

A Study on the Control of Rice Whorl Maggot *Hydrellia philippina* Ferino

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ABSTRACT

Use of diazinon 1 per cent, monocrotophos 0.1 per cent or carbofuran 1 per cent as seed treatment checked the whorl maggot effectively while fenthion 0.05 per cent was least effective. The observations on germination percentage and plumule and radicle growth showed that chlorfenvinphos 0.05 per cent had some adverse effect. Orthene 0.1 per cent was found to have low inhibitory effect on germination and stimulatory effect on plumule and radicle growth.

INTRODUCTION

The Whorl maggot, *Hydrellia philippina* Ferino is an important pest of rice in the early stages of crop growth. Dyck (1974) reported reduction in number of tillers and plant height, and 30 per cent yield loss due to its damage. The damage by this pest was found to reduce the chlorophyll content of leaves and uptake of major nutrients, (Ramamurthy, 1975). Seed treatment with insecticides was evaluated as a method of control of this pest by Pathak and Dyck (1973) and Encarnacion and Dupo (1974). Seed treatment with diazinon and chlorfenvinphos was reported effective (Anon., 1968). In the present studies certain insecticides were evaluated as seed treatment under field conditions for their effectiveness against the whorl maggot.

MATERIALS AND METHODS

A field experiment was laid out during October 1974 to January 1975 in simple randomised block design with three replications with a plot size of 4 x 2 m and variety IR. 8. The insecticides evaluated include carbofuran, diazinon, chlorfenvinphos, fenthion, monocrotophos, phosphamidan and orthene (Acephate) and the seeds were soaked in the insecticide solutions for 24 hr. An untreated check was maintained using water alone for soaking. To study the side effects of seed treatment, the treated seeds were kept in standard germination trays with filter paper and number of seeds germinated, and radicle and plumule growth were observed on 7th day after treatment. The incidence of the pest was assessed by counting total and damaged tillers and leaves of each of

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ten clumps selected at random and percentage incidence worked out. The incidence was also assessed by scoring grades for the damaged area in the youngest leaf of five main tillers selected at random in each of the ten clumps, which were also selected at random. The data on the percentage incidence were converted into corresponding angles (Arc sine $\sqrt{\text{percentage}}$) for statistical analysis.

RESULTS AND DISCUSSION

(i) Effect of seed treatment on the control of whorl maggot: Diazinon, monocrotophos and carbofuran were superior as seed treatment and reduced the damage by 52.5, 52.0 and 51.8 per cent respectively on tiller basis compared to untreated check (Table I). Fenthion was the least effective and recorded only 11.8 per cent

TABLE I Effect of seed treatment on the control of rice whorl maggot

Treatment	% tillers damaged			% leaves damaged			Damage grades		
	Period in days after planting		Mean	Period in days after planting		Mean	Period in days after planting		Mean
	8	15		8	15		8	15	
Carbofuran 1%	11.2 (19.6)	11.4 (19.8)	11.3 (19.7)	8.2 (16.6)	8.8 (16.8)	8.3 (16.7)	107.0	108.0	107.5
Diazinon 1%	10.4 (18.8)	12.0 (20.3)	11.2 (19.5)	7.5 (15.9)	9.0 (17.4)	8.2 (16.6)	98.0	116.0	107.2
Chlorfenvinphos 0.05%	12.6 (20.8)	16.1 (23.6)	14.3 (22.2)	9.5 (18.0)	13.0 (21.1)	11.3 (19.6)	123.0	168.0	145.3
Fenthion 0.05%	17.6 (24.8)	23.9 (29.3)	20.7 (27.0)	14.0 (21.9)	20.9 (27.2)	17.4 (24.6)	183.0	194.0	188.7
Monocrotophos 0.1%	12.2 (20.4)	10.4 (18.9)	11.3 (19.6)	9.1 (17.6)	7.4 (15.8)	8.2 (16.7)	118.0	97.0	107.7
Phosphamidan 0.1%	13.3 (21.4)	16.0 (23.6)	14.6 (22.5)	10.4 (18.5)	13.3 (21.1)	11.5 (19.8)	135.0	169.0	151.9
Orthene 0.1%	13.4 (21.4)	14.2 (22.1)	13.8 (21.8)	10.4 (18.8)	10.8 (19.2)	10.6 (19.0)	140.0	141.0	140.5
Control	20.0 (26.6)	27.0 (31.1)	23.5 (28.8)	16.9 (24.3)	22.9 (29.2)	20.4 (26.8)	211.0	225.0	218.0
Level of significance			0.01			0.01			0.01
C.D. (P=0.05)			0.7			1.2			23.6

Mean of 6 values

Figures in parentheses are transformed values

reduction from check. In the same experiment incidence assessed on leaf basis and by scoring grades for the damaged area also showed similar results. Orthene, chlorfenvinphos and phosphamidan were moderately effective. The effectiveness of diazinon and chlorfenvinphos (Anon., 1968; 1971) has been reported earlier.

When the efficacy of insecticides was compared over the periods, all the treatments were found to show an increased infestation percentage on 15th day except monocrotophos (Table I). This consistent effect of monocrotophos can be attributed to its high systemic and residual effect.

(ii) **Effect of seed treatment on germination and seedling growth:** Chlorfenvinphos followed by monocrotophos and diazinon reduced the germination. Orthene and carbofuran showed very low inhibition. Chlorfenvinphos, diazinon, phosphamidan and fenthion adversely affected plumule growth, while chlorfenvinphos inhibited the radicle growth. Both orthene and carbofuran stimulated the plumule growth while orthene stimulated radicle also (Table II). The adverse effects of chlorfenvinphos on germination and radicle and that of chlorfenvinphos, fenthion and diazinon on plumule (Anon., 1968) has already been reported. The adverse effects of

TABLE II Effect of seed treatment on germination, plumule and radicle Length (Under Controlled conditions)

Treatment	Germination percentages	Plumule length (cm) @	Radicle length (cm) @
Carbofuran 1%	95.7 (78.5)	3.95	4.39
Diazinon 1%	90.7 (72.4)	2.24	3.82
Chlorfenvinphos 0.05%	84.3 (65.8)	2.17	2.22
Fenthion 0.05%	95.7 (78.5)	3.18	4.71
Monocrotophos 0.1%	93.3 (75.2)	3.87	3.94
Phosphamidan 0.1%	95.7 (78.5)	3.03	8.38
Orthene 0.1%	97.0 (80.5)	4.04	6.50
Control	98.7 (84.8)	3.91	5.69
Level of significance	0.01	0.01	0.01
C.D. (P=0.05)	6.5	0.76	1.22

* Mean of 3 values

@ Mean of 30 values

Figures in parantheses are transformed values

phosphamidan on plumule was also shown by Mitra *et al.* (1970) and Mani and Jayaraj (1975) in rice. The stimulatory or very low inhibitory effect of orthene agrees with earlier findings of Mani and Jayaraj (1975).

ACKNOWLEDGEMENT

Grateful acknowledgements are due to the Tamil Nadu Agricultural University for granting permission to publish the results from the M. Sc. (Ag). dissertation of the senior author and to the Indian Council of Agricultural Research for the financial help during the course of studies.

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