



ISSN (E): 2277-7695
ISSN (P): 2349-8242
NAAS Rating: 5.23
TPI 2023; SP-12(7): 714-718
© 2023 TPI
www.thepharmajournal.com
Received: 10-04-2023
Accepted: 15-05-2023

VP Wagh

Assistant Professor,
Department of Entomology
Section, College of Agriculture,
Konghara, Maharashtra, India

Dr PR Panchbhai

Assistant Professor,
Department of Entomology
Section, College of Agriculture,
Nagpur, Maharashtra, India

SG Biradar

PG Student, Department of
Entomology Section, College of
Agriculture, Dhule,
Maharashtra, India

ND Gajbe

Assistant Professor, Department
of Entomology Section, ANCA,
Warora, Maharashtra, India

Comparative efficacy of different recommended insecticides against leaf folder of paddy

VP Wagh, Dr. PR Panchbhai, SG Biradar and ND Gajbe

Abstract

The present investigation entitled “Comparative efficacy of different recommended insecticides against leaf folder 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. A total of 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 Leaf folder, Acephate 75 SP (1.44%), Thiamethoxam 25% WG (1.5%), carbosulfan 25 EC (1.50%), Cartap hydrochloride 50 (1.55%) and control (1.61%) respectively.

Keywords: Paddy, insecticide, leaf folder

Introduction

Rice (*Oryza sativa*) is a major field crop in India covering a larger area of the country. In order to meet the growing demand of the ever-increasing population. We need to produce more rice every year. But rice production is less due to the cause of biotic and abiotic stresses, of which insect pests alone caused about 25 percent 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 percent of total food grain production and 46 percent of total cereal production and continues to play a vital role in the national food grain supply (Anonymous 2017) [1]. In Maharashtra rice is grown in Vidarbha and Konkan regions from which Chandrapur, Gadchiroli, Gondiya, Bhandara, Nagpur, Wardha, Ratnagiri, Sindhudurga, Raigad, Thane, etc. are important rice-producing districts. In India, the yellow leaf folder solely causes 2-20% damage and for an increase in every percent of white ear heads there was a 1.3% yield loss observed (Satpathi *et al.* 2012) [6]. In the entire country, the earlier rice leaf folder, *C. medinalis* was considered a minor pest. But now it has assumed major pest status (Nanda, *et al.* 1990) [3]. Maximum leaf damage by this pest is about 60 to 70 percent at tillering and flowering stage which leads to 80 percent yield reduction. Usually, the second instar larvae of rice leaf folder stitches and glues to the longitudinal growing rice leaves for its shelter and starts feeding reducing green foliage leading to papery dry, stunting, curling, or yellowing (Yaspal *et al.* 2015) [7]. Insect pest damage cause heavy economic losses to farming communities. The incidence of insect pests on rice would give an idea of the peak period of their activity which helps with management strategy. Newer insecticides were taken to study and evaluate their efficacy for the changing level of pest demands for new chemicals possessing novel insecticidal action against them.

Materials and Methods

The Present investigation on “Comparative efficacy of different recommended Insecticides against Leaf folder of Paddy” was carried out at the field of Anand Niketan College of Agriculture, Warora, and Dist. Chandrapur during *Kharif* 2021. The experiment was laid out in a randomized block design with seven treatments by using a variety of PKV-HMT. Each set of experiments was replicated three times. The size of the gross plot - 5 x 4.5 m² and the Net Plot -4.60 x 4.20 m², with a spacing of 20x15 cm. Periodical application of the respective test insecticides was applied at ETL-based infestation of the insect pests at different stages of the crop. Treatment details of the insecticides used is as under in the experiment.

Corresponding Author:

VP Wagh

Assistant Professor,
Department of Entomology
Section, College of Agriculture,
Konghara, Maharashtra, India

Result and Discussion

Effect of different treatments on percent infestation of Leaf folder on paddy after the first spray

7 DAS

All the treatments showed the lowest per-cent leaf infestation of the leaf folder than the untreated control (1.61%) at seven days after the first spray Table. Among different treatments, Bifenthrin 10 EC @ 1 ml/10L recorded minimum infestation of leaf folder (1.36%) and it was followed by Fipronil 5% SC @ 2 ml/10L (1.39%), Acephate 75 SP @ 2 g/10L (1.44%), Carbosulfan 25 EC @ 1.6 ml/10L recorded (1.49%), Thiamethoxam 25 WG @ 1 ml/10L recorded (1.51%), Cartap hydrochloride 50 SP @ 2 g/10L recorded (1.54%) respectively. The maximum percent infestation of 1.61% leaf folder infestation was recorded in control.

14 DAS

The data obtained in Table 1 revealed that percent infestation of leaf folder was recorded at 14 DAS after 1st spray presented in Table revealed that the minimum percent infestation was 1.28% recorded in treatment Bifenthrin 10 EC

@ 1 ml/10L recorded minimum infestation i.e. 1.28%, However, this treatment was found superior at par with Fipronil 5 SC @ 2 ml/10L recorded 1.37%, Acephate 75 SP @ 2 g/10L 1.42% and Thiamethoxam 25 WG @ 1 ml/10L 1.44% leaf folder infestation. The next effective treatment was Carbosulfan 25 EC @ 1.6 ml/10L recorded at 1.47% and Cartap hydrochloride 50 SP @ 2 g/10L recorded at 1.51% and these were at par with each other. The maximum percent infestation of leaf folders in control is 1.64%.

Mean percent Dead heart infestation of leaf folder after first spray

From the data presented in Table 1 revealed that there were no significant differences were observed in all the treatments. However, in overall lowest percent infestation of leaf folder 1.36% was noticed in Bifenthrin 10 EC @ 1 ml/10L and was followed by Fipronil 5 SC @ 2 ml/10L 1.39%, Acephate 75 SP @ 2 g/10L 1.44%, Thiamethoxam 25 WG @ 1 ml/10L 1.5, Carbosulfan 25 EC @ 1.6 ml/10L 1.50%, Cartap hydrochloride 50 SP @ 2 g/10L 1.55%, and control 1.61% respectively.

Table 1: Comparative efficacy effect of different treatments on percent infestation of leaf folder on paddy after the first spray

Tr. No.	Treatments	% Dose Concent ration	Per cent DH infestation of Leaf folder after 1st spray		
			7DAS	14 DAS	Mean
T ₁	Carbosulfan	1.6 ml/l	1.86	1.65	1.75
	25% EC		(1.36)	(1.28)	(1.32)
T ₂	Acephate 75%	2 g/l	1.61	1.42	1.51
	SP		(1.26)	(1.19)	(1.22)
T ₃	Cartap	2 g/l	1.81	1.63	1.72
	hydrochloride		(1.34)	(1.27)	(1.31)
50% SP					
T ₄	Fipronil 5% SC	2 ml/l	1.43	1.32	1.37
			(1.19)	(1.14)	(1.17)
T ₅	Thiamethoxam	0.2 g/l	1.65	1.41	1.53
	25% WG		(1.28)	(1.18)	(1.23)
T ₆	Bifenthrin 10%	1 ml/l	1.36	1.25	1.30
	EC		(1.16)	(1.11)	(1.14)
T ₇	Control	(water spray)	2.98	3.08	3.03
			(1.72)	(1.75)	(1.74)
F Test			Sig	Sig	Sig
SE(m)±			0.5	0.07	0.12
CD at 5%			0.17	0.19	0.34
CV (%)			11.96	10.74	11.35

Figures in parentheses are square root transformation DAS - day after spray

Effect of different treatments on percent infestation of leaf folder on paddy after the second spray

3 DAS

Data presented in (Table 2) pertaining to the percent infestation of leaf folder three days after the second spray revealed that, the lowest (1.03%) infestation was recorded in a plot treated with Fipronil 5 SC @ 2 ml/10L and was at par with Cartap hydrochloride 50 SP @ 2 g/10L, Carbosulfan 25 EC @ 1.6 ml/10L recorded 1.88% and 1.76% DH. The next effective group of treatment were Acephate 75 SP @ 2 g/10L, Thiamethoxam 25 WG @ 0.2 g/10L and Bifenthrin 10 EC @ 1 ml/10L recorded 2.35% DH, 2.43% DH, 2.50% DH infestation respectively. The maximum percent infestation 7.83% DH was recorded in control.

7 DAS

The data on comparative effect of different treatments against leaf folder seven days after the second spray (Table 2) revealed that application of Fipronil 5 SC @ 2 ml/10L recorded significantly lowest percent infestation of YSB i.e. 1.00% DH and it was found at par with Carbosulfan 25 EC @ 1.6 ml/10L 1.10%, Cartap hydrochloride 50 SP @ 2 g/10L 1.20%, Acephate 75 SP @ 2 g/10L 1.43%, Thiamethoxam 25 WG @ 0.2 g/10L 2.01% DH infestation of YSB respectively. These treatments were followed by Bifenthrin 10 EC @ 1 ml/10L reached 2.05% DH of YSB. The maximum percent infestation 8.89% was recorded in control.

Table 2: Comparative efficacy effect of different treatments on percent infestation of leaf folder on paddy after the second spray

Tr. No	Treatments	% Dose Concent	Percent DH infestation of YSB after 2nd spray			
T ₁	Carbosulfan	1.6 ml/l	1.76	1.10	1.01	1.29
	25% EC		(1.32)	(1.04)	(1.00)	(1.13)
T ₂	Acephate 75%	2 g/l	2.35	1.43	1.05	1.61
	SP		(1.53)	(1.19)	(1.02)	(1.26)
T ₃	Cartap	2 g/l	1.88	1.20	1.02	1.36
	hydrochloride		(1.27)	(1.09)	(1.00)	(1.16)
50% SP						
T ₄	Fipronil 5% SC	2 ml/l	1.03	1.00	1.00	1.01
			(1.01)	(1.00)	(1.00)	(1.00)
T ₅	Thiamethoxam	0.2 g/l	2.43	2.01	1.50	1.98
	25% WG		(1.55)	(1.41)	(1.22)	(1.40)
T ₆	Bifenthrin 10%	1 ml/l	2.50	2.05	1.23	1.92
	EC		(1.58)	(1.43)	(1.10)	(1.38)
T ₇	Control	Water Spray	7.83	8.89	9.13	8.61
			(2.79)	(2.98)	(3.02)	(2.93)
F Test			Sig	Sig	Sig	Sig
SE(m)±			0.11	0.15	0.14	0.13
CD at 5%			0.33	0.46	0.44	0.41
CV (%)			10.16	14.82	12.82	12.6

Figures in parentheses are square root transformation DAS - day after spray

14 DAS

The data revealed on the percent infestation of leaf folder at fourteen days after the second spray presented in (Table 2) was statistically significant. Among all the treatments Fipronil 5 SC @ 2 ml/10L recorded the lowest per cent infestation of YSB i.e. 1.00% DH and it was at par with Carbosulfan 25 EC @ 1.6 ml/10L, Cartap hydrochloride 50 SP @ 2 g/10L, Acephate 75 SP @ 2 g/10L, Bifenthrin 10 EC @ 1ml/10L and Thiamethoxam 25 WG @ 0.2 g/10L which recorded 1.01%, 1.02%, 1.05%, 1.23% and 1.50% of DH infestation respectively. The maximum percent infestation 9.13% was recorded in control.

Mean percent Dead heart infestation of leaf folder after the second spray

From the data presented in Table 2 revealed that all the treatments was significantly superior over the control. However, in overall, lowest percent infestation of Leaf folder 1.01% was noticed in Fipronil 5 SC @ 2 ml/10L and was at par with Carbosulfan 25 EC @ 1.6 ml/10L 1.29%, Cartap hydrochloride 50 SP @ 2 g/10L 1.36%, Acephate 75 SP @ 2 g/10L 1.61%, Bifenthrin 10 EC @ 1 ml/10L 1.92% and Thiamethoxam 25 WG @ 0.2 g/10L 1.98% respectively. The highest percentage of dead hearts was recorded in control 8.61%.

Table 3: Comparative efficacy effect of different treatments on percent infestation of Leaf folder on paddy after the third spray

Tr. No.	Treatments	% Dose Consent ration	Percent DH infestation of Leaf folder after 3rd spray		
			7DAS	14 DAS	Mean
T ₁	Carbosulfan	1.6 ml/l	1.86	1.65	1.75
	25% EC		(1.36)	(1.28)	(1.32)
T ₂	Acephate 75%	2 g/l	1.61	1.42	1.51
	SP		(1.26)	(1.19)	(1.22)
T ₃	Cartap	2 g/l	1.81	1.63	1.72
	hydrochloride		(1.34)	(1.27)	(1.31)
50% SP					
T ₄	Fipronil 5% SC	2 ml/l	1.43	1.32	1.37
			(1.19)	(1.14)	(1.17)
T ₅	Thiamethoxam	0.2 g/l	1.65	1.41	1.53
	25% WG		(1.28)	(1.18)	(1.23)
T ₆	Bifenthrin 10%	1 ml/l	1.36	1.25	1.30
	EC		(1.16)	(1.11)	(1.14)
T ₇	Control	Water Spray	2.98	3.08	3.03
			(1.72)	(1.75)	(1.74)
F Test			Sig	Sig	Sig
SE(m)±			0.5	0.07	0.12
CD at 5%			0.17	0.19	0.34
CV (%)			11.96	10.74	11.35

Figures in parentheses are square root transformation DAS - day after spray

3 DAS

Data presented in (Table 3) pertaining to percent infestation of leaf folder three days after the third spray revealed that all the treatments were significantly superior over the control. The lowest i.e. 1.00% DH infestation of YSB recorded in Fipronil 5 SC @ 2 ml/10L and it was found at par with

Carbosulfan 25 EC @ 1.6 ml/10L recorded 1.00%, Cartap hydrochloride 50 SP @ 2 g/10L recorded 1.01%, Acephate 75 SP @ 2 g/10L recorded 1.02%, Bifenthrin 10 EC @ 1 ml/10L recorded 1.20% and Thiamethoxam 25 WG @ 0.2 g/10L recorded 1.48% DH infestation of YSB respectively. The maximum percent infestation i.e. 9.15% was recorded in

control.

7 DAS

The data on the comparative effect of different treatments against the leaf folder seven days after the third spray (Table 3) revealed that similar treatments of the efficacy of insecticides at 3 DAS were also noticed at 7 DAS. Application of Fipronil 5 SC @ 2 ml/10L recorded the lowest percent infestation i.e. 0.50% DH. This treatment was found at par with Carbosulfan 25 EC @ 1.6 ml/10L recorded 0.52%, Cartap hydrochloride 50 SP @ 2 g/10L 0.61%, Acephate 75 SP @ 2 g/10L 0.63%, Bifenthrin 10 EC @ 1 ml/10L 1.00% and Thiamethoxam 25 WG @ 0.2 g/10L 1.02% DH infestation recorded respectively. The maximum percent infestation 9.21% DH infestation was recorded in control.

14 DAS

The data revealed on the percent infestation of leaf folder at fourteen days after the third spray presented in (Table 3) was statistically significant. Among the different treatments comparatively Fipronil 5 SC @ 2 ml/10L recorded the lowest percent infestation i.e. 0.21% DH. This treatment was at par with Cartap hydrochloride 50 SP @ 2 g/10L, Carbosulfan 25 EC @ 1.6 ml/10L, Acephate 75 SP @ 2 g/10L and Bifenthrin 10 EC @ 1 ml/10L which recorded 0.23%, 0.28%, 0.36% and 0.46% DH respectively. Thiamethoxam 25 WG @ 0.2 g/10L was least effective than above which exhibited higher percent infestation i.e. 0.73% DH. The maximum percent infestation 9.29% was recorded in control.

Mean percent Dead heart infestation of leaf folder after third spray

From the data presented in (Table 3) revealed that all the treatments were significantly superior to the control. However, in overall lowest percent infestation of Leaf folder, 0.57% was noticed in Fipronil 5 SC @ 2 ml/10L and was at par with Carbosulfan 25 EC @ 1.6 ml/10L 0.6%, Cartap hydrochloride 50 SP @ 2 g/10L 0.61%, Acephate 75 SP @ 2 g/10L 0.67%, Bifenthrin 10 EC @ 1 ml/10L 0.88% and Thiamethoxam 25 WG @ 0.2 g/10L 1.07% respectively. The highest percentage (9.33% DH) was observed in the control.

The cumulative effect of different treatments on percent infestation of leaf folder on paddy

3 DAS

The data on percent infestation of leaf folder is presented in (Table 4) exhibited that all the treatments were significantly superior over untreated control. The minimum infestation of 2.31% was recorded in the treatment Fipronil 5 SC @ 2 ml/10L which was at par with Carbosulfan 25 EC @ 1.6 ml/10L recorded at 2.58%, Cartap hydrochloride 50 SP @ 2 g/10L recorded 2.65%, Acephate 75 SP @ 2 g/10L recorded 2.84%, Bifenthrin 10 EC @ 1 ml/10L recorded 2.97%, Thiamethoxam 25 WG @ 0.2 g/10L recorded 3.05% DH infestation respectively. The maximum percent infestation of YSB at the vegetative state (7.63%) was recorded in the control.

7 DAS

The data on the cumulative effect of different treatments against the leaf folder seven days after the spray was significant (Table 4) the application of Fipronil 5 SC @ 2 ml/10L recorded a minimum infestation of 1.24%. This treatment was at par with Carbosulfan 25 EC @ 1.6 ml/10L recorded 1.28%, Cartap hydrochloride 50 SP @ 2 g/10L

recorded 1.63%, Acephate 75 SP @ 2 g/10L recorded 1.74%, Bifenthrin 10 EC @ 1 ml/10L recorded 2.14%, Thiamethoxam 25 WG @ 0.2 g/10L recorded 2.34% respectively. The maximum percent infestation (8.37%) was recorded in control.

Table 4: Cumulative effect of three applications of different treatments on percent infestation of leaf folder

Tr. No.	Treatments	% Dose Concentration	Cumulative% infestation			
			3 DAS	7 DAS	14 DAS	Mean
T ₁	Carbosulfan 25% EC	1.6 ml/l	2.58 (1.52)	1.28 (1.09)	1.02 (0.95)	1.62 (1.27)
T ₂	Acephate 75% SP	2 g/l	2.84 (1.60)	1.74 (1.26)	1.26 (1.05)	1.94 (1.39)
T ₃	Cartap Hydrochloride 50% SP	2 g/l	2.65 (1.54)	1.63 (1.21)	1.05 (0.96)	1.77 (1.33)
T ₄	Fipronil 5% SC	2 ml/l	2.31 (1.41)	1.24 (1.07)	0.79 (0.85)	1.44 (1.2)
T ₅	Thiamethoxam 25% WG	0.2 g/l	3.05 (1.69)	2.34 (1.47)	1.74 (1.27)	2.37 (1.53)
T ₆	Bifenthrin 10% EC	1 ml/l	2.97 (1.65)	2.14 (1.42)	1.41 (1.13)	2.17 (1.47)
T ₇	Control water spray		7.63 (2.75)	8.37 (2.89)	8.75 (2.96)	8.25 (2.87)
F Test			Sig	Sig	Sig	Sig
SE(m)±			0.20	0.14	0.12	0.15
CD at 5%			0.64	0.45	0.39	0.49
CV (%)			15.80	14.01	15.91	15.57

Figures in parentheses are square root transformation DAS - day after spray

14 DAS

All the insecticidal treatments were significantly superior over the control. Cumulative minimum percent infestation of three applications at 14 DAS was recorded in the plots treated with Fipronil 5 SC @ 2 ml/10L 0.79%. This treatment was at par with Carbosulfan 25 EC @ 1.6 ml/10L recorded at 1.02%, Cartap hydrochloride 50 SP @ 2 g/10L recorded at 1.05%, Acephate 75 SP @ 2 g/10L recorded at 1.26% and Bifenthrin 10 EC @ 1 ml/10L recorded 1.41% Yellow leaf folder infestation. These treatments were followed by Thiamethoxam 25 WG @ 0.2 g/10L 1.74% Yellow leaf folder infestation. The maximum percent infestation 8.75% was recorded in control.

Mean

It is evident from the cumulative mean data presented in (Table 4) and illustrated in Fig that the treatment with Fipronil 5 SC @ 2 ml/10L proved significantly effective and showed minimum percent infestation of leaf folder 1.44% DH and was found at par with Carbosulfan 25 EC @ 1.6 ml/10L recorded 1.62% DH, Cartap hydrochloride 50 SP @ 2 g/10L recorded 1.77% DH, Acephate 75 SP @ 2 g/10L recorded 1.94% DH, Bifenthrin 10 EC @ 1 ml/10L recorded 2.17% DH and Thiamethoxam 25 WG @ 0.2 g/10L recorded 2.37% DH infestation respectively. The maximum percent infestation 8.25% was recorded in control.

The present investigation of the research work collaborates with the earlier findings of Niranjana, *et al.* (2018) [4], who reported after the application of Fipronil 0.3 G recorded minimum percent infestation of leaf folder at 10 & 20 Kg/ha and recorded 1.84% DH and 2.13% DH and it was followed by Cartap Hydrochloride 4 G at 25 & 50 kg/ha.

Mishra, *et al.* (2012) [2] also reported the lowest percent infestation of yellow leaf folder and highest grain yield in the

treated plots with Fipronil 5 SC 50 g ai/ha and was followed by Cartap hydrochloride 50 SP 300 g ai/ha. Thus these results are comparable to the findings of the present investigation and gave support to the data.

Conclusion

The cumulative mean percent infestations of leaf folder after three applications in all the treatments were significantly superior over the control. The application of Fipronil 5 SC @ 2ml/10L recorded minimum infestation (1.2% DH). This treatment was at par with Carbosulfan 25 EC@ 1.6ml/10L recorded (1.27% DH), Cartap hydrochloride 50 SP @ 2g/10L recorded (1.33% DH), Acephate 75 SP @ 2g/10L recorded (1.39% DH), Bifenthrin 10 EC @ 1ml/10L recorded (1.47% DH), Thiamethoxam 25WG @ 0.2 g/10L recorded (1.53% DH) respectively. The maximum percent infestation (2.87% DH) was recorded in control.

References

1. Anonymous. All India estimates of area, production and yield of food grains/Third advance estimates of Production of food grains for 2016-17 (As on May 09, 2017). Agricultural Statistics Division. Directorate of Economics & Statistics Department of Agriculture, Cooperation and Farmers Welfare, Ministry of Agriculture and Farmers Welfare, Government of India, New Delhi; c2017.
2. Mishra MK, Sharma RC, Singh RB. Efficacy of insecticides against rice yellow leaf folder, *Scirpophaga incertulas* (WLK.) on basmati rice. *Oryzae*. 2012;49(2):127-129.
3. Nanda VK, Bisoi RC. Bionomics of rice L7 CM Orissa J Agrl. Res. 1990;3(2):130-135.
4. Niranjana HP, Suja G, Shobha YB. Evaluation of efficacy of new generation granular insecticides against rice yellow leaf folder. *International Journal of Current Microbiology and Applied Sciences*. 2018;7(10):374-379.
5. Pathak MD, Andres F, Galacgnae N, Raros R. Resistance of rice varieties to the stripped leaf folder. *International Rice Research Institute Technical Bulletins*. 1971;11:69.
6. Satpathi CR, Chakraborty K, Shikari D, Acharjee IP. Consequences of Feeding by yellow leaf folder on Rice Cultivar Swarnamashuri. *World Applied Sciences Journal*. 2012;17(4):532-539.
7. Yaspal, Singh N, Sahu CM, Ghirtlahre SK, Painkra KL, Chandrakar G. Studies on the seasonal incidence of leaf folder, *Cnaphalocrocis medinalis* Gurnee in midland SRI and normal transplanted rice ecosystem. *International Journal of Tropical Agriculture*. 2015;33(2):547-551.