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Research article

FIELD EFFICACY OF SOME NEW INSECTICIDES AGAINST RICE STEM BORER AND GUNDHI BUG IN IRRIGATED RICE ECOLOGY

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ABSTRACT: Eleven insecticides including new insecticide sulfoxaflor and check insecticide monocrotophos were evaluated in field condition against yellow stem borer and rice gundhi bug during dry season of 2011 and 2012**.** Imidacloprid 17.8% @ 300g/ha treatment recorded lowest percentage of DH (3.3%), WEH (3.33%), gundhi bug damage (7.16%) and highest grain yield of 5.28 t/ha in variety Jaya followed by the treatment Sulfoxaflor 24%@375g/ha, 4.96 t/ha, Thiamethoxam 25%@100g/ha, 4.9 t/ha and triazophus 40% @625g/ha, 4.78t/ha during 2011 and similar result was also observed in 2012. All the tested insecticides significantly reduce damage due to yellow stem borer and gundhi bug. The grain yield of treatment imidacloprid17.8% @ 300g/ha was highest (5.28 and 5.21 t/ha) significantly superior to check insecticide monocrotophus 36 % @ 1390 ml/ha (4.65 and 4.62t/ha) and at par with thiamethoxam 25%@100g/ha (4.9 and 4.85 t/ha), triazophos 40% @625g/ha (4.78 and 4.8 t/ha) and new insecticide Sulfoxaflor 24% @ 375g/ha (4.96 and 4.92t/ha) during 2011 and 2012 respectively. The check insecticide was found superior to new insecticide sulfoxaflor at lower dose i.e.311 g/ha against yellow stemborer and gundhi bug damage.
Key words: Insecticides, Stemborer, Rice, Gundhibug

INTRODUCTION

The yellow stem borer causes significant damage to boro rice cultivars in different crop stage [1]. Rice stem borers are of major economic significance causing 25-30% loss to rice crop [2]. In India, the yellow stem borer caused 1% to 19% yield loss in early planted rice crops and 38% to 80% in late planted rice [3]. The rice bug, another important pest of rice, caused damage by feeding on the sap of milky grain and turn them chaffy. Of the 15 species of bug reported to infest rice crop in India, *Leptocorisa* spp. are considered serious [4].Chemical control is still considered as the first line of defense in rice pest control. Application of various granular and sprayable insecticidal formulations gives effective control of rice pests [5], [6]. Various chemical insecticides have been recommended to control the rice bugs [7], [8]. In the present paper, the comparative effectiveness of some new insecticides evaluated in irrigated field condition against these two pests of transplanted rice has been reported.

MATERIALS AND METHODS

Eleven formulations of insecticides Viz., Imidacloprid 17.8% @ 300g/ha, Sulfoxaflor 24% @375g/ha, Sulfoxaflor 24% @ 313 g/ha, Thiamethoxam 25% @ 100g/ha, Applaud (Buprofezin) 25% @ 700 ml/ha, Acephate 95% SG @ 592 ml/ha, Dinotefuron 20% @ 200 ml/ha, Dinotefuron 20%@ 150 ml/ha, Acephate 75 SP ,@ 800 ml/ha, Triazophos 40% @625g/ha with Monocrotophos (Monocrown) 36 % @ 1390 ml/ha were screened against insect pest of rice during Rabi-2011 and 2012 at the research farm of Central Rice Research Institute, Cuttack. The trial was laid out in randomized block design with three replications. Two seedlings per hill of variety Jaya were transplanted at a spacing of 20 x 15 cm. Individual plots (5 x 4 m) were separated by bunds and channels to regulate water flow. Treatments were applied at 45 and 75 days after transplanting. Observations on the incidence of dead hearts (DH) were taken on 20 randomly selected hills per plot from each replication at 55 days after transplanting. The white ear head (WEH) was counted on 20 randomly selected clumps from each plot just before harvest. Gundhi bug damage was calculated by counting total grain to infested grains in the sampled panicles (five panicles) from each plot. Treatment-wise grain yield was recorded after harvest. The per cent DH, WEH and gundhi bug damage was calculated and transformed into arc sine transformation for statistical analysis and presentation in table. Percentage of DH, WEH and gundhibug damage was computed as follows:

$$DH\% = \frac{\text{Total number of dead hearts in 20 hills x100}}{\text{Total number of tillers (dead hearts + healthy tillers) in 20 hills}}$$

$$WEH\% = \frac{\text{Total number of white ears in 20 hills x100}}{\text{Total number of ear bearing tillers (white ears + healthy ears) in 20 hills}}$$

$$\%\ \text{Gundhibug damage} = \frac{\text{Total number of damaged grain in 5 panicles x100}}{\text{Total number of grains (damage + healthy grain) in 5 panicles}}$$

RESULTS AND DISCUSSION

The result showed that all the treatments are significantly reduces the % infestation of the yellow stem borer and gundhi bug damage and at the same time significant increase in grain yield was due to application of insecticide. Result of the experiment during Rabi 2011 revealed that infestation level of stem borer was 7.5% in vegetative stage and 7.63% in heading stage.

Table- 1: Testing of some new insecticides against yellow stem borer and gundhi bug in dry season of 2011.

S. No.	Treatment	% a.i	Dose g/ha	%DH	%WEH	% Gundhi bug damage	Yield t/ha
1	Imidacloprid	17.8	300	3.3(10.46)	3.33(10.52)	7.16(15.52)	5.28
2	Sulfoxaflor	24	375	3.5(10.78)	3.5(10.78)	7.43(15.82)	4.96
3	Thiamethoxam	25	100	3.7(11.09)	3.7(11.09)	7.73(16.14)	4.9
4	Triazophos	40	625	3.8(11.14)	3.86(11.34)	8.03(16.46)	4.78
5	Monocrotophos	36	1390	4.1(11.68)	4.1(11.68)	8.4(16.84)	4.65
6	Buprofezin	25	700	4.2(11.82)	4.2(11.82)	8.4(16.84)	4.36
7	Acephate	95	592	4.26(11.92)	4.46(12.20)	8.7(17.15)	4.28
8	Dinotefuron	20	200	4.5(12.24)	4.7(12.52)	8.86(17.32)	4.26
9	Acephate	75	800	4.7(12.52)	4.9(12.79)	9.2(17.66)	4.18
10	Dinotefuron	20	150	4.8(12.65)	5.26(13.26)	9.5(17.95)	4.11
11	Sulfoxaflor	24	313	5.1(13.05)	5.5(13.56)	10.13(18.56)	3.9
12	Control	Water	500l/ha	7.5(15.89)	7.63(16.04)	15.43(23.12)	3.25
CD at 5%				0.23	0.27	0.45	0.61

Data in the parenthesis are angular transformed values.

Gundhibug infestation in harvesting stage was 15.43%. Imidacloprid 17.8% @ 300g/ha treatment recorded lowest % of DH (3.3%),WEH (3.33%), gundhi bug damage (7.16%) and highest grain yield of 5.28 t/ha in variety Jaya followed by the treatment Sulfoxaflor 24%@375g/ha, 4.96 t/ha, Thiamethoxam 25%@100g/ha, 4.9 t/ha and triazophus 40% @625g/ha, 4.78t/ha. All the tested insecticides were found very effective against yellow stem borer (YSB) and gundhibug. In control, the grain yield was 3.25 t/ha.

The same eleven insecticides were evaluated against rice stem borer and gundhi bug during rabi 2012 and The infestation level of stem borer was 8.32% in vegetative stage and 8.66 % in heading stage. Gundhibug infestation in harvesting stage was 18.91 %. During 2012 Imidacloprid 17.8% @ 300 g/ha was found best insecticide with 3.12% DH, 3.62 % WEH and 9.25 % Gundi bug damage and grain yield of 5.21 t/ha and was at par with Sulfoxaflor 24%@375 g/ha, 4.92 t/ha, Thiamethoxam 25%@ 100g/ha, 4.85 t/ha and triazophus 40% @625g/ha, 4.8t/ha in increasing the grain yield over control (3.15 t/ha). The present findings corroborated the findings of Rath [9] who reported that most of the new insecticides were effective in controlling the stem borer incidence.

Applaud (Buprofezin) 25%@ 700ml/ha, Acephate 95%SG @ 592 ml/ha, Dinotefuron 20% @ 200 ml/ha and Monocrotophos (Monocrown) 36 % @ 1390ml/ha were effective against rice stemborer and gundhibug agrees with finding of Rath, [10], [11]. Earlier workers like Uthamasamy and Kuruppuchamy [5], Dash and his group [6] had similar observation like present investigation of effective control of rice pests by application of granular and sprayable insecticidal formulation. Applications of new insecticides for control of rice gundhibug was advocated by Singh [7] which support the present finding.

Table- 2: Testing of some new insecticides against yellow stem borer and gundhi bug in dry season of 2012.

S.No.	Treatment	% a.i	Dose g/ha	%DH	%WEH	% Gundhi bug damage	Yield t/ha
1	Imidacloprid	17.8	300	3.12(10.15)	3.62(10.97)	9.25(17.69)	5.21
2	Sulfoxaflor	24	375	3.7(11.05)	3.87(11.35)	10.12(18.55)	4.92
3	Thiamethoxam	25	100	3.87(11.35)	3.86(11.34)	10.13(18.56)	4.85
4	Triazophos	40	625	4.1(11.68)	3.87(11.35)	10.4(18.81)	4.80
5	Monocrotophos	36	1390	4.3(11.96)	4.46(12.20)	10.4(18.81)	4.62
6	Buprofezin	25	700	4.6(12.38)	4.7(12.52)	10.63(19.03)	4.38
7	Acephate	95	592	4.86(12.74)	4.9(12.79)	11.2(19.55)	4.22
8	Dinotefuron	20	200	5.1(13.05)	5.2(13.18)	11.2(19.55)	4.21
9	Acephate	75	800	5.2(13.18)	5.4(13.43)	12.87(21.02)	4.15
10	Dinotefuron	20	150	5.4(13.43)	5.53(13.58)	13.00(21.13)	4.08
11	Sulfoxaflor	24	313	5.6(13.68)	5.8(13.93)	14.93(22.73)	3.85
12	Control	Water	500l/ha	8.32(16.76)	8.66(17.11)	18.91(25.73)	3.15
CD at 5%				0.45	0.46	0.61	0.59

Data in the parenthesis are angular transformed values.

CONCLUSION

All the tested insecticides significantly reduce damage due to yellow stem borer and gundhi bug. The treatment imidacloprid yielded highest (5.28 and 5.21 t/ha) significantly superior to check insecticide monocrotophus and at par with thiamethoxam, triazophos and new insecticide Sulfoxaflor 24% @ 375g/ha during both the year.

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