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## Efficiency of chlorpyrifos 75 WDG against rice leaf folder, *Cnaphalocrosis medinalis* Guenee. (Lepidoptera: Crambidae)

**Vaishali P Sawant and Anand Narangalkar**

### Abstract

The experiment was conducted to study the efficiency of chlorpyrifos 75 WDG against rice leaf folder, *Cnaphalocrosis medinalis* Guenee. The research work was carried out during Rabi 2014 - 15 on the rice field of Mr. Kamal Murarkar, village Morabe, Tal. Karjat, Dist. Raigad (M.S.). Experiment consisted of eight treatments and three replications. Two rounds of sprays were done. Observations on per cent infested leaves due to leaf folder were recorded at 7 and 14 days after each application. It was observed that per cent infested leaves decreased with increase in concentration of each insecticide. The results revealed that 7 days after first and second spraying, treatment, Chlorpyrifos 75 WDG @533g/ha was found effective and at par with the treatment, Chlorpyrifos 75 WDG @500g/ha and were significantly superior over all other treatments. Maximum yield was also obtained from the treatment, Chlorpyrifos 75 WDG @533g/ha (51.90 q/ha) and at par with the treatment, Chlorpyrifos 75 WDG @500g/ha (50.70 q/ha).

**Keywords:** Chlorpyrifos 75 WDG, rice leaf folder, *Cnaphalocrosis medinalis*, Crambidae, per cent infested leaves

### 1. Introduction

Rice (*Oryza sativa* L.) is the staple food of more than 50 per cent population of the world [FAO, 2011, Garris, *et al*, 2005] <sup>[4, 5]</sup>. In India, area under paddy cultivation is decreasing but the production of rice is increasing day by day. During year 2016-17, production of rice was 109.97 metric tonnes, in year 2017-18, it increased up to 112.91 metric tonnes and in year 2018-19, the production of rice reached up to 114.00 metric tonnes (Grain & Feed Annual, 2019) <sup>[6]</sup>. But though the production of rice is increasing, this crop is attacked by number of insect pests which affects its productivity. There are about 128 insect species recorded to infest the rice fields. Rice crop is attacked by insect pests at different stages of its growth. There are some insect pests which feeds on leaves. These insect pests *viz.* rice leaf folder (*Cnaphalocrocis medinalis*), rice caseworm (*Nymphula depunctalis*) etc. remove the chlorophyll content of the leaves leading to considerable reduction in yield. Rice leaf folder, *Cnaphalocrocis medinalis* was considered as minor insect pest of rice, but its abundance increased in late 1980's and have become major pest in many parts of the world (Ahmed *et al.*, 2010) <sup>[1]</sup>. The larvae of rice leaf folder seals the edges of leaves together, fold them longitudinally and feed on green matter from inside the folded leaves which results in reduced photosynthetic activity. Depending upon stage of the crop at the time of infestation, 18 to 60 per cent yield losses by leaf folder has been reported (Ramasamy and Jaliecksono, 1996 and Alvi *et al.*, 2003) <sup>[10, 2]</sup>. The hot and humid climate during rice growth stages is very congenial for proliferation of insect pests. Farmers generally use different pesticides to manage stem borer and leaf folder in rice. Insecticides application in rice fields against insect pests helps in increasing rice production (Misra and Parida, 2004) <sup>[9]</sup>, though they may cause environmental pollution (Khan *et al.*, 2010) <sup>[7]</sup>. Keeping in view the importance of rice, studies were conducted to evaluate efficacy of new molecule of insecticides against rice leaf folder.

Hence, the present work is carried out to determine the efficacy of coded formulation Chlorpyrifos 75 WDG against rice leaf folder, *Cnaphalocrosis medinalis* Guenee. (Lepidoptera: Crambidae).

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## 2. Material and Methods

The field experiment was laid out on the rice field of Mr. Kamal Murarkar, village Morabe, Tal. Karjat, Dist. Raigad (M.S.) during Rabi 2014-15. The experiment comprised of total eight treatments including different insecticides viz. Chlorpyrifos 75 WDG, Chlorpyrifos 50 EC and Acephate 75 SP with different concentrations and water spray as control. The experiment was replicated thrice. The treatments included T0- Control, T1- Chlorpyrifos 75 WDG@ 467 g/ha, T2- Chlorpyrifos 75 WDG@ 500 g/ha, T3- Chlorpyrifos 75 WDG@ 533 g/ha, T4- Chlorpyrifos 50 EC@750 ml/ha, T5- Chlorpyrifos 50 EC@750 ml/ha, T6- Acephate 75 SP@666 g/ha and T7- Acephate 75 SP@1000 g/ha. details are as follows.

**Table 1:** Treatment details

Treatments	Product	Dosage (per ha)/ 500 lit water
T0	Control (Water Spray)	
T1	Chlorpyrifos 75 WDG	467 g/ha
T2	Chlorpyrifos 75 WDG	500 g/ha
T3	Chlorpyrifos 75 WDG	533 g/ha
T4	Chlorpyrifos 50 EC	750 ml/ha
T5	Chlorpyrifos 50 EC	800 ml/ha
T6	Acephate 75 SP	666 g/ha
T7	Acephate 75 SP	1000 g/ha

### 2.1 Method of assessment

Pre- treatment observations were recorded on randomly selected 20 hills per plot by counting total number of leaves and damaged leaves per hill one day before spray. The per cent infestation was thus calculated. Post treatment observations were recorded on total number of leaves and damaged leaves at 7 and 14 days after application of insecticides. At each time of recording observations, 20 hills were randomly selected to record the total number of leaves and damaged leaves.

$$\text{Per cent infested leaves} = \frac{\text{Infested leaves per hill}}{\text{Total leaves per hill}} \times 100$$

The average per cent infestation was worked out, transformed in to arc sine and analysed statistically. The yield from each treatment was calculated and converted in to q/ha.

## 3. Experimental Results

### 3.1 Effect of Chlorpyrifos 75 WDG against Rice Leaf Folder (*Cnaphalocrosis medinalis*)

The per cent leaf folder infestation ranged from 10.23 to 10.87 before treatment (Table 2). Seven Days after insecticide application (DAA), there was significant difference in incidence among the treatments. Treatment Chlorpyrifos 75 WDG @533 g/ha (3.71 per cent) was found at par with the treatment Chlorpyrifos 75 WDG @500 g/ha (4.00 per cent) and were significantly superior over all other treatments. The next best treatments in order of efficacy were the treatment, Chlorpyrifos 50 EC @800 ml/ha (4.26 per cent), Acephate 75 SP @ 1000 gm/ha (4.38 per cent) and Acephate 75 SP @ 666 gm/ha (4.50 per cent) which were at par with each other.

The observations recorded at 14 DAA, indicated that the treatment Chlorpyrifos 75 WDG @533 g/ha (4.17 per cent) was found at par with the treatment Chlorpyrifos 75 WDG @500 g/ha (4.40 per cent) and were significantly superior over all other treatments. The next best treatments in order of efficacy were the treatment Chlorpyrifos 50 EC @800 ml/ha (4.65 per cent), Acephate 75 SP @ 1000 gm/ha (4.85 per cent) and Acephate 75 SP @ 666 gm/ha (4.87 per cent) which were at par with each other. Maximum incidence was observed in untreated control (10.91 per cent).

The same trend was observed 7 and 14 Days after second insecticide application.

New insecticide molecules show higher efficacy in controlling rice leaf folder damage in rice due to their new broad spectrum and high insecticidal activity with novel mode of action.

**Table 2:** Bio-efficacy of insecticides against Leaf Folder in rice.

Treatments	Dose Per ha	Pre- Treatment Count	Mean per cent infested leaves (Avg. of 20 hills)				Yield (q/ha)
			First spray		Second spray		
			Days After Application				
			7	14	7	14	
T1 - Chlorpyrifos 75 WDG	467 g/ha	10.78 (19.17)	5.40 (13.44)	5.73 (13.92)	3.12 (10.18)	3.34(10.52)	46.77
T2 - Chlorpyrifos 75 WDG	500 g/ha	10.30 (18.72)	4.00 (11.53)	4.40 (12.10)	2.20 (8.53)	2.49 (9.08)	50.37
T3 - Chlorpyrifos 75 WDG	533 g/ha	10.87 (19.25)	3.71 (11.10)	4.17 (11.78)	1.82 (7.74)	2.24 (8.56)	51.90
T4 - Chlorpyrifos 50 EC	750 ml/ha	10.23 (18.63)	4.78 (12.63)	5.17 (13.14)	2.87 (9.75)	3.24 (10.36)	47.10
T5 - Chlorpyrifos 50 EC	800 ml/ha	10.60 (18.99)	4.26 (11.90)	4.65 (12.45)	2.32 (8.76)	2.78 (9.59)	49.60
T6 - Acephate 75 SP	666 g/ha	10.66 (19.05)	4.50 (12.24)	4.87 (12.74)	2.68 (9.42)	3.20 (10.30)	47.90
T7 - Acephate 75 SP	1000 g/ha	10.75 (19.14)	4.38 (12.08)	4.85 (12.72)	2.37 (8.86)	2.86 (9.73)	49.00
T0 - Untreated control	---	10.31 (18.72)	10.32 (18.73)	10.91 (19.29)	11.29 (19.63)	10.22 (18.64)	44.13
SE ±		0.32	0.22	0.19	0.26	0.28	0.66
C.D. at 5 %		N.S.	0.73	0.64	0.87	0.94	2.21

\*Figures in parantheses are arcsine transformed values.

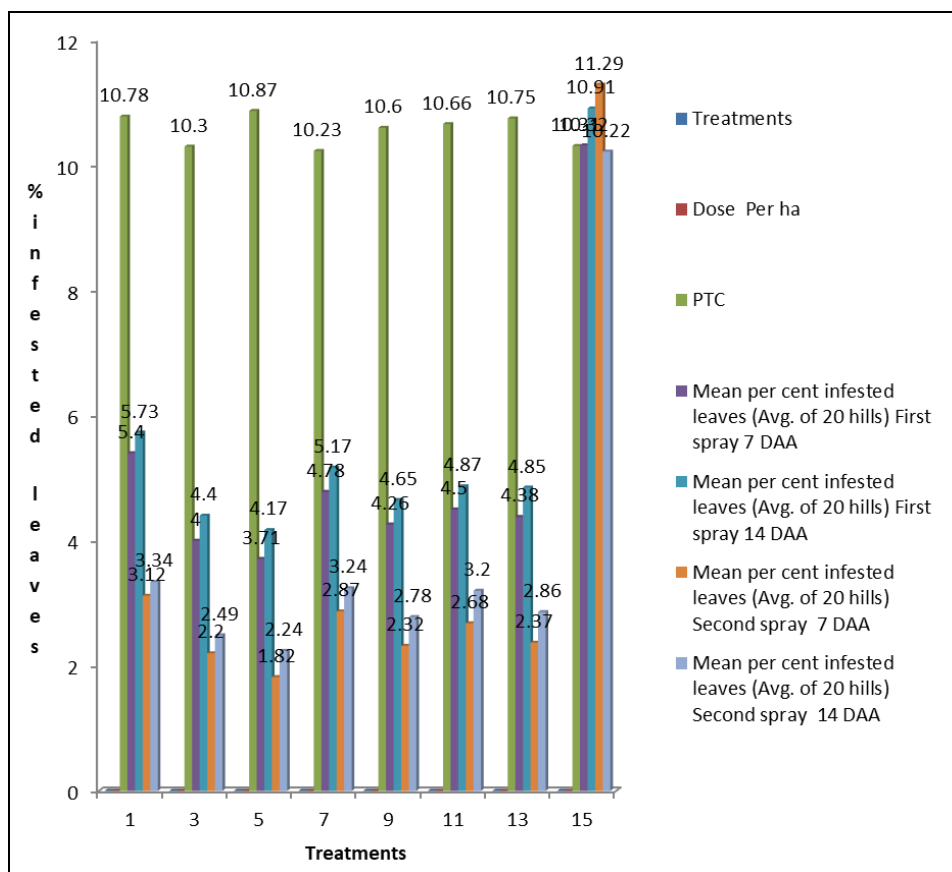


Fig 1: Bio-efficacy of insecticides against Leaf Folder of rice

**3.2 Yield parameters**

The yield data revealed that the maximum yield was obtained from the treatment Chlorpyrifos 75 WDG @533 g/ha (51.90 q/ha) which was at par with the treatment Chlorpyrifos 75 WDG @500g/ha (50.7 q/ha) and both the treatments were found significantly superior over all other treatments in terms

of yield. The next best treatments in order of yield were Chlorpyrifos 50 EC @800 ml/ha (49.60 q/ha) and Acephate 75 SP @ 1000 gm/ha (49.00 q/ha) which were at par with each other. Minimum yield (44.13 q/ha) was observed in untreated control.

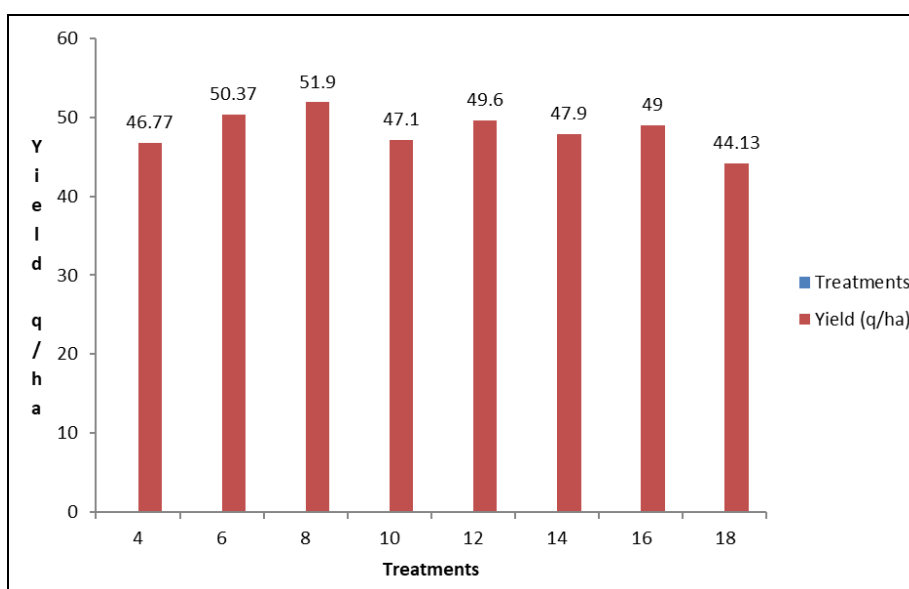


Fig 2: Effect of per cent Leaf Folder of rice on yield

**4. Discussion**

The results obtained from this experiment are in accordance with the results of Sudipta Padhan and Raghuraman, 2018. They determined the bioefficacy of newer insecticides against

rice leaf folder, *Cnaphalocrocis medinalis* Guenee and found that Thiocyclam Hydrogen oxalate was effective in controlling rice leaf folder damage. The results are also in the same line with the results of Wakil, *et al.*, 2001 who observed

that chlorpyrifos 40 EC was effective in controlling rice leaf folder damage. The results from this experiment also showed similarity with the results obtained by Sandhu and Dhaliwal, 2016<sup>[13]</sup> and Khuhro, *et al.*, 2014<sup>[8]</sup> who evaluated different insecticides against rice leaf folder and found effective. The present findings are also in conformity with the finding of earlier studies conducted by Rath, 2017<sup>[11]</sup> who observed that Acephate 75 SP@1000gms/ha was found effective against leaf folder as compared to control.

The results obtained from Dey, *et al.*, 2012 revealed that chlorpyrifos 40 EC is effective in controlling rice leaf folder as compared to untreated control, which are in accordance with our findings.

## 5. Conclusion

The treatment Chlorpyrifos 75 WDG @533 g/ha and Chlorpyrifos 75 WDG @500 g/ha were found superior in minimizing the leaf folder incidence over rest of the treatments.

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