THE EFFECTIVENESS OF INSECTICIDAL SEED DRESSINGS AGAINST SOLDIER FLY LARVAE

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Summary

In a pot experiment a number of insecticidal seed dressings were tested for activity against soldier fly larvae (*Inopus rubriceps*). Trichlorfon and omethoate proved the most effective followed by isofenphos and carbofuran. Information on the way this control affected the growth of the seedlings is presented.

INTRODUCTION

Previous work has reported a number of systemic insecticides to have activity against soldier fly larvae (*Inopus rubriceps*) (Fellowes 1973; Mackay and Rowe 1973; 1974; Dixon and Grimmer 1973; Dixon *et al.* 1974). Incorporating an insecticide with the sowing of seed has beneficial effects on subsequent dry matter production when soldier fly larval populations are high (Mackay *et al.* 1974; Dixon 1974). This paper reports the results of recent work to evaluate the possibilities of placing less toxic insecticides on the seed as a means of both reducing soldier fly larval populations and enhancing the establishment of ryegrass (*Lolium perenne*) seedlings.

EXPERIMENTAL METHODS

The following insecticides, concentrations and formulations, were used; permethrin W.P., trichlorfon 95% W.P., benomyl 50% W.P., thiabendazole 100% W.P., omethoate 58% concentrate, isofenphos 20% S.I., carbofuran 75% W.P., methiocarb 75% W.P., triazophos 50% E.C. Each insecticide was applied to ryegrass seed at 10% weight for weight of these formulations irrespective of their concentrations. One percent methyl cellulose was used as a sticker.

Ryegrass seeds were sown in 18 cm diameter pots (100 seeds/pot) and 100 soldier fly larvae were introduced into each pot at the time of sowing. There were four replicates of each insecticide. In addition four pots with untreated seed and soldier fly larvae and another four with untreated seed and without larvae, were included, giving a total of 11 treatments. After emergence plant numbers were reduced to 70 per pot. The experiment was carried out over a ten week period at the end of which the pots were washed out and the number of live soldier fly larvae counted. Assessments were also made of the number of tillers and the weight of roots.

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RESULTS

Triazophos proved phytotoxic as the number of seedlings emerging was significantly lower than in all other treatments. Thiabendazole caused a reduction in plant growth throughout the experiment.

TABLE 1: EFFECT OF INSECTICIDAL SEED DRESSINGS ON SOLDIER FLY LARVAE AND SUBSEQUENT ROOT GROWTH, TILLER FORMATION AND DRY MATTER PRODUCTION TEN WEEKS AFTER SOWING (means of 4 replicates)

Insecticide	ai/25 kg seed	Number of larvae per pot	Dry weight of roots per pot (g)	No tillers/plant	Total DM production
uninfested	Nil	Nil	1.3 a	2.2 a	2.6 a
trichlorfon	2.4	14 eD	1.0 a	2.0 ab	2.2 abc
omethoate	1.5	16 eD	1.1 a	2.1 ab	2.3 ab
isofenphos	0.5	28 dCD	1.3 a	1.9 abc	2.4 ab
carbofuran	1.9	29 dCD	1.1 a	1.6 cd	2.4 ab
triazophos	1.3	40 cBC	0.8 a	1.5 cd	1.5 cd
methiocarb	1.9	45 bcAB	0.8 a	1.4 d	1.6 cd
permethrin	2.5	48 bcAB	1.1 a	1.6 cd	2.0 abc
thiabendazole*	2.5	55 abAB	0.8 a	1.4 d	1.2 d
benomyl	1.3	60 aA	1.0 a	1.7 bcd	1.9 bcd
untreated	Nil	61 aA	0.9 a	1.6 cd	1.7 bcd

* showed phytotoxic symptoms.

Table 1 shows the significant effect insecticidal seed dressings have had upon the soldier fly larvae. The number of larvae present after the ten week period was correlated with the number of tillers per plant ($r = -0.51^*$) and dry matter production ($r = -0.47^*$). The number of tillers per plant was correlated with root weight ($r = 0.72^{***}$).

DISCUSSION AND CONCLUSIONS

The results indicate that by placing insecticides on the seed a satisfactory control of soldier fly larvae can be achieved. Soldier fly larvae suck juices directly from the vascular tissue (Fellowes *pers comm*). The materials that killed the larvae most successfully are relatively soluble in water, and are known to enter plant tissue and to exhibit varying degrees of systemic activity. Within plant tissue carbofuran is known to either oxidise or hydrolyse, and conjugate with sugar molecules (Cook *et al.* 1969) and it seems most likely that soldier fly larvae ingest it in this form. Other insecticides are almost certainly entering soldier fly larvae via the plants' vascular system.

The opportunity of both accurate placement and protection, together with the specificity of action to the target organism and low cost that this technique offers warrants further consideration and field assessment.

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Soldier Fly

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