

SAFETY OF CERTAIN NEW INSECTICIDES TO MIRIDBUG POPULATION IN RICE ECOSYSTEM

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Abstract: Field experiment was conducted at Research and Instructional Farm of Indira Gandhi Krishi Vishwavidyalaya, Raipur (C.G) during kharif of 2006-07. The major predator is found to be associated in the rice ecosystem were mirid bug is an important predator of rice. Evaluation of newer insecticides in combination with present and new formulations of older molecules was thrust point of investigation. The application of alika 247 ZC @33 g.a.i./ ha. is safer for mirid bug. Application of Spinosad 45SC@56 g.a.i/ha., alika 247 ZC@44 g.a.i/ha. And monocrown 36 WSC @500 g.a.i/ha. Were found harmful to mirid bug.

Keywords: Insecticides, Population, Rice, Ecosystem

INTRODUCTION

Rice is the staple food of more than half of humanity in the world and for more than 65 to 70 % of Indian population. It is grown over 44 million hectare in India under diverse ecologies, like upland, lowland, Irrigated, deep water etc. Indian population is increasing @1.5% and it would need over 100 million tons of rice by 2015 and 120 million tons by 2020 (Anonymous, 2007a). This additional production has to come from declining and degrading resources like land and water. Chhattisgarh popularly known as “rice bowl of India” occupies an area around 3.60 m ha. with the production of 6.16 mt of paddy and was awarded Krishi Karman award during 2010-2011 (Anonymous, 2011).

An average productivity of 1323 Kg/ha, which is very low as compared to the national average of 2263 Kg/ha (Anonymous, 2007b). About 96 percent of total area under rice in the state is concentrated in low and very low productivity groups of the state (Sastri *et al.*, 2006).

The major predator is found to be associated in the rice ecosystem were mirid bug is an important predator of rice. Development of integrated pest management (IPM) strategies is the most appropriate solution to tackle the pest problems. Target specific and eco-friendly insecticide application is one of the important components of IPM. Insecticide plays a major role in the production system of rice, in spite of their much highlighted hazardous effect on the

environment. They are still relied upon by the rice farmers for better management of different pests. Continuous and consistent use of pesticides leads to the development of resistance among pests and adverse effects on non-target organisms.

To cope with ever challenging insects pest problems in Rice, the farmers needs to have the latest technological knowledge in pest management. Evaluation of new insecticides, combine them with present one and new formulations of older molecules is an important exercise of Rice entomologist.

MATERIAL AND METHOD

The present investigation entitled “Evaluation of effect of insecticidal spray on the mirid bug of rice plant” was carried out at IGKV Research Farm, Raipur under field as well as glass house condition during Kharif season. The materials used and techniques adopted for this study is illustrated in this chapter.

Site and Climate

Raipur is an important rice growing tract of Chhattisgarh and comes under tropical region of India. It is situated at 21.16⁰N latitude and 81.36⁰E longitude and at an altitude of 299 meters above from mean sea level (MSL). The general climate condition of Raipur is sub-humid to semi-arid with annual rainfall of more than 1350 mm of which 85 percent occurring during June to September month.

Details of Experiment Conducted in Field Condition

Crop	: Rice
Situation	: Irrigated
Plot Size	: 5 x 4 m = 20m ²
Number of treatment	: 14
Number of replication	: 04
Total number of Plot	: 56
Plant spacing	: 20 x 15Cm (R x P)

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No. of Hills per plot	: 650 hills /plot
Date of treatment application	: 15/09/2006 I st spraying 06/10/2006 II nd spraying
Volume of spray solution used	: @500 lit./ha
Type of spray applicator used	: Manually-operated Knapsack sprayer

Table1. Treatment details

Treatment	Common name	Trade name	% a.i. in the Formulation	g a.i/ha Dose	g Or ml of formulation/ha
T1.	Chlorpyrifos	Dursban 10G	10%	1000	10.0 Kg
T2.	Chlorpyrifos	Dursban 10G	10%	1250	12.5 Kg
T3.	Carbofuran (check)	Furadan 3G	3.0%	1000	33.0 Kg
T4.	Ethiprole 40% + Imidacloprid 40%	Bayer	80%	100	125 g
T5.	Neonicotinoid + Synthetic pyrethroid	ALIKA 247ZC	22%	33	150 ml
T6.	Neonicotinoid + Synthetic pyrethroid	ALIKA 247ZC	22%	44	200 ml
T7.	Deltamethrin	Decis 10%EC	10%	15	150 ml
T8.	RIL 043 oxadiazin + synthetic pyrethoid)	-	-	-	400 ml
T9.	Indoxacarb	Kingdoxa 15 SC	14.5%	30	200 ml
T10.	Spinosyn A 50% + Spinosyn D 50%	Spinosad 45%SC	45%	45	100 g
T11.	Spinosyn A 50% + Spinosyn D 50%	Spinosad 45%SC	45%	56	120 g
T12.	Monocrotophos (check)	Monocrown 36 WSC	36%	500	1390 ml
T13.	Phorate 10G	Uthane (UPL)	10%	1000	12.5 Kg
T14.	Untreated control	-	-	-	-

Fertilizer application (N: P: K 80:60:40) Kg/ha

The paddy crop grown for experimental purpose was given nutrition through the chemical fertilizer @ 80:60:40 NPK kg/ha. Full dose of P and K were applied at the time of planting and "N" was applied in three split doses. First dose was given at the time of planting and remaining two doses were applied at the tillering and panicle initiation stage of the crop.

Method of insecticidal treatment application

The required quantity of insecticide for each plot was calculated on the basis of active ingredient and standard doses. Before applications of insecticide per plot insect population were counted for ten random plants in each plot, then the insecticidal treatments were applied to the crop homogeneously.

Time of insecticidal treatment application

All the insecticidal treatments were applied twice during the crop season. The first application was given as prophylactic treatment at 30 days after transplanting. The second insecticidal treatment

application was given at the maximum tillering stage of the crop i.e.50 DAT. The increasing trend of insect infestation was observed at 50 DAT observations.

Sampling technique applied in field experimentation

The observations on occurrence of major insect pests of paddy were recorded in each plots after transplanting. The pre treatment and post treatment observations were recorded at 30 and 50 DAT on ten randomly selected hills from each plot.

Natural enemies:The populations of natural enemies present in the crop ecosystem were counted in each hill after insecticidal spraying for all the treatments. The major predators found to be associated in the paddy crop ecosystem were mirid bug. This information will be helpful in understanding the safety of insecticides for natural enemies of the insect pest.

Table 2. Population of Mirid Bug found to be associated under different insecticidal treatment during kharif - 2006

Treatment	Formulation g a.i/ha	Mean percentage of Mirid Bug on ten plant
T1 : Durban 10 G	1000	3.50 (1.99)
T2 : Durban 10 G	1250	2.50 (1.73)
T3 : Furadon 3 G	1000	3.50 (1.99)
T4 : Ethiprole 40% + Imidacloprid 40%	100	3.25 (1.92)
T5 : Alika 247 SC	33	3.75 (2.06)
T6 : Alika 247 SC	44	2.00 (1.58)
T7 : Decis 10 EC	15	2.75 (1.79)
T8 : RIL -043	400	2.25 (1.65)
T9 : Kingdoxa 14.5 SC	30	2.25 (1.65)
T10 : Spinosad-45 SC	45	3.50 (1.99)
T11 : Spinosad-45 SC	56	1.75 (1.48)
T12:Monocrown 36 WSC	500	2.00 (1.58)
T13 : Phorate 10 G	1000	3.50 (1.99)
T14 : Untreated control	-	4.75 (2.28)
SE (m) + CD(5%)		0.11 0.32

Figures in Parenthesis are square root transformed values.

RESULT AND DISCUSSION

This chapter deals with the brief description of results obtained under different objectives of this study. The findings of the present study are compared with the previous findings of the relevant aspects in justified manner to draw a concrete conclusion. The results and discussion are presented here under different sub headings:

Safety for natural enemies

Impact of insecticidal application were also accessed for the natural enemies of insects present in the crop ecosystem. This data will be helpful in deciding the safety of insecticidal treatment. The major predator found to be associated in the rice ecosystem were mirid bug. The post application observations of major predators were counted on ten random plant of each treatment replication.

Mirid bug

Minimum mirid bug population were recorded with Spinosad 45 SC @ 56 g a.i/ha (1.75) which was at

par with Alika 247 SC @ 44 g a.i/ ha (2) and Monocrown 36 WSC @ 500 g a.i/ha (2) followed by Ethiprole + imidacloprid @ 100 g a.i/ha (3.25). The maximum mirid bug population 4.75 per ten plant was observed with the untreated control plot. The application of Alika 247 SC @ 33 g a.i/ ha was found statistically at par with the untreated control.

It may be stated that the application of Alika 247 SC @ 33 g a.i/ ha was found safer for mirid bug. The application of spinosad 45 SC, Alika 247 SC @ 44 g a.i/ ha and Monocrown 36 WSC @ 500 g a.i/ha were shown harmful effect to mirid bug. Panda *et.al.* (1991) reported synthetic pyrethroids as safer insecticide for mirid bug. Similar results were also reported by Sharma *et al.*2010.

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