

Control of Rice Stem Borer, *Tryporyza incertulas* Walk. with Water Surface Application of Granular Insecticides

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Application of mephosfolan granules at 0.75 kg a.i./ha was found to be effective in checking the stem borer both at the vegetative and panicle bearing stage. The commencement of the insecticidal application either at 15th or 20th day after transplanting and repeated three times at 20 days interval was found to give better check of the stem borer.

The stem borer, *Tryporyza incertulas* Wlk. is one of the major pests of rice. Losses caused by borers have been estimated to range from 3 to 93 per cent (Ghose *et al.*, 1960). Reports are available on the effectiveness of various granular insecticides (Pathak, 1964; Satpathy, 1970; Venkataraman *et al.*, 1973 and Chelliah *et al.*, 1975) in controlling stem borer. Rao *et al.* (1976) reported carbofuran and mephosfolan are effective till 45 days after transplanting (DAT).

MATERIAL AND METHODS

Two field experiments were conducted with the insecticides mephosfolan (Cytrolane 5 G) and Carbofuran (Furadan 3 G) with rice variety Jaya. The insecticides were applied by broadcasting commencing the first application either at 15 or 20 DAT and repeated at 20 days interval. The frequency of application consisted of two and three rounds. Observations on the deadhearts were made at 30 and 50 DAT and the white ear infestation was recorded at

the time of harvest adopting stratified area sampling technique representing 2 per cent of the total population (Anon, 1969). At harvest the grain yield was recorded.

RESULTS AND DISCUSSION

Data on stem borer infestation and grain yield for the two experiments are furnished in Tables I, II and III. In the first experiment, mephosfolan and carbofuran recorded 1.89 and 2.32 per cent dead heart damage respectively at 30 DAT while the corresponding values at 50 DAT were 2.07 and 2.25 per cent. The white ear damage was 3.63 and 4.22 per cent in mephosfolan and carbofuran respectively as compared to 13.23 per cent in untreated control. Mephosfolan was superior to carbofuran in recording minimum infestation. When the different periods of observations were compared, low stem borer infestation was noticed at 30 DAT but it was on par with 50 DAT. Mephosfolan consistently recorded low stem borer infestation in all the three periods. Three rounds of

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TABLE I. Effect of different doses of carbofuran and mephosfolan in the control of rice stem borer

(Figures in parenthesis represent transformed values)

Treatments	I experiment			II experiment		
	30	50	Harvest	30	Harvest	
Carbofuran	2.05	2.36	3.05	1.15	3.78	
0.75 kg a.i./ha	(7.85)	(8.27)	(9.33)	(5.99)	(10.92)	
Carbofuran	2.59	2.15	3.69	0.94	4.59	
1.0 kg a.i./ha	(9.05)	(8.08)	(8.11)	(5.49)	(11.90)	
Mephosfolan	2.14	2.29	3.56	0.70	4.63	
0.75 kg a.i./ha	(7.84)	(8.30)	(13.10)	(4.73)	(12.17)	
Mephosfolan	1.64	1.86	3.71	0.94	3.72	
1.0 kg a.i./ha	(6.95)	(7.54)	(12.16)	(5.27)	(10.82)	
Control	3.63	8.35	13.23	2.18	9.83	
	(10.94)	(6.72)	(21.23)	(8.43)	(18.86)	
	Between periods	Control Vs other treatments	Between other treatments	Between doses	Chemical x dose	Period X chemical
I. Experiment						
Level of significance	0.01	0.01	0.01	NS	NS	0.05
CD (P=0.05)	1.11	1.98	0.93	—	—	1.62
II. Experiment						
Level of significance	0.01	0.01	0.01	NS	NS	0.05
CD (P=0.05)	0.90	1.96	0.93	—	—	1.31

application of insecticides at 15, 35 and 55 DAT was found to be superior and it was on par with 20, 40 and 60 DAT schedule.

The stem borer infestation was negligible in the second experiment at 50 DAT and hence it was not subject to statistical appraisal. Data at 30 DAT and white ear at harvest alone were used for statistical scrutiny. The stem borer infestation was 0.82, 1.04 and 2.18 per cent in mephosfolan, carbofuran and control plot respectively at 30 DAT while the respective values at harvest were 4.19, 4.17 and 9.83 per cent. The stem borer infestation was significant at 30 DAT observation. Schedules of 15, 35 and 55 DAT and 20,

40 and 60 DAT were effective at 30 DAT and at harvest respectively in controlling the damage.

When the periods of observation and the time of application was compared, the schedule of 15, 35 and 55 DAT was effective at 30 DAT and 50 DAT while and harvest the schedule of 20, 40 and 60 DAT was effective in the first experiment. In the second experiment, the schedules of 15, 35 and 55 DAT and 20, 40 and 60 DAT were effective for stem borer at 30 DAT and white ear at harvest respectively.

It can be concluded that application of the first dose of the insecticide either at 15th or 20th day after transplanting

TABLE II. Effect of different times of application of Carbofuran and mephostolan in the control of rice stem borer

(Figures in parenthesis represent transformed values)

Times of application (DAT)	I Experiment			II Experiment	
	Period			Period	
	30	Period	Harvest	30	Harvest
20, 40	2.35 (8.43)	1.99 (7.82)	6.66 (14.48)	0.83 (5.11)	5.30 (13.07)
25, 45	2.91 (9.58)	1.98 (7.76)	3.68 (10.34)	1.41 (6.57)	3.79 (10.73)
15, 35, 55	1.33 (6.22)	1.94 (7.74)	3.00 (9.63)	0.65 (4.56)	4.34 (11.92)
20, 40, 60	1.81 (7.45)	2.64 (8.86)	2.35 (8.24)	0.84 (5.21)	3.40 (10.09)

	I Experiment		II Experiment	
	Time of appli- cation	Time x dose	Time x periods	Time
Level of significance	0.01	0.01	0.05	NS
C.D. (P=0.05)	1.32	2.28	1.85	—

and repeating at 20 days interval thrice resulted in better check of the dead-hearts and white ear. This was in conformity with the work done at International Research Institute, Philippines (Anon, 1969) which revealed that carbofuran applied at 20 days interval commencing the first application at 17 DAT was highly effective. Lakshmanan (1973) opined that better control of stem borer could be obtained when the insecticide application commenced either at 15 or 20 or 25 DAT. A lower dose of 0.75 kg a.i/ha will give good control of this pest since there were no differences between the doses.

Carbofuran was superior to mephostolan in registering increased grain yield. There was no significant difference between the doses of insecticides in the grain yield.

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REFERENCES

- ANONYMOUS. 1969. Annual Report. *All India Co-ordinated Rice Improvement Project*. Hyderabad, 12 : 1 to 12 : 8.
- CHELLIAH, S., A. SUBRAMANIAN, K. SAIVARAJ and R.S. ANNAPPAN. 1975. Efficacy of certain candidate granular pesticides in the control of rice gall midge and stem borer. *Pesticides* 9 : 36-37.
- GHOSE, R.L.M., M.B. GHATGE and V. SUBRAMANIAM. 1960. Rice in India. *I.C.A.R.* New Delhi. pp.474.
- LAKSHMANAN, P. L. 1973. *Studies on the control of rice gall fly, stem borer and leaf roller*. Unpub. M.Sc. (Ag.) Dissert. submitted to the Tamil Nadu Agricultural University, Coimbatore.

TABLE III. Effect of different doses of carbofuran and mephosfolan on grain yield in kg/ha

Treatments	Experiment I			Experiment II		
	20.30	25.45	15.35,55	20.40,60	25.45	15.35,55
Carbofuran 0.75 kg a.i/ha	6548	6919	6552	5976	5775	5820
Carbofuran 1.0 kg a.i/ha	5954	6148	6762	6372	6105	5955
Mephosfolan 0.75 kg a.i/ha	5848	6072	6743	6222	5452	5363
Mephosfolan 1.0 kg a.i/ha	5794	6690	5893	6462	5227	5018
Control	-	-	-	5013	-	-

1. Between chemicals	Experiment I		Experiment II	
	Level of significance	C.D. (P=0.05)	Level of Significance	C.D. (P=0.05)
i) Control vs other treatments	0.01	752.7	0.01	676.00
ii) Between other treatments	0.01	349.7	0.01	318.00

PATHAK, M.D. 1964. Recent developments and future prospects for the chemical control of the rice stem borer at IRRI. In "The Major insect pests of the rice plants". pp. 727. *Proc. Symp. at IRRI, Philippines.*

RAO, P.B.M. R.C. DHANI and P.S. PRAKASA RAO. 1976. Recent studies on the chemical control of rice pests. *Madras agric. J.* 63 : 281-87.

SATPATHY, J.M. 1970. Further studies on the insecticidal control of rice stem borer and gall midge. *Oryza* 7 : 85-88.

VENKATARAMAN, A., E.V. ABRAHAM and J.C. SAMUEL. 1973. Control of rice pests with granular insecticides in Thanjavur district. *Madras agric. J.* 60 : 210-13.