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Field evaluation of some newer insecticides against the white backed planthopper (*Sogatella furcifera* Horvath)

H.P. Mishra*

College of Agriculture, Orissa University of Agriculture and Technology, Bhubaneswar-751 003, Orissa, India

ABSTRACT

Seven insecticides viz., ethiprole 10 SC, clothianidin 50 WDG, cartap hydrochloride 50 SP, phosphamidon 40 SL, triazophos 40 EC, diazinon 20 EC and a-cypermethrin 10 EC @ 50, 25, 500, 400, 400, 200 and 25g a.i. ha^{-1}, respectively were evaluated against the white backed planthopper, Sogatella furcifera Horvath (WBPH) of rice. The results revealed that out of seven insecticides tested the newer insecticides clothianidin belonging to neonicotinoid group and ethiprole belonging to phenyl pyrazole group were superior to other insecticides in suppressing WBPH population to the tune of 73.33-77.78% over control at 20 days after spraying during both the seasons of evaluation. Other insecticides registered below 50% control of the planthopper at 20 days after treatment with insecticides. Alpha-cypermethrin showed resurgence condition of the WBPH with 5.18-9.33% increase in population over control.

Key words: *Sogatella furcifera, control, insecticides*

Among the two dominant species of planthoppers infesting rice *viz*., the brown planthopper (BPH) and the white backed planthopper (WBPH), the latter wins the race of interspecific competition over the former successfully (Gunathilagraj and Chelliah, 1994). The WBPH, *Sogatella furcifera* Horvath is a serious pest of rice and under favourable conditions alone cause 35-95% yield loss (Sidhu, 1979). The plant protection drive through age-old insecticides has not kept pace with the production potential of rice for which the growers, at times suffer huge loss. Under such circumstances, newer formulations of insecticides with selectivity need to be evaluated for justification of chemical control as the first line of defense. Therefore, the present investigations were carried out to evaluate the efficacy of some newer molecules against the WBPH of rice.

The field experiments were conducted for two cropping seasons during wet season, 2003 and 2004 in a randomized block design with eight treatments replicated thrice at the Central Research Station, Orissa University of Agriculture and Technology, Bhubaneswar. The insecticide treatments included the ethiprole 10SC, clothianidin 50WDG, cartap hydrochloride 50 SP, phosphamidon 40 SL, triazophos 40EC, diazinon 20EC and a-cypermethrin 10EC @ 50, 25, 500, 400, 400, 200 and 25 g a.i. ha-1, respectively along with an untreated control. Rice variety 'Khandagiri' (95-100 days maturity) was grown in plots of size 5m X 4m at a spacing of 20cm X 10cm with recommended package of practices excluding plant protection. The insecticides were sprayed on 20 and 41 days after transplanting. Control plots were sprayed with water only.

Observations were recorded on the number of WBPH nymphs and adults present at the base of the rice plants on ten randomly selected clumps from each plot leaving the border rows at one day before spraying (DBS) and 5,10,15 and 20 days after each spraying in both the seasons of experiments. The population of WBPH at one day before first spraying was negligible and the population builded up to economic prominence by the time of second spraying. The data on WBPH population before and after the second spraying have been transformed (Gomez and Gomez, 1984), analyzed and presented in the text.

The WBPH population hill^{-1} recorded in active tillering stage did not vary significantly (Table 1) at one day before second spraying (1DBSS) during wet season

Table 1. WBPH population as influenced by various insecticide treatments during wet season 2003 and 2004 at Bhubaneswar

Treatments	Trade name	Dose	Number of WBPH hill^{-1}											
		g a.i.	Wet season 2003						Wet season 2004					
		ha^{-1}	1 DBSS	5 DASS	10 DASS	15 DASS	20 DASS	Reduction over control (%)	1 DBSS	5 DASS	10 DASS	15 DASS	20 DASS	Reduction over control (%)
Ethiprole 10 SC	-	50	4.50 (2.12)	0.33 (0.57)a	0.67 (0.81)a	1.33 (1.14)a	1.67 (1.28)a	77.73	8.50 (2.91)	0.40 (0.60)a	1.80 (1.34)a	2.33 (1.52)a	3.20 (1.79)a	76.30
Clothianidin	Dantop 50WDG	25	5.33 (2.31)	0.33 (0.57)a	0.67 (0.80)a	1.60 (1.26)a	2.00 (1.40)a	73.33	8.67 (2.21)	0.33 (0.55)a	1.70 (1.30)a	2.67 (1.63)a	3.00 (1.73)a	77.78
Cartap hydrochloride	Padan 50SP	500	4.67 (2.16)	2.50 (1.58)b	2.33 (1.52)b	3.90 (1.97)c	5.25 (2.29)c	30.00	9.00 (2.99)	3.67 (1.91)b	5.20 (2.28)b	7.95 (2.82)c	9.40 (3.06)c	30.37
Phosphamidon	Sumidon 40SL	400	4.33 92.08)	1.90 (1.37)b	2.00 (1.41)b	3.33 (1.82)b	4.33 (2.08)b	42.27	8.50 (2.90)	4.00 (2.00)b	4.70 (2.17)b	7.00 (2.65)b	7.00 (2.83)b	40.74
Triazophos	Sutathion 40EC	400	5.00 92.23)	2.00 (1.41)b	2.00 (1.41)b	3.65 (1.91)b	4.50 (2.12)b	40.00	7.50 (2.73)	4.50 (2.12)b	5.30 (2.30)b	7.50 (2.74)b	8.26 (2.87)b	38.89
Diazinon	Suzon 20EC	200	5.67 (2.37)	5.70 (2.39)c	2.50 (1.58)c	4.20 (2.05)c	5.40 (2.32)c	28.00	9.00 (2.99)	4.20 (2.05)b	5.60 (2.36)c	8.70 (2.95)c	10.00 (3.16)c	25.92
α-cypermethrin	Guru 10EC	25	4.67 (2.14)	5.90 (2.43)c	4.98 (2.23)d	7.65 (2.76)d	8.20 (2.86)d	-9.33	9.50 (3.06)	4.00 (2.00)b	6.00 (2.45)c	10.40 (3.22)d	14.20 (3.77)d	-5.18
Control	-	-	5.33 92.30)	6.67 (2.58)c	5.60 (2.36)d	7.00 (2.64)d	7.50 (2.74)d		8.50 (2.90)	8.67 (2.95)c	9.00 (3.00)d	11.00 (3.31)d	13.50 (3.67)d	
SEm (±)	-	-	90.13)	(0.07)	(0.04)	(0.04)	(0.06)		(0.17)	(0.10)	(0.04)	(0.04)	(0.04)	
CD (P=0.05)			NS	(0.21)	(0.14)	(0.12)	(0.20)		NS	(0.30)	(0.14)	(0.13)	(0.11)	

Figures in the parentheses are square root transformed values; Means followed by a common letter in a column are not significantly different from each other by LSD; DBSS= Day before second spraying, DASS= Days after second spraying

2003(4.33-5.67) and wet season 2004(7.50-9.50). During wet season 2003 the WBPH population in a-cypermethrin was on par with control up to 20 days after second spraying (DASS). Among other insecticides similar results with regard to effectiveness was observed on 5, 10, 15 and 20 DASS. At 20DASS ethiprole (1.67) and clothianidin (2.00) significantly suppressed WBPH population/clump compared to other insecticides (4.33-5.40) and control (7.50). In a-cypermethrin 9.33% more population was observed over control at 20DASS, although statistically the population was on par with control. The per cent reduction in WBPH population was highest (77.73) in ethiprole followed by clothianidin (73.33) over control at 20DASS compared to below 50% in other insecticides.

In wet season 2004 all the insecticides evaluated were effective in bringing down the planthopper population up to 10DASS with ethiprole and clothianidin showing significantly superior control of the pest. On 15 and 20 DASS the WBPH population in ∝-cypermethrin was on par with control. Other insecticides evaluated showed similar efficacy in controlling WBPH at 15 and 20DASS. Clothianidin (3.00) and ethiprole (3.20) registered significantly lowest population compared to other insecticides (8.00-10.00) and control (13.50). Unlike wet season 2003 increased WBPH population (5.18%) was observed at 20DASS during wet season 2004 with ∝-cypermethrin application. Highest population reduction (77.78%) was recorded in clothianidin followed by ethiprole (76.30%) over control at 20DASS. In other insecticides, below 50% control of WBPH was noticed over untreated check.

Varma *et al.* (2003) from their experiments concluded that ethiprole 10EC @ 50g a.i. ha^{-1} was most effective in managing WBPH population. Krishnaiah *et al.* (2004) from greenhouse studies found that out of several insecticides evaluated ethiprole had better ovicidal effect than others. Insecticide evaluation trial of coordinated entomology programme (DRR, 2003) revealed that, of several insecticides, all neonicotinoid insecticide formulations viz., imidacloprid @ 25g a.i. ha^{-1} and clothianidin @ 10g a.i. ha^{-1} were superior to other insecticides in controlling planthoppers. The present finding is in agreement with the findings of the above workers. Krishnaiah *et al.* (1996) recorded planthopper resurgence with cypermethrin application, which was observed with a-cypermethrin in the present investigation.

It may be concluded from the present study that in early-medium duration transplanted rice foliar application of the new molecules like ethiprole 10 SC @ 50g a.i. ha^{-1} and clothianidin 50WDG @ 25 g a.i. ha^{-1} at 20 and 41 days after transplanting can effectively suppress the WBPH population compared to conventional insecticides. However, application of the newer insecticide ∝-cypermethrin may induce resurgence of WBPH as indicated in the present study.

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