J. Exp. Zool. India Vol. 18, No. 1, pp. 177-179, 2015 *ISSN 0972-0030*

MANAGEMENT OF RICE EARHEAD BUG, *LEPTOCORISA ORATORIUS* FABRICIUS (HEMIPTERA: ALYDIDAE)

H. T. Basavaraj Ashokappa, S. T. Prabhu and K. Manjappa

Department of Agricultural Entomology, Agricultural Research Station (Paddy), Sirsi, U.A.S., Dharwad - 580 005, India.
e-mail: prajostp@yahoo.com

(Accepted 24 December 2014)

ABSTRACT : Among six plant extracts, two entomopathogenic fungi and six new molecules of insecticides evaluated against *Leptocorisa oratorius* Fabricius, the field data showed that all chemicals could bring down the population of rice earhead bug in comparison to untreated control plots where there was a minor increase of population. Insecticides, imidacloprid 17.8 SL @ 0.25 ml/l, thiamethoxam 25 WG @ 0.3 g/l and malathion D @ 20 kg/ha recorded lowest population 0.05, 0.14 and 0.18 bugs/hill with a highest yield of 7049.26, 6461.11 and 6253.33 kg/ha, respectively. Among the plant products tested azadirachtin @ 3 ml/l and *Acorus calamus* L. auqeous rhizome extract @ 10 per cent recorded 0.33 and 0.48 bugs/hill with an yield of 6057.78 and 5705.19 kg/ha, respectively. Thus, the present study has come out with such two promising botanical pesticides *viz., Azadirachtin indica* and *A. calamus* against rice earhead bug.

Key words: Rice earhead bug, botanicals, entomopathogenic fungi, chemical insecticides.

INTRODUCTION

All the rice area of Uttara Kannada district contribution a major once under rainfed situation which starts with onset of monsoon every year. However, this district also comprises ecologically sensitive biodiversity which lies in Western Ghats. Of the 100 species of insect pests of attack rice crop at various stages of its growth, the rice earhead bug (*Leptocorisa oratorius*) is one of the important pest in the earhead stage causing economic damage. Both nymph and adults suck the plant sap and attack the rice grains, particularly during milky stage which leads to production of empty or "pecked" grains. Heavy infestation by this pest can results in total loss of the crop. Present management practices against rice earhead bug are based on insecticide application and needs exploration of environmentally sound ways of management. Many insecticides have been screened against rice earhead bug by several workers. But, the information generated was scanty especially as for as using of botanicals, entomopathogenic fungi and new molecules of insecticides are concerned. Therefore, it was felt necessary to take up a study on rice earhead bug and to develop management practices.

MATERIALS AND METHODS

A field study was under taken at Agricultural Research Station (Paddy), Sirsi ('upghat' transplanted paddy) during *kharif*, 2010 to evaluate eco friendly approaches for the management of rice earhead bug in rainfed transplanted rice ecosystem. The experiment was laid out in completely randomized block design (RBD) where 15 treatments (Table 1) were randomized by randomization technique. Each treatment was replicated thrice and rice variety "Abhilash" was selected. Plot size of 4 x 4.5 m was maintained for each treatment and seedlings were transplanted on 3rd August in rows with spacing of 20 x 10 cm. All agronomical practices along with recommended dose fertilizers were followed for uniform crop raising. All the liquid formulations were applied by spraying high volume water diluted spray with the help of high volume of knapsack sprayer. The dusting was applied by using a thin cloth. Treatment application was done only once on 6th November depending on economic threshold level (ETL). Pre-treatment observations were made on bug population level. The observations recorded were subjected to data transformation before going for statistical analysis and analysis of variance was done by single factor RBD analysis in computer with software programs of MSTAT C and treatment means were compared by using Duncan Multiple Range Test (DMRT). All the treatments were imposed at milky stage (93 days after transplanting) of crop in the experiment field by using high volume knapsack sprayer.

RESULTS AND DISCUSSION

The results on number of nymphs and adults of rice earhead bug, per cent grain damage and grain yield as influenced by various treatments are presented in Table 1.

Table 1 : Effect of plant products, entomopathogenic fungi and new molecules of insecticides against rice earhead bug and grain yield.

S. No.	Treatments	Number of nymphs and adults of rice earhead bug / hill*			Average **	% grain damage	Grain yield (kg/ha)
		1 DBS	3 DAS	7 DAS			
1.	Azadirachtin 3000 ppm @ 3 ml/l	1.30(1.34)^{a}	0.33(0.91)^{ab}	0.43(0.97)^{b}	0.38(0.91)^{bc}	6.53(2.65)^{bcd}	6057.78^{bcd}
2.	*Acorus calamus* aqueous rhyzome extract @ 10%	1.10(1.26)^{a}	0.47(0.98)^{bc}	0.50(1.00)^{bc}	0.48(0.99)^{cd}	7.26(2.87)^{cd}	5705.19^{b-e}
3.	*Strychnos nux vomica* aqueous leaf extract @ 10%	1.40(1.38)^{a}	0.90(1.18)^{de}	0.97(1.21)^{de}	0.93(1.21)^{gh}	9.51(3.16)^{efg}	4426.67^{hi}
4.	*Vitex negundo* aqueous leaf extract @ 10%	1.03(1.24)^{a}	0.73(1.11)^{cde}	0.80(1.14)^{cde}	0.76(1.12)^{fg}	8.05(2.92)^{def}	4709.26^{f-i}
5.	*Adathoda vasica* aqueous leaf extract @ 10%	1.30(1.34)^{a}	0.77(1.13)^{cde}	0.90(1.18)^{de}	0.83(1.18)^{fgh}	9.19(3.11)^{efg}	4573.33^{ghi}
6.	*Randia spinosa* aqueous fruit extract @ 5%	1.13(1.28)^{a}	0.67(1.08)$^{b-e}$	0.80(1.14)^{cde}	0.73(1.15)^{fgh}	8.34(2.97)^{def}	4875.93^{e-h}
7.	*Metarhizium anisopliae* @ 2 g/l	1.03(1.24)^{a}	0.93(1.20)^{e}	1.00(1.22)^{de}	0.96(1.23)^{h}	10.02(3.24)^{fg}	5076.30^{e-h}
8.	*Beauveria bassiana* @ 2 g/l	1.10(1.26)^{a}	0.97(1.21)^{e}	1.10(1.26)^{e}	1.03(1.24)^{h}	10.87(3.37)^{g}	5335.19^{c-f}
9.	Malathion (Cythion) 5% or 10% D @ 20 kg/ha	1.27(1.33)^{a}	0.13(0.80)^{a}	0.20(0.84)^{a}	0.16(0.82)^{ab}	6.23(2.59)^{bc}	6253.33^{abc}
10.	Indoxcarb (Avant) 14.8 SL @ 0.5 ml/l	1.03(1.24)^{a}	0.63(1.06)$^{b-e}$	0.77(1.13)^{cde}	0.70(1.09)^{ef}	8.12(2.93)^{def}	5625.56^{b-e}
11.	Dimethoate (Rogor) 30 EC @ 1.75 ml/l	1.30(1.34)^{a}	0.50(1.00)^{bcd}	0.67(1.08)^{bcd}	0.58(1.00)^{cde}	7.94(2.90)^{cde}	5049.63^{e-h}
12.	Emamectin benzoate (Proclaim) 5 SG @ 0.2 g/l	1.30(1.34)^{a}	0.67(1.08)$^{b-e}$	0.70(1.10)^{bcd}	0.68(1.08)^{def}	7.71(2.85)^{cde}	5501.48^{c-f}
13.	Imidacloprid (Confidor) 17.8 SL @ 0.25 ml/l	1.20(1.30)^{a}	0.03(0.73)^{a}	0.07(0.75)^{a}	0.05(0.74)^{a}	4.14(2.15)^{a}	7049.26^{a}
14.	Thiamethoxam (Renova) 25 WG @ 0.3 g/l	1.13(1.28)^{a}	0.13(0.80)^{a}	0.13(0.80)^{a}	0.13(0.80)^{a}	5.45(2.44)^{b}	6461.11^{ab}
15.	Untreated check	1.50(1.41)^{a}	2.67(1.78)^{f}	3.00(1.87)^{f}	2.83(1.82)^{i}	17.08(4.19)^{h}	4056.67^{i}
	S. Em. ±	0.05	0.05	0.05	0.03	0.10	255.80
	C. D. (0.05)	NS	0.15	0.13	0.10	0.28	741.03
	C. V. (%)	6.00	8.56	7.02	5.29	5.77	8.23

*Values in parentheses are √x+0.5 transformed values, ** Mean of 3 DAS and 7 DAS which differ significantly, DBS = Day before spray, DAS = Day after spray,
Means followed by the same letter in a column are not significantly different (p=0.05) by DMRT.

Number of nymphs and adults of rice earhead bug

Pre-treatment count of rice earhead bug in all treatments was similar and the variation was non-significant indicating uniformity in the distribution of bugs in the field a day before spray. Observation on bug population 3 days after application of treatments exhibited significant difference among the treatments. Imidacloprid recorded lowest population of bugs (0.03/hill) which was at par with thiamethoxam (0.13/hill), malathion (0.13/hill) and azadirachtin (0.33/hill). The next best treatments in the order of efficacy were *Acorus calamus* followed by dimethoate, indoxacarb, emamectin benzoate and *Randia spinosa* which recorded moderate bug population of 0.47, 0.50, 0.63, 0.67 and 0.67 per hill, respectively. While, rest of the treatments *Vitex negundo, Adothoda vasica, Strychnos nux vomica, Metarhizium anisopliae* and *Beauveria bassiana,* recorded bug population of 0.73, 0.77, 0.90, 1.01, and 1.04 per hill, respectively and were at par with each other. Minimum appearances of the bugs in all the treatments were noticed after seven days of spraying. Imidacloprid sustained its superiority even after 7 days of treatment by records significantly lowest in bug population of 0.07/hill and was found at par with thiamethoxam (0.13/hill), malathion (0.20/hill). The overall mean bug population was calculated and among all the treatments imidacloprid recorded lowest bug population (0.05/hill), which was at par with thiamethoxam (0.13/hill) and malathion (0.16/hill) were found. This result is in conformity with the findings of Pangtey (1990), Durairaj and Venugopal (1993) and Deore (2003) where in they reported imidacloprid and malathion as effective against this pest. Other next best treatment included azadirachtin (0.38/hill) and *A. calamus* (0.48/hii) which was at par with each other which are in agreement with that result of Misra (1999), Jeyarajan *et al.* (2003) and Ponnusamy (2003) who reported that *A. calamus* and azadirachtin can effectively control the rice bug. These two botanicals were significantly superior over rest of the treatments which followed by dimethoate, emamectin benzoate, indoxacarb, *R. spinosa, V. negundo, A. vasica, S. nux vomica, M. anisopliae* and *B. bassiana,* treatments with bug population of 0.58, 0.68, 0.70, 0.73, 0.76, 0.83, 0.93, 0.96 and 1.03 per hill, respectively in the trial (Table1).

Per cent grain damage

All the treatments showed significant difference over control for the per cent grain damage. The percent grain damage during the *kharif* season of 2010 ranged from 4.14 -10.87 % in different treatments and 17.08 % in control. However, the results indicated that the lowest per cent of grain damage was observed in imidacloprid treated plot (4.14 %) and moderate per cent grain damage was observed in thiamethoxam treated plot (5.45%) and was at par with malathion (6.23%) and azadirachtin (6.53%), *A. calamus* (7.26%) (Table1).

Grain yield

The highest grain yield of 7049.26 kg/ha was obtained with imidacloprid treated plot and it was at par with thiamethoxam (6461.11 kg/ha) and malathion (6253.33 kg/ha) and all these treatments were significantly superior over rest of the treatments. And this was followed by azadirachtin (6057.78 kg/ha) which was at par with *A. calamus* (5705.19 kg/ha) (Table 1).

CONCLUSION

The overall performance of insecticides based on their effectiveness against rice earhead bug releaved that for effective control of this pest application imidacloprid or thiamethoxam or malathion or two new botanical insecticides (*A. indica* and *A. calamus*) is necessary for safe management of rice earhead bug.

REFERENCES

Deore N R (2003) Biology and chemical control of rice earhead bug *Leptocorisa acuta* Thurnberg (Coridae: Hemiptera) on rice. *M. Sc. (Agri.) Thesis,* Gujarat Agricultural University, Navasari, Gujatat, India.

Durairaj C and Venugopal M S (1993) Effects too old of neem and nochi on rice bug, *Leptocorisa acuta. Int. Rice Res. Notes* **18**(3), 34.

Jeyarajan N S, Murugesanj N, Sathyanandam V, Johnson T D and Muthusamy M (2003) A new botanical insecticide for managing rice bug. *Int. Rice Res. Notes* **28**(1), 44.

Misra H P (1999) Control of Gundhi bug in upland rice. Indian *J. Entomol*. **61**(2), 169-172.

Pangtey V S (1990) A note on the efficacy of selected insecticides against Gundhi bug, *Leptocorisa acuta* (Thunberg). *Indian J. Entomol*. **52**, 715-717.

Ponnusamy P (2003) Farmers participatory assessment of neem based insecticide in controlling the ear head bug (*Leptocorisa acuta*) in rice. *Madras Agric. J*. **90**(7-9), 564-566.