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FIELD EVALUATION OF INSECTICIDES ON THE CONTROL OF RICE BUG (*LEPTOCORISA ACUTA* THUNB.) IN EPIDEMIC OUTBREAKS

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Abstract : Two field experiments were conducted to assess the efficacy of different insecticides for controlling *Leptocorisa acuta* Thunb. at different population levels. In the first experiment, where there was more of a population stress, the insecticides malathion, methyl parathion and fenthion were found to be more effective in controlling the hug, the percentage reduction being 75.72 to 97.15, 72.71 to 94.76 and 69.92 to 91.85 per cent respectively. In the second experiment with lesser population stress also, the same insecticides showed the maximum effect in controlling *Leptocorisa acula* in the field. The effect of these insecticides was indicated by the higher grain/chaff ratio in all these treatments.

Key words : Efficacy of insecticides, insect control, *Leptocorisa acuta* Thunb, rice bug.

INTRODUCTION

The rice bug *Leplocorisa acuta* Thunb. is a major pest of rice in India as well as in Kerala occurring in epidemic forms sporadically. The loss caused by the bug infestation ranged from 10 to 40 per cent (Israel and Rao, 1961) and at times in severe infestations, total loss of the crop is also observed (Srivastava and Saxena, 1960; Smith, 1981). A serious outbreak of the pest was noted often in some pockets of Trivandriun district. Field experiments were conducted to study the efficacy of the different insecticides in controlling the pest at different population levels.

MATERIALS AND METHODS

Two experiments were undertaken in this study in which one was done during the puncha season where there was a high population pressure of the bugs in the field and the other during the virippu season where, the bug population was less than that at the puncha season. The experiments were done in RBD and the insecticides (Table 1&2) were applied in the field on need basis. Observations as pre-treatment and post-treatment populations of the bugs were made by trapping of the bugs in a cylindrical cage of 50cm diameter and 125 cm height covered on the side and the top with the polythene sheets. Ten such trappings were made per plot and counted. The grain : chaff ratio based on the weight at harvest was also worked out. In the first experiment (Table 1), a second spraying was also necessitated due to the high population of the bug after the first spraying.

RESULTS AND DISCUSSION

The results were assessed in terms of per cent reduction of the insect population over pre-population due to spraying (Table 1&2). In the first experiment one day after the treatment all insecticides were found to reduce the bug population significantly (Table 1). Among the different insecticides, malathion was the most effective in controlling the pest, closely followed by methyl parathion, fenthion, fenitrothion and phosphamidon. It was observed that on the fourth day after the treatments, the populations of the rice bug showed an increasing trend over the previous populations in all treatments except those involving malathion, methyl parathion and phosphamidon. Therefore, following the principle of need based application of insecticides, a second spraying was given on the fourth day following the first application.

One day after the second spraying, the population reduction showed that malathion and methyl parathion were found to be the best insecticides causing maximum reduction

Table 1. Per cent reduction in rice bug population in field caused by different insecticide sprays at different intervals after spraying*

Insecticide	Dosage, %	1st pre-count	1st spraying: Days after spraying 1	3	4	2nd pre-count	2nd spraying: Days after spraying 1	3	4	Grain yield, g	Grain chaff ratio	Cost benefit ratio for control operation
Malathion	0.10	70	75.72	77.13	86.60	22	90.70	95.76	97.15	200.00	6.00:1	1:9.52
Methyl parathion	0.05	61	72.71	76.08	78.36	30	92.62	93.52	94.76	180.00	5.00:1	1:11.25
Fenthion	0.10	50	69.92	64.92	64.09	50	68.62	84.36	91.85	180.00	7.50:1	1:6.25
Phosphamidon	0.05	53	68.98	57.09	59.98	52	66.05	67.87	82.35	170.00	4.10:1	1:11.25
Fenitrothion	0.10	57	69.98	64.92	56.00	48	65.32	70.16	79.20	170.00	4.00:1	1:6.25
Monocrotophos	0.05	52	56.59	59.55	69.12	40	66.62	71.09	77.48	160.00	3.00:1	1:6.4
Phosalone	0.07	57	49.13	52.65	48.59	69	72.52	75.44	77.75	150.00	2.60:1	1:6.3
Dimethoate	0.05	70	47.37	52.79	48.59	50	66.67	68.79	74.64	150.00	3.10:1	1:6.8
Formothion	0.05	51	40.26	48.91	29.27	48	63.13	66.67	72.13	150.00	3.50:1	1:5.95
Quinalphos	0.05	52	36.69	28.22	24.95	50	59.60	67.29	70.94	150.00	1.85:1	1:6.25
Carbaryl	0.20	65	26.30	28.07	19.02	52	63.31	67.61	70.00	148.33	2.85:1	1:3.2
HCH	0.20	57	16.55	14.55	3.80	39	59.60	64.28	67.65	100.00	1.20:1	1:3.95
Control	-	57	16.23	1.65	3.09	42	5.14	11.74	14.79	70.00	0.55:1	-
CD (0.05)	-	-	7.43	6.47	8.29	-	10.63	5.40	6.79	22.90	-	-

* Means of three replications

of the rice bugs followed by phosalone, fenthion, dimethoate, monocrotophos, phosphamidon, fenitrothion, carbaryl, formothion, quinalphos and HCH in the descending order. Here, all insecticides were observed to be significantly superior to control. The population reductions on the 4th day after second spraying, followed the same trend as on the 3rd day with malathion, methyl parathion and fenthion giving maximum population reductions of the bug and was observed to be statistically on par. Formothion, carbaryl and HCH caused mortality lesser than the other treatments.

The grain yields from the treated plots have shown that the highest yield per m^2 was obtained from malathion treated plots followed by methyl parathion, fenthion, phosphamidon, fenitrothion, monocrotophos, phosalone, dimethoate, formothion and quinalphos, carbaryl and HCH, the least which vary from 200 g to 100 g. The grain : chaff ratio showed that fenthion (7.50:1) gave maximum followed by malathion (6.00:1), methyl parathion (5.00:1), phosphamidon (4.10:1), fenitrothion (4.00:1), formothion (3.50:1), dimethoate (3.10:1), monocrotophos (3.00:1), carbaryl (2.85:1), phosalone (2.60:1), quinalphos (1.85:1), HCH (1.20:1) and control (0.55:1) in the descending order. The cost/benefit ratio for the control operations revealed that methyl parathion and phosphamidon gave the highest values follo-

Table 2. Per cent reduction in rice bug population in field caused by different insecticide sprays at different intervals after spraying*

Insecticide	Dosage, %	Pre-count	Days after spraying						Grain yield, g	Grain chaff ratio	Cost benefit ratio for control operation
			1	3	4	5	7	9			
Malathion	0.10	11	63.03	67.40	68.50	71.02	81.72	90.61	310	11.20:1	1:29.50
Methyl parathion	0.05	10	63.13	63.40	66.21	72.58	81.72	82.72	300	10.69:1	1:37.50
Fenthion	0.10	11	54.60	63.43	69.55	69.55	72.58	81.72	295	10.37:1	1:20.38
Phosphamidon	0.05	10	49.50	49.56	50.00	60.66	60.66	70.00	250	8.4:1	1:33.78
Fenitrothion	0.10	9	45.56	46.52	49.67	58.52	61.85	68.69	235	7.9:1	1:19.45
Monocrotophos	0.05	10	43.14	45.90	49.30	62.42	62.42	68.19	235	6.7:1	1:20.10
Phosalone	0.07	9	42.73	44.11	44.11	48.49	60.35	68.19	226	6.6:1	1:16.80
Dimethoate	0.05	11	40.73	42.42	42.42	51.02	60.45	67.24	210	5.7:1	1:17.50
Formothion	0.05	9	40.70	41.50	44.44	48.15	49.95	62.22	205	5.5:1	1:14.85
Quinalphos	0.05	10	39.76	40.07	40.30	47.50	50.66	56.77	200	4.9:1	1:16.67
Carbaryl	0.20	8	21.45	30.79	21.45	37.30	40.48	55.93	210	5.2:1	1:17.50
HCH	0.20	9	15.28	20.50	29.43	29.69	36.84	44.60	150	2.5:1	1:23.00
Control	-	12	-13.18	-7.54	-6.59	-5.59	12.78	15.08	105	1.2:1	-
CD (0.05)	-	-	23.38	16.25	22.35	15.72	13.31	12.34	24.25	-	-

*Means of three replications

wed by malathion, dimethoate, monocrotophos, phosalone, fenthion, fenitrothion, quinalphos, formothion, HCH and carbaryl.

In the second trial in which the population density of the bug was much less than that in the first experiment (Table 2), methyl parathion gave the maximum population reduction of the bugs one day after the treatment and this was statistically on par with malathion, fenthion, phosphamidon, fenitrothion, monocrotophos, phosalone, dimethoate, fonnothion and quinalphos. Carbaryl and HCH could produce only a low population reduction and were statistically on par. All insecticides were found significantly superior to control. The percentage reduction in the population of the bugs on the third day after the treatment was the maximum (67.4%) followed by fenthion, methyl parathion, phosphamidon, fenitrothion, monocrotophos, phosalone, dimethoate, formothion, quinalphos, carbaryl and HCH in the descending order. On the fourth day after spraying, fenthion has showed high percentage reductions than other insecticides and was found to be on par with malathion, methyl parathion, phosphamidon, fenitrothion and monocrotophos. The percentage reductions on the fifth day after the treatments revealed the methyl parathion (72.58%) caused the maximum population reduction of the bugs and was statistically on par with malathion (71.02%), fenthion (69.55%), monocrotophos (62.4%), phosphamidon (60.66%), fenitrothion (58.52%) and dimethoate (51.02%), phosalone (48.49%) and formothion (48:15%) and the insecticides quinalphos, carbaryl and HCH were found to be producing least population reductions. On the seventh and ninth days after spraying, the same trend was observed but the insecticides were found superior to control.

In the case of grain yields obtained from treated plots, the plots treated with malathion gave highest yield (310 g) followed by methyl parathion (300g), fenthion(295 g), phosphamidon (250 g) fenitrothion (235 g), monocrotophos (235 g), phosalone (226 g), dimethoate (210 g), carbaryl (210 g), formothion (205 g), quinalphos (200 g) and HCH (150 g). The yields obtained from all treated plots were found to be statistically superior than control. The grain : chaff ratio revealed that it is found to be higher in the case of malathion (11.20:1) followed by methyl parathion (1.69:1), fenthion (10.37:1), phosphamidon (8.4:1), fenitrothion (7.9:1), monocrotophos (6.7:1), phosalone (6.6:1), dimethoate (5.7:1), formothion (5.5:1), carbaryl(5.2:1), quinalphos (49:1), HCH (2.5:1) and control (1.2:1) in the descending order. The cost benefit ratio showed that methyl parathion (1:37.5) gives highest ratio for the control operations followed by phosphamidon, malathion, HCH, fenthion, monocrotophos, fenitrothion, dimethoate, carbaryl, phosalone, quinalphos and formothion in the descending order, the ratio varying 1:20.38 to 1:14.35. Results of these studies thus show that sprays of malathion, methyl parathion, fenthion and phosphamidon can be recommended for the effective control of rice bug in respect to not only toxicity but also high population stress in consideration to the cost:benefit and grain:chaff ratios.

REFERENCES

Israel, P. and Rao, Y. S. 1961. Distribution of economic statue of rice pests in India. *Rice News Teller* XX(3) : 23-26

Srivastava, A. S. and Saxena, K. N. 1960. Bionomics **and** control of Gundhi hug of **paddy** during 1958. *Proceedings of Kice Research Workers Conference*, CRRI : Cuttack, p. 287-89

Smith, E. S. C. 1981. Rice insects **in** the northern Province. *Harvest 1* : 31-34