CHEMICAL CONTROL OF ARGENTINE STEM WEEVIL in MAIZE

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Summary

In trials involving three granular insecticides for the control of Argentine stem weevil (*Hyperodes bonariensis*) in maize, carbofuran (1 and 2 kg/ha) significantly reduced plant damage in comparison with phorate 1 kg/ha, parathion 1.5 kg/ha and untreated control.

INTRODUCTION

Argentine stem weevil (*Hyperodes bonariensis*) may cause severe damage to establishing maize crops (Kain and Barker, 1966). It is considered to be an important insect pest of maize throughout the Waikato, South Auckland and Bay of Plenty areas by Government Advisors, representatives of the Mercantile firms and farmers.

The symptoms of plant damage are failure to emerge, leaf mining, wilting, collapse and death at the two to four leaf stage, yellow streaking of the leaves, stunting, premature tillering and splitting of the stems (Kain and Barker, 1966). Severe weevil damage to crops has traditionally been linked with those grown on land that was previously permanent pasture, or had been sown in a short rotation ryegrass for winter feed. Poor cultivation where a proportion of the turf mat remains on the surface is thought to be a contributing factor to the severity of plant damage in the ensuing maize crop.

Investigation of volunteer ryegrass shooting from undecomposed turfs within maize crops, revealed a high population of weevil larvae. Evidence strongly suggests that maize plants are infected and killed by Argentine stem weevil larvae and that the mode of infestation is by transfer from ryegrass turfs into emerging or emerged maize (Kain and Barker, 1966).

EXPERIMENTAL

Five trials were undertaken to study the effectiveness of three granular insecticides for the control of stem weevil damage in establishing maize. These trials were located in the Waikato and Bay of Plenty districts and were begun in October and November 1973.

The layout for each trial was a randomised block with 4 to 6 replications and a plot size of 25 m x 3 m. The trials were sited on land previously in permanent pasture. Maize was sown in 75 cm rows using a precision planter. The insecticides were sown along the seed lines at a depth of 5 cm using a 'Planet Junior' model 300A.

Plant population was assessed by counting the total number of plants in each plot. Seedling damage was assessed by lifting and dissecting wilted plants for weevil presence at weekly intervals during the first month after emergence. These were totalled and are shown in Table 1. Crop yield was estimated by harvesting all the cobs in the centre two rows of each replicate. These cobs were dried, dekernelled, weighed and the treatment yield adjusted to 14% moisture.

TABLE 1: EFFECT OF INSECTICIDES ON MAIZE PLANT POPULATION, STEM WEEVIL DAMAGE AND YIELD

Treatment kg/ha	Trial 1		Trial 2		Trial 3		Trial 4		Trial 5				
	Plant pop. 000/ha	Damaged plants 000/ha	Plant pop. 000/ha	Damaged plants 000/ha	Plant pop. 000/ha	Damaged plants 000/ha	Plant pop. 000/ha	Damaged plants 000/ha	Plant pop. 000/ha	Damaged plants 000/ha			
Control	57.2 bA	6.0 aA	8.9 bB	164 a	5.3 aAB	76.1 a	4.5 aA	63.8 bA	2.7 aA	9.73 abA	83.9 a	0.93 a	10.6 a
parathion 1.5	61.7 abA	4.0 abA	9.15 bB			75.9 a	3.7 aA	66.0 abA	2.1 abA	9.22 bA	78.8 a	0.80 a	10.2 a
phorate 1	61.6 abA	3.6 bA	9.63 abB	155.3 a	6.3 aA	76.1 a	3.2 aAB	67.1 abA	1.9 abAB	9.57 abA	80.0 a	0.67 a	10.5 a
carbofuran 1	64.8 aA	1.1 cB	9.55 abAB	166.7 a	3.3 bAB	79.7 a	1.7 bB	66.3 abA	1.5 bcAB	9.83 abA	83.9 a	0.27 a	10.8 a
carbofuran 2	64.0 aA	0.67 cB	10.13 aA	171.3 a	2.3 bB	—		69.3 aA	0.7 cB	9.96 aA	79.2 a	0.08 a	10.8 a
CV%	6.1	43	5.6	6.9	53	4.2	34	3.8	47.6	4.1	4.9		4.0

RESULTS

The results are shown in Table 1. In the first trial carbofuran (1 and 2 kg/ha) significantly increased plant population in comparison with control and reduced the number of plants damaged in comparison with parathion, phorate and untreated. Phorate also reduced the number of plants damaged in comparison with control. The high rate of carbofuran significantly increased grain yield in comparison with control and parathion.

In trials 2 and 3 plant damage was again reduced by carbofuran in comparison with the other treatments.

In trial 4 carbofuran (2 kg/ha) increased the plant population relative to control and reduced plant damage relative to all other treatments tested. Carbofuran (1 kg/ha) also reduced plant damage compared with control.

In trial 5 there were no significant differences in plant population, plant damage and grain yield between treatments.

DISCUSSION

In all five trials, carbofuran drilled with maize seed at planting reduced the subsequent incidence of seedling damage caused by stem weevil.

In four out of five trials reported, carbofuran significantly reduced the number of damaged plants.

Less plant damage recorded on the carbofuran treatments tended to be reflected in increased plant populations per hectare but this did not always increase grain yield.

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