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## Comparative efficacy of different recommended insecticides against brown plant hopper of paddy

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### Abstract

The present investigation entitled “Comparative efficacy of different recommended insecticides against brown plant hopper of paddy” was conducted at the field of Anand Niketan College of Agriculture, Warora Dist. Chandrapur in Randomized Block Design with seven treatments and three replications. The insecticidal treatments *viz.*, were, Carbosulfan 25% EC, Acephate 75% SP, Cartap hydrochloride 50% SP, Fipronil 5% SC,

Thiamethoxam 25% WG, Bifenthrin 10% EC, including control were used during *kharif* 2021. Total three applications were applied at an interval of 15 days. The application of Bifenthrin 10 EC (1.36%) and was followed by Fipronil 5% SC (1.39%) proved effective in minimizing the Brown plant hopper, Acephate 75 SP (1.44%), Thiamethoxam 25% WG (1.5%), Carbosulfan 25 EC%, Cartap hydrochloride 50 (1.55%) and control (1.61%) respectively.

**Keywords:** Paddy, insecticide, brown plant hopper

### Introduction

Rice (*Oryza sativa*) is a major field crop of India covering larger area in the country. In order to meet the growing demand of the ever increasing population. We need to produce more rice every year. But the rice production is less due to the cause of biotic and abiotic stresses, of which insect pests alone caused about 25 per cent losses. India has the largest area of 43.13 million hectare with production of 104.80 MT which ranks second in production next to China and contributing 43 per cent of total food grain production and 46 per cent of total cereal production and continues to play a vital role in the national food grain supply (Anonymous 2017) <sup>[1]</sup>. In recent years, BPH has caused devastating damages to rice crop in China, Japan, Korea and Vietnam. In 2005 and 2008, China reported a combined yield loss of 2.7 million tons of rice due to direct damage by BPH, while a yield loss of 0.4 million tons in Vietnam was mainly due to two virus diseases, RGSV and RRSV, transmitted by BPH (Brar *et al.* 2010) <sup>[3]</sup>. To develop a sustainable pest management system, it is important to find the right balance between breeding and management strategies to reduce the ecological fitness of BPH and to keep the pest under economic threshold levels (Bosque-Perez and Buddenhagen 1992) <sup>[2]</sup>. The Brown plant hopper (BPH) *Nilaparvata lugens* (Stal.) belong to the suborder Homoptera, family Delphacidae with piercing and sucking mouth parts. The plant hoppers suck the plant sap from the phloem vessels through their proboscis, due to this plant starts wilting with outer most leaves drying first and then the entire plant dries up. The Green leaf hopper (GLH) *Nephotettix virescens* (Distant) belong to order Hemiptera, family Cicadellidae, suck the cell sap from leaves and turn brown. It transmits the tungro diseases of rice. White backed planthopper (WBPH), *Sogatella furcifera* (Horvath) of the order Homoptera and family Delphacidae, reduce vigour, stunting growth, yellowing of leaves and delayed tillering and grain formation.

### Materials and Methods

The Present investigation on “Comparative efficacy of different recommended Insecticides against Brown plant hopper of Paddy” was carried out at the field of Anand Niketan College of Agriculture, Warora, Dist. Chandrapur during *kharif* 2021. The experiment was laid out in randomized block design with seven treatments by using variety PKV-HMT. Each set of experiment was replicated three times. The size of gross plot 5 x 4.5 m<sup>2</sup> and Net Plot -4.60 x 4.20 m<sup>2</sup>, with spacing 20x15cm. Periodical application of the respective test insecticides was applied at ETL based infestation of the insect pests on different stages of the crop. Treatment details of the insecticides used is as under in the experiment.

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## Results and Discussion

### Effect of different treatments on population of Brown plant hopper after third spray

#### 3 DAS

Hopper incidence was noticed in experimental plot at 65 DAT. Therefore the data on treatment effect was recorded only after 3rd spray for the study of comparative efficacy. Data presented in Table 1 was significant at 3 DAS there were no significantly differ the effect of all the treatments including untreated control in reducing the nymphal population of brown plant hopper. The treatment Carbosulfan 25 EC @ 1.6 ml/10L recorded lowest 5.18 nymph/hill and was followed by Thiamethoxam 25 WG @ 0.2 g/10L 5.38 nymph/hill, Fipronil 5 SC @ 2 ml/10L 5.97 nymph/hill, Bifenthrin 10 EC @ 1 ml/10L 6.16 nymph/hill, Acephate 75 SP @ 2 g/10L 6.26 nymph/hill and Cartap hydrochloride 50 SP @ 2 g/10L recording infestation 7.15 nymph/hill. The maximum population of Brown plant hopper was recorded in treatment untreated control 7.70 nymph/hill.

#### 7 DAS

The data obtained on average population of Brown plant hopper recorded at seven days after first spray are presented in Table 1 expressed that the lowest significant population

was recorded in treatment Thiamethoxam 25 WG @ 0.2 g/10L 4.03 nymph/hill and was found at par with Fipronil 5 SC @ 2 ml/10L 4.63 nymph/hill, Carbosulfan 25 EC @ 1.6 ml/10L recorded 4.87 nymph/hill, Bifenthrin 10 EC @ 1 ml/10L 4.91 nymph/hill, Acephate 75 SP @ 2 g/10L 4.93 nymph/hill and Cartap hydrochloride 50 SP @ 2 g/10L infestation 5.87 nymph/hill recorded respectively. The maximum population of Brown plant hopper was recorded in treatment control 8.15 nymph/hill.

#### 14 DAS

The data obtained on average population of brown plant hopper recorded at 14 DAS after first spray are presented in Table 1 is significant. The minimum population of brown plant hopper was recorded in treatment Carbosulfan 25 EC @ 1.6 ml/10L recorded 3.05 nymph/hill was found superior and at par with Thiamethoxam 25WG @ 0.2 g/10L 3.56 nymph/hill, Fipronil 5 SC @ 2ml/10L 3.70 nymph/hill, Acephate 75 SP @ 2 g/10L 3.80 nymph/hill, Cartap hydrochloride 50 SP @ 2g/10L recording BPH population 4.10 nymph/hill and Bifenthrin 10 EC @ 1ml/10L 4.15 nymph/hill respectively. The maximum population of brown plant hopper was recorded in treatment control 8.63 nymph/hill.

**Table 1:** Comparative efficacy effect of different treatments on per cent infestation of brown plant hopper on paddy after second spray

Tr. No	Treatments	% Dose Concent	1 <sup>st</sup> spreynypal population			
T <sub>1</sub>	Carbosulfan	1.6 ml/l	5.18	4.87	3.05	4.36
	25% EC		(2.27)	(2.20)	(1.74)	(2.08)
T <sub>2</sub>	Acephate 75%	2 g/l	6.26	4.93	3.80	4.99
	SP		(2.50)	(2.22)	(1.94)	(2.23)
T <sub>3</sub>	Cartap	2 g/l	7.15	5.87	4.10	5.70
	hydrochloride		(2.67)	(2.42)	(2.02)	(2.38)
<b>50% SP</b>						
T <sub>4</sub>	Fipronil 5% SC	2 ml/l	5.97	4.63	3.70	4.76
			(2.44)	(2.15)	(1.90)	(2.18)
T <sub>5</sub>	Thiamethoxam	0.2 g/l	5.38	4.03	3.56	4.32
	25% WG		(2.31)	(2.00)	(1.88)	(2.07)
T <sub>6</sub>	Bifenthrin 10%	1 ml/l	6.16	4.91	4.15	5.07
	EC		(2.48)	(2.21)	(2.03)	(2.25)
T <sub>7</sub>	Control		7.70	8.15	8.63	8.16
	(water spray)		(2.77)	(2.85)	(2.93)	(2.85)
F Test			Sig	Sig	Sig	Sig
SE(m)±			0.16	0.16	0.14	0.15
CD at 5%			0.51	0.50	0.44	0.48
CV (%)			12.67	11.80	10.19	11.55

Figures in parentheses are square root transformation DAS-Day After Spray

### Average mean population of Brown plant hopper after first spray

From the data presented in Table 13 revealed that all the treatments were significantly superior over control. However, in overall lowest population infestation of brown plant hopper was noticed in Thiamethoxam 25WG @ 0.2g/10L 4.32 nymph/hill and was at par with Carbosulfan 25 EC@ 1.6ml/10L 4.36%, Fipronil 5 SC @ 2ml/10L 4.76 nymph/hill, Acephate 75 SP @ 2g/10L 4.99 nymph/hill, Bifenthrin 10 EC @ 1ml/10L 5.07 nymph/hill and Cartap hydrochloride 50 SP @ 2g/10L 5.70 nymph/hill respectively. Highest population of brown plant hopper was noticed in control 8.16 nymph/hill.

### Conclusion

The mean data on effect of different treatments against Brown

plant hopper is significant and exhibited that the application of Thiamethoxam 25WG @ 0.2g/10L recorded lowest population of Brown plant hopper 2.07 nymph/hill and at par with Carbosulfan 25 EC@ 1.6ml/10L recorded 2.08 nymph/hill, Fipronil 5 SC @ 2ml/10L recorded 2.18 nymph/hill, Acephate 75 SP @ 2g/10L recorded 2.23 nymph/hill, Bifenthrin 10 EC @ 1ml/10L recorded 2.25 nymph/hill, Cartap hydrochloride 50 SP @ 2g/10L recording infestation 2.38 nymph/hill respectively. The highest no of Brown plant hopper population was recorded in control 2.85 nymph/hill Table 1.

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