ARMY CATERPILLAR CONTROL IN NORTH ISLAND MAIZE AND BARLEY WITH LEPTOPHOS

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Summary

Trials are reported which measured the effectiveness of leptophos in comparison with trichlorfon for the control of army caterpillar (*Pseudaletia separata*) in maize and barley. In all three trials leptophos at 0.25, 0.5, and 1.0 kg/ha was superior to trichlorfon, 1.0 kg/ha in terms of caterpillar mortality and longevity of control.

INTRODUCTION

The common exotic army caterpillar (*Pseudaletia separata*) periodically becomes gregarious and reaches epidemic proportions, when they destroy considerable areas of cereals and grasses (Miller 1971).

Although a race of the introduced parasite (*Apanteles ruficrus*) appears to be controlling army caterpillar in some localities, insecticides are still widely used. In cereal crops field experience has shown that army caterpillar populations can rapidly increase to levels requiring further insecticide application. There appeared therefore to be a need for an insecticide with greater residual activity than materials in current use. In the summers of 1973 and 1974 trials were commenced to evaluate the insecticides leptophos and trichlorfon for the control of army caterpillar in maize and barley.

METHOD

The 1973 trial was sited in a green feed maize crop near Hamilton. At the time of spraying, on 27 March 1973, the maize was approximately 1m in height. The treatments were applied to 10 m x 2 m plots in 300 litres water/ha, using a precision plot sprayer.

The 1974 maize trial was located in a commercial grain crop in the Te Awamutu district. Insecticide application was made on 1 February 1974 with a fixed wing aircraft delivering 110 litres/ha. The plot size was 0.5 ha. A standard recommended rate of wetting agent was added to all treatments. At the time of spraying the crop was 2 to 2.5 m high.

The 1974 Manawatu barley trial was aerially sprayed on 21 February 1974, all treatments being applied in 110 litres/ha. At the time of spraying the crop was at Feekes stage 11.2 and harboured a moderate infestation of army caterpillar. The plot size was 0.2 ha. Rainfall was measured on all trial sites.

Laboratory bio-assay:

Green plant material was collected at random from treated and untreated plots at intervals following spraying, and fed to fifty captive army caterpillars per treatment. Caterpillar mortality was recorded at intervals after feeding commenced.

In the 1973 maize trial sampling was carried out 1, 4, 7, 10, 14, 21, 31, 41, 50 and 57 days following treatment. The 1974 maize trial was sampled at intervals of 12 hours, 1, 2, 4, 7, 14, 21, 28, 42 and 49 days post treatments, whilst the 1974 barley trial was sampled at

12 hours, 1, 2, 4, 7, 12 and 19 days after treatment. In the 1974 Hamilton maize trial samples were taken at intervals of 12, 24 and 48 hours post treatment from the top and bottom of plants treated with leptophos. These were then fed to separate batches of army caterpillar to ascertain whether the spray had penetrated the leaf canopy.

1973 Hamilton Maize Trial:

The analysed results of this trial are shown in Fig. 1.

Leptophos 0.25, 0.50 and 1 kg/ha was significantly superior to trichlorfon for a period of 42 days after treatment (Fig. 1).

Leptophos 0.50 and 1 kg/ha was superior to leptophos 0.25 kg/ha within the period of 14 to 50 days post treatment. A higher mortality was measured on trichlorfon 1 kg/ha in comparison with untreated for a period of seven days post application.

1974 Hamilton Maize Trial:

Reference to Fig. 2 shows that leptophos 0.50 kg/ha recorded an army caterpillar mortality of 78% for a period of 14 days. Trichlorfon 1 kg/ha resulted in an army caterpillar mortality of 38% 12 hours after treatment and 6% mortality two days after application.

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1974 Manawatu Barley Trial:

An army caterpillar mortality of 90% plus was measured on leptophos (0.25, 0.5, 1 kg/ha) 12 hours after treatment.

In contrast trichlorfon 1 kg/ha recorded a mortality of 46% 12 hours after application. This difference between leptophos and trichlorfon persisted for the period of the trial (Fig. 3).

DISCUSSION

In the 1973 Hamilton maize trial, the superiority of leptophos 0.50 and 1 kg/ha for the control of army caterpillar in comparison with trichlorfon and carbofuran is clearly demonstrated (Fig. 1). Caterpillar mortality remained above 75% on leptophos 0.50 and 1 kg/ha for 42 days. The effectiveness of leptophos at 0.50 and 1 kg/ha did not appear to be effected by rainfall during this period.

Leptophos 0.25 kg/ha recorded a higher army caterpillar mortality than trichlorfon for the period of the trial. However caterpillar mortality declined rapidly from 83% on day 1 to 11% on day 42. This could have been related to the 100 mm of rain which fell during this period (Fig. 1).

Results from the 1974 maize trial are illustrated in Fig. 2. Twelve hours after treatment leptophos recorded a mortality of 85% in comparison with trichlorfon 38%, while the longevity of control demonstrated by leptophos in comparison with trichlorfon is also apparent. The decline in caterpillar mortality from 90% on day 14 to 34% on day 21 may have been caused by rainfall (35 mm) which fell in this period.

Fig. 3 further illustrates the extended control of army caterpillar by leptophos in comparison with trichlorfon in a Manawatu barley crop. The decline in percentage mortality between days 2 and 4 may have been caused by heavy rain (21 mm) during this period.

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