



E-ISSN: 2320-7078  
P-ISSN: 2349-6800  
JEZS 2017; 5(4): 126-128  
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Received: 18-05-2017  
Accepted: 19-06-2017

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## Efficacy of insecticide and fungicide combinations against Rice leaf folder and yellow stem borer in field condition

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#### Abstract

The present field evaluation was carried out to assess the efficacy of insecticide fungicide combinations against leaf folder and yellow stem borer in Zonal Agricultural Research Station, V.C. Farm, Mandya during 2014-15. Among the combination, lowest per cent of dead heart recorded in tricyclazole + chlorpyrifos combination (2.00%), white ear in azoxystrobin + chlorpyrifos combination (1.05%), minimum per cent of leaf folder damage in carbendazim + flubendiamide (6.38%) and carbendazim + chlorpyrifos (6.03%) as compared to control which recorded maximum damage yellow stem borer and leaf folder.

**Keywords:** Rice, combinations, fungicides, insecticides

#### 1. Introduction

Rice (*Oryza sativa* L.) is the most widely cultivated food crop in the world. It is the staple food for over half of the world's population (Hegde S and Hegde V, 2013) [1]. Majority of the rice (90%) is being produced in Asian countries with China and India being the major producers (Evans, 1998) [2]. In India, rice is the most important food crop occupying an area of 43.95 million hectare with a production of 106.1 million tonnes which contributes to 41.5 per cent of total food grain production of our country (Anon., 2014) [3]. In an attempt to increase the rice production, many high yielding varieties have been developed. Due to introduction of high yielding varieties and modern production technologies, secondary pests have attained major pest status. Among the various insect pest of rice, stem borer and leaf folder also one of the most destructive insect pests in rice ecosystem. Stem borer causes heavy yield losses to paddy crop at different growth stages. The early stage larvae which come out of eggs damage the leaf or leaf sheath and middle growing portion due to which leaves get dried, known as dead heart. Due to its infestation at the time of ear-head emergence, ears get dried and turn white in colour, known as white ear. Ear Heads of affected plants can be easily pulled out. The rice leaf folder is also common pest which usually damages rice crops from a young stage to throughout flowering. The newly hatched caterpillar cut the leaf edges and folds the leaf. When young seedlings are attacked it folds 3-4 adjacent plant leaves and scrapes the green matter so that the infested leaves appear white. A single caterpillar damages several leaves and it is more problematic at boot leaf stage. To overcome the losses caused by these insect pests, the present piece of work is conducted find the best insecticides fungicide combinations for the management of rice leaf folder and stem borer.

#### 2. Materials and Methods

The present investigation was conducted in the Zonal Agricultural Reserch Station, V.C. Farm, Mandya during kharif 2014. The paddy crop of variety-CTH-1 was raised as per recommended practices and experimental plot size was 2.5m<sup>2</sup>. The insecticides and fungicide tested at recommended concentration. An untreated control without any insecticide was included in trial for comparison. All the treatments were imposed based on the ETL at different stages of the crop growth. The observations on the incidence of yellow stem borer and leaf folder was recorded by following the standard procedures (SES, 2002) [4]. The infestation of insect pests prevalence data were subjected to statistical analysis after arc sine and square root transformations.

### 3. Results and Discussion

#### 3.1 Evaluation of Insecticides and fungicide combinations against of stem borer

In combination trial, lowest per cent of dead heart was observed in tricyclazole + chlorpyrifos combination (2.00%) and lowest per cent of white ear was observed in azoxystrobin + chlorpyrifos combination (1.05%) as compared to control with 24.36 per cent dead heart and 15.38 per cent white ear respectively. Thus indicating that the combination of insecticide and fungicide does not have any antagonistic effect. the present findings were in agreement with Prasanna Kumar *et al.* (2011) [5] who reported least per cent of dead heart (1.7%) in application of tricyclazole + fipronil. another study by ram singh *et al.* (2010) [6] revealed 1.6 to 2.5 per cent white ear heads in case of fungicides tricyclazole and iprobenphos.

#### 3.2 Evaluation of Insecticides and fungicide combinations against of Incidence of leaf folder

Insecticide and fungicide combination studies indicated minimum per cent of leaf folder damage in carbendazim +

flubendiamide on 9<sup>th</sup> day after 1<sup>st</sup> spray (6.38%) and carbendazim + chlorpyrifos 9<sup>th</sup> day after 2<sup>nd</sup> spray (6.03%). It is evident from the studies by Bhuvaneshwari and Raju, (2013) [7] that chlorantraniliprole @0.3 ml/l in combination with hexaconazole @ 2 ml/l recorded 3.7 per cent leaf folder affected leaves per hill which strengthens the present findings.

**Table 1:** Insecticides and fungicides used under study

Pesticide	Trade name	Doses per litre
Flubendiamide	Fame 39.35 SC	0.1 ml/L
Rynaxypyr	Coragen18.5SC	0.1 ml/L
Buprofezin	Applaud 25 SC	1.4 ml/L
Imidacloprid	Confidor 17.8 SL	0.3 ml/L
Thiamethoxam	Actara 25 WG	0.2 gm/L
Chlorpyrifos	Dursban 20 EC	2 ml/L
Fipronil	Regent 5 EC	0.1 ml/L
Carbendazim	Bavistin 50 WP	1 gm/L
Tricyclazole	Baan75 WP	0.6 gm/L
Azoxystrobin	Onestar 23 SC	1.5 ml/L
Kresoxim methyl	Ergon 44.3 SC	1 ml/L

**Table 2:** Efficacy of fungicides-insecticides combinations against Rice leaf folder and stem borer

Tr. No.	Treatment	Dosage	9th day after 1 <sup>st</sup> Spray		9th day after 2 <sup>nd</sup> spray		Yield \ Plot **
			% LF damage	% Dead heart	% LF damage	% white ear	
1	Carbendazim + Flubendiamide	1 gm + 0.1 ml	6.38 (11.89)	4.41 (12.12)	7.61 (15.97)	1.27 (6.44)*	5.17
2	Carbendazim + Buprofezin	1 gm + 1.4 ml	26.11 (30.73)	13.37 (21.44)	13.65 (21.68)	10.17 (18.6)	4.60
3	Carbendazim + Imidacloprid	1 gm + 0.3 ml	21.80 (27.77)	6.68 (14.98)	17.24 (24.10)	3.30 (10.48)	4.73
4	Carbendazim + Thiamethoxam	1 gm + 0.2 gm	28.33 (32.12)	20.05 (26.60)	15.18 (22.91)	9.41 (7.86)	4.59
5	Carbendazim + Chlorpyrifos	1 gm + 2 ml	10.83 (19.03)	3.07 (10.10)	6.03 (14.04)	1.15 (6.17)	5.07
6	Carbendazim + Fipronil	1 gm + 0.1 ml	13.05 (21.18)	15.11 (22.87)	6.87 (15.04)	3.46 (10.72)	4.84
7	Carbendazim + Rynaxypyr	1 gm + 0.1 ml	26.38 (30.41)	15.15 (22.90)	15.87 (23.45)	9.48 (17.94)	3.96
8	Tricyclazole + Flubendiamide	0.6 gm + 0.1 ml	10.97 (18.67)	4.34 (12.03)	8.35 (16.76)	2.66 (9.40)	4.98
9	Tricyclazole + Buprofezin	0.6 gm + 1.4 ml	25.97 (30.55)	17.05 (24.38)	13.70 (21.66)	10.30 (18.70)	4.37
10	Tricyclazole + Imidacloprid	0.6 gm + 0.3 ml	15.13 (22.40)	4.41 (12.12)	11.32(19.62)	2.56 (9.19)	4.68
11	Tricyclazole + Thiamethoxam	0.6 gm + 0.2 gm	24.02 (29.28)	15.75 (23.23)	19.73 (26.36)	12.46 (20.48)	4.56
12	Tricyclazole + Chlorpyrifos	0.6 gm + 2 ml	12.91 (20.68)	2.00 (8.14)	12.96 (20.95)	2.48 (9.07)	5.11
13	Tricyclazole + Fipronil	0.6 gm + 0.1 ml	17.22 (24.28)	6.44 (14.71)	6.87 (15.04)	11.84 (19.84)	5.09
14	Tricyclazole + Rynaxypyr	0.6 gm + 0.1 ml	13.05 (21.18)	12.31 (20.53)	18.20 (25.22)	11.79 (20.08)	3.89
15	Azoxystrobin + Flubendiamide	1 ml + 0.1 ml	15.27 (22.90)	3.62 (10.13)	7.40 (15.76)	4.71 (12.54)	4.55
16	Azoxystrobin + Buprofezin	1 ml + 1.4 ml	24.16 (29.02)	11.15 (19.29)	11.85 (20.12)	6.20 (14.42)	3.70
17	Azoxystrobin + Imidacloprid	1 ml + 0.3 ml	19.86 (25.44)	6.68 (15.16)	8.88 (16.16)	3.10 (10.14)	4.68
18	Azoxystrobin + Thiamethoxam	1 ml + 0.2 gm	13.05 (21.18)	13.37 (21.44)	10.37 (18.70)	12.71 (20.89)	4.59
19	Azoxystrobin + Chlorpyrifos	1 ml + 2 ml	8.61 (16.88)	1.79 (7.66)	11.85 (20.11)	1.04 (5.87)*	5.12
20	Azoxystrobin + Fipronil	1 ml + 0.1 ml	8.75 (16.95)	13.37 (21.44)	13.33 (21.37)	10.92 (18.81)	5.09
21	Azoxystrobin + Rynaxypyr	1 ml + 0.1 ml	30.69 (33.38)	15.59 (23.16)	17.77 (24.91)	12.51 (20.71)	3.87
22	Kresoxim methyl + Flubendiamide	1.5 ml + 0.1 ml	10.83 (15.76)	5.13 (12.85)	9.62 (18.05)	2.30 (8.74)	4.90
23	Kresoxim methyl + Buprofezin	1.5 ml + 1.4 ml	25.97 (30.55)	13.37 (21.44)	14.81 (22.15)	11.07 (19.44)	4.84
24	Kresoxim methyl + Imidacloprid	1.5 ml + 0.3 ml	13.05 (21.18)	6.68 (14.98)	10.37 (18.76)	3.58 (10.87)	4.03
25	Kresoxim methyl + Thiamethoxam	1.5 ml + 0.2 gm	19.44 (25.99)	13.37 (21.44)	14.81 (22.48)	3.38 (10.60)	3.66
26	Kresoxim methyl + Chlorpyrifos	1.5 ml + 2 ml	19.72 (25.80)	2.34 (8.80)	7.40 (15.76)	4.46 (12.19)	5.03
27	Kresoxim methyl + Fipronil	1.5 ml + 0.1 ml	15.27 (22.90)	6.01 (14.20)	17.03 (24.37)	7.69 (16.10)	4.11
28	Kresoxim methyl + Rynaxypyr	1.5 ml + 0.1 ml	17.36 (24.54)	8.44 (16.89)	11.85 (24.36)	6.15 (11.79)	4.01
29	Control	-	32.63 (34.84)	24.36 (29.56)	21.48 (27.61)	15.38 (22.64)	3.30
	S.Em ±		3.33	0.93	1.73	1.60	0.24
	CD at 5%		9.44	2.63	4.90	4.55	0.68

\*Figures in parenthesis are arc sine transformed values\*\*  
Plot size-kg per 2.5 m<sup>2</sup>

#### 4. Conclusion

The experiment conducted at Zonal Agricultural Reserch Station, V.C. Farm, Mandya during kharif 2014-15 on the bioefficacy of insecticides fungicide combinations, found that lowest per cent of stem borer damage recorded in tricyclazole + chlorpyrifos, azoxystrobin + chlorpyrifos combination and minimum per cent of leaf folder damage in carbendazim + flubendiamide and carbendazim + chlorpyrifos and are

found to be best.

#### 5. Acknowledgement

I take this opportunity to convey my deep sense of gratitude, reverence and indebtedness to Dr. D. K. Sidde Gowda, Professor and Head, Department of Entomology and Chairman of my Advisory Committee, for his meticulous guidance, persistence encouragement, generosity,

thoughtfulness and timely advice extended till the last minute of my research as well as throughout the period of my study in the department of Entomology College of Agriculture, V. C. Farm, Mandya. I equally express my deep sense of gratitude to members of my advisory Committee Dr. B.S Basavaraju, Dr. T. Shivashankar and also thankful to my friends Siddaraj Gudur, Rajesh V, Dattatreya Mudkanna, Mallikarjun C. K. and Santosh kumar for their support and help.

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