to less than 5 m^{-2} by all insecticide treatments 3 weeks after treatment. Populations in the untreated plots averaged 153 m^{-2} at this time. The higher rate of the more concentrated granule gave a faster kill, but was not superior to other insecticide treatments 3 weeks after treatment.

1. Introduction

Serious reduction of pasture growth by *Oncopera* spp. (pasture webworms) has been measured on the Atherton Tableland of north Queensland (Quinlan, Elder and Shaw 1975). Several insecticides have been shown to give effective control. The main difficulty in controlling webworms is getting the insecticide down to ground level where the larvae feed. This necessitates the removal of pasture cover by heavy grazing, slashing, or waiting until the webworms have destroyed a large proportion of standing pasture (Elder 1974).

The need for control usually becomes apparent in August (the start of the dry season). It is undesirable to remove any pasture reserves by slashing at this time.

Granular formulations of insecticide should, in theory, fall through the pasture cover to ground level and obviate the necessity of slashing. Elder (1974) showed that diazinon at 0.42 kg a.c. ha^{-1} applied as a spray effectively controlled webworms. Helson, Meeklah, Darwin and Robertson (1964), Kelsey (1965), Lowe (1966) and Perrott (1966) obtained variable, but generally satisfactory results in New Zealand using diazinon granules to control the related porina caterpillar (*Wiseana* spp.).

This experiment was designed to test the effectiveness of two proprietary preparations of diazinon granules in controlling *O. mitocera*.

2. Materials and methods

Plots were laid down in webworm-infested setaria (*Setaria sphacelata* var. *sericea* cv. Nandi) and pangola grass (*Digitaria decumbens*) pasture near Malanda in September 1972. The flat-headed pasture webworm (*Oncopera mitocera* (Turner)) was the species present.

Treatments were:

1. Nil
2. 0.56 kg a.c. ha^{-1} diazinon as 5% granules
3. 1.12 kg a.c. ha^{-1} diazinon as 5% granules
4. 0.56 kg a.c. ha^{-1} diazinon as 10% granules
5. 1.12 kg a.c. ha^{-1} diazinon as 10% granules

These were arranged in a 5 x 5 latin square. Plot size was 4.57 m x 4.57 m.

Granules were mixed with a quantity of sand and applied by hand on 8 September 1972.

Larval counts were taken using the hardboard square method of Miller and Martyn (1952) before (7 September), and 1 week (15 September) and 3 weeks (27 September) after insecticide application. One square (0.093 m^2) per plot was placed for the first two counts and two squares per plot for the final count.

When the diazinon granules were applied the pasture was about 10 cm high. Experience with these pastures indicates they should have an oven-dry-matter yield of between 1 500 and 2 000 kg ha^{-1}.

This pasture did not appear to greatly hinder the penetration of the granule, as both sand and granules were found on the soil surface following chemical application.

Stock were excluded during the trial.

Counts 2 and 3 were square root $(x + \frac{1}{2})$ transformed. Data were then analysed by analysis of variance with pairwise testing for significant differences by the protected least significant difference procedure.

3. Results and discussions

Table 1 shows the results of the three counts.

Table 1. Larval populations in larvae m^{-2}

Treatment	Count 1 7 Sep 72	Count 2 15 Sep 72	Count 3 27 Sep 72
Nil	118.4	163.2* (12.79)†	144.4* (12.04)†
0.56 kg 5% granule ..	133.5	12.2* (3.57)†	4.9* (2.33)†
1.12 kg 5% granule ..	148.5	10.5* (3.31)†	1.4* (1.38)†
0.56 kg 10% granule ..	118.4	3.6* (2.03)†	1.4* (1.39)†
1.12 kg 10% granule ..	131.3	0.0* (0.71)†	1.4* (1.39)†
L.S.D. 0.05%	n.s.	2.05†	2.33†
L.S.D. 0.01%	..	2.88†	3.26†

* Equivalent means from $\sqrt{x + \frac{1}{2}}$ transformed larval counts.

† $\sqrt{x + \frac{1}{2}}$ transformed larval counts.

There were no significant differences between treatments before insecticide application (count 1) indicating that the population was evenly distributed over the trial area. The mean larval population density for the experimental area calculated from table 1 was 130 m^{-2}. A population of this magnitude could be expected to reduce pasture presentation yield by around 1 100 kg ha^{-1} over the following 10-week period (Quinlan, Elder and Shaw 1975).

At count 2 all insecticide treatments had significantly lower populations ($P < 0.001$) than the nil treatment, and 1.12 kg ha^{-1} of the 10% granule formulation gave significantly better control of larvae than either rate of the 5% granule formulation ($P < 0.05$).

By count 3 there was no significant difference between granular rate or concentrations, all of which had reduced larval populations to insignificant numbers (table 1).

The higher rate of the concentrated granule gave a faster kill, but since the time factor was short and the differences small this effect is of no practical importance.

O. brachyphylla, which is closely related to *O. mitocera,* has similar susceptibility to insecticides including diazinon (Elder 1974). Diazinon granules could also be expected to control this species.

These results indicate that granular formulations can successfully control pasture webworm in pastures of this type at rates as low as 0.56 kg a.c. ha^{-1}.

There is obviously scope for further work with varying rates and concentrations of granular or bait forms of insecticide under a variety of conditions of pasture cover.

4. Acknowledgements

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