The Pharma Innovation Journal 2022; SP-11(1): 536-538

www.ThePharmaJournal.com

The Pharma Innovation

ISSN (E): 2277- 7695
ISSN (P): 2349-8242
NAAS Rating: 5.23
TPI 2022; SP-11(1): 536-538

www.thepharmajournal.com
Received: 04-11-2021
Accepted: 06-12-2021

Mohammad Rizwan
Department of Entomology, Sardar Vallabhbhai Patel University of Agriculture and Technology, Meerut, Uttar Pradesh, India

SK Sachan
Department of Entomology, Sardar Vallabhbhai Patel University of Agriculture and Technology, Meerut, Uttar Pradesh, India

Mohammad Imran
Department of Genetics and Plant Breeding, Sardar Vallabhbhai Patel University of Agriculture and Technology, Meerut, Uttar Pradesh, India

Nazim Ali
Department of Animal Husbandry, Sardar Vallabhbhai Patel University of Agriculture and Technology, Meerut, Uttar Pradesh, India

Corresponding Author
Mohammad Rizwan
Department of Entomology, Sardar Vallabhbhai Patel University of Agriculture and Technology, Meerut, Uttar Pradesh, India

Population buildup of rice leaf folder *C. medinalis* of basmati rice in relation to abiotic factors

Mohammad Rizwan, SK Sachan, Mohammad Imran and Nazim Ali

Abstract
The population buildup of rice leaf folder, *C. medinalis* was experimented during the *Kharif*, 2018 and 2019 at the CRC farm of Sardar Vallabhbhai Patel University of Agriculture & Technology, Meerut (U.P.). The infestation of leaf folder was recorded on variety Pusa Basmati-1 at weekly intervals from 32ndstandard week and continued till the 42nd standard week and 32^{tnd} standard week and continued till harvest of the crop and ranged from 1.14 to 12.20 percent leaf damage during *Kharif* 2018 and *Kharif* 2019, respectively. The infestation of leaf folder recorded as leaf damage ranged from 2.59 to 14.38 percent. The infestation reached its peak during 39th standard week (last week of September) and the infestation of leaf folder ranged from 1.14 to 12.20 percent leaf damage. The infestation increased from 33rd standard week and reached at maximum during 38th standard week (fourth week of September) during *Kharif* 2018 and *Kharif* 2019, respectively.

Keywords: population buildup, abiotic factors, basmati rice and leaf folder

Introduction
Rice also known as the princess of cereals is staple food of 65 percent of the world's population and contributes about 23 per cent of the total calories requirement of mankind (Dhaliwal, 2005) [1]. Rice is grown in diverse growing conditions such as irrigated, rainfed low land, rainfed upland and flood prone ecosystem. In India, area under rice cultivation is 44.50 million ha with production of 115.63 million tones and productivity of 2.39 t/ha. Uttar Pradesh is the second largest producer of rice after West Bengal occupying 5.87 million ha area with annual production of 12.17 million tones and average productivity of 2.07 t/ha. In National food security the contribution of rice is very important since it occupy a good acreage. Although, the present level of national productivity is enough to ensure food security but for future with increasing population we can not rely on it and we have to improve productivity at state and national level (DAC and FW, 2019).

Basmati rice which is mainly known for its aroma, fragrance and super fine bran grown mainly in the western part of Uttar Pradesh, Uttarakhand, Haryana and Panjab account for 92 % of the total basmati rice production. In fact, Indian basmati rice is well recognized in the international market. Realizing the importance of crop and availability of irrigation water and best climatic conditions, the government of India has identified western Uttar Pradesh has one of the potential basmati rice export zone.

Among various insect-pests associated with rice, the rice leaf folder, *C. medinalis* (Crambidae: Lepidoptera) earlier considered as a minor foliage feeding pest has recently acquired the status of a major pest throughout the rice growing countries in the world (Teng *et al*., 1993) [3]. The incidence of leaf folder occurs one month after transplantation of rice seedlings and continues up to the milking stage of the crop. The larvae of leaf folder feed on green matter of the leaves by folding them leaving white parallel streaks running longitudinally on the leaf blade and reduces photosynthetic activity of the plant. The maximum yield loss inflicted by leaf folder is reported to be due to feeding on the flag leaf. Unfortunately, nitrogen fertilizers which generally contribute to the high yield of rice varieties through nutrition of rice plants also lead to greater insect survival, reproduction and feeding rates resulting in greater damage.

The intensity of pest damage varies is different seasons, years and agro climatic zones due to variability in weather parameters and biotic mortality factors. Understanding of pest population dynamics in relation to weather factors can help in better management of pests. Besides, knowledge of the seasonal abundance and pest build up trend is essential to ensure timely preparedness to tackle pest problems and prevent crop losses. The availability of resources, economic constraints and inadequacy of the technological inputs are the well-known

limitations being faced by developing nations. Therefore, it is a big challenge to the agriculturists and the scientists to come out with cost effective strategies for sustainable pest management, without disrupting the agroecosystem.

Materials and Methods

The field experiment was carried out in randomized block design (RBD) with three replications of variety Pusa Basmati-1. There were used total seven treatments including control. The plot size for each treatment was kept 5x4 m^2 with spacing between row to row 20 cm and plant to plant 20 cm, respectively. All the recommended agronomical practices were adopted in raising the crop except package recommended for insect pest managements. The population fluctuation of leaf folder and the random sampling was carried out. Ten hills were tagged out randomly from each plot of the untreated trial. These hills were observed regularly in the morning hours at weekly intervals starting from transplanting till the harvest of crop. The larval population of leaf folder was recorded per hill. The meteorological data pertaining to temperature, relative humidity and rainfall during experimental period was obtained from the meteorological observatory of Sardar Vallabhbhai Patel University of Agriculture and Technology, Meerut, U.P.

Results and Discussion

Kharif 2018

The infestation of leaf folder on basmati rice was started from 32ndstandard week and continued till the 42nd standard week (Table 1). The infestation of leaf folder recorded as leaf damage ranged from 2.59 to 14.38 percent. The infestation reached its peak during 39th standard week (last week of September). During this period the weather parameters like temperature, relative humidity and rainfall ranged from 23.00 to 32.57 ^{0}C, 72.14 to 94.00 % and 5.29 mm, respectively. Thereafter infestation declined.

Kharif 2019

Infestation of leaf folder was appeared first on 32^{tnd} standard week and continued till harvest of the crop and ranged from 1.14 to 12.20 percent leaf damage during *Kharif* 2019 (Table 2). The infestation increased from 33rd standard week and reached at maximum during 38th standard week (fourth week of September). During this period the weather parameters like temperature, relative humidity and rainfall ranged from 23.21 to 33.50 ^{0}C, 62.41 to 93.66 % and 0.33 mm, respectively. Thereafter infestation denied.

Pooled (*Kharif*, 2018 and 2019)

Perusal of pooled infestation of both the years (*Kharif*, 2018 and 2019) revealed that the infestation of *C. medinalis* appeared first on 32nd standard week and recorded its peak with 13.29 percent leaf damage during 39th standard week. During this period the weather parameters like temperature, relative humidity and rainfall ranged from 22.80 to 31.90^0 C, 72.22to 94.42 % and 3.67 mm, respectively. Thereafter, infestation declined slightly. Further, this infestation turn down and observed up to the harvest with minimum infestation of 1.86 percent leaf damage at 42nd standard week (Table 3).The observations recorded during present investigation are in accordance with the finding of earlier workers like Kakde *et al.* (2015) [4] who reported the peak occurrence of rice leaf folder, *C. medinalis* (Guenee) during 4th week of September (39th SMW). Sulagitti *et al.* (2017) [5] also observed the incidence of leaf folder, *C. medinalis* during first fortnight of August and the larval population increased gradually till 38th week with 10 larvae/10 hills. Sabir *et al.* (2006) [6] reported that the population of rice leaf folder, *C. medinalis* attained their peaks in September (7.75 larvae per hills). They also observed that the maximum and minimum temperatures and rainfall were vital for a change in the population of leaf folder. As a whole, 82.99 per cent change in population of *C. medinalis* was found to be due to environmental factors. Nigam (2009) [7] noticed the maximum larval population of *C. medinalis* during 41st standard week with 24.8 to 31.5 ^{0}C temperature, 104.2 mm rainfall and 98% relative humidity.

Table 1: Population build-up of rice leaf folder, *C. medinalis* in relation to abiotic factors during *Kharif*, 2018

S. No.	S. W.	Dates	Leaf damage (%)	Meteorological parameters						
				Temperature (^{0}C)			Relative Humidity (%)			Rainfall (mm)
				Max.	Min.	Mean	Morn.	Eve.	Mean	
1.	30	23 July – 29 July	0.00	34.00	26.71	30.35	91.29	59.57	75.43	52.77
2.	31	30 July – 05 Aug	0.00	36.57	26.71	31.64	94.29	51.43	72.86	0.00
3.	32	06 Aug – 12 Aug	2.98	37.14	27.29	32.21	93.57	52.86	73.21	8.04
4.	33	13 Aug – 19 Aug	4.76	39.00	28.29	33.64	93.29	42.57	67.93	3.29
5.	34	20 Aug – 26 Aug	6.87	37.00	27.00	32.00	92.43	54.43	73.43	3.14
6.	35	27 Aug – 02 Sep	7.90	39.14	28.57	33.85	91.43	44.14	67.78	28.24
7.	36	03 Sep – 09 Sep	9.16	37.14	26.71	31.92	94.29	52.86	73.57	11.83
8.	37	10 Sep – 16 Sep	12.31	38.57	27.86	33.21	88.71	50.57	69.64	1.39
9.	38	17 Sep – 23 Sep	13.67	35.14	21.90	28.52	87.86	55.86	71.86	1.86
10.	39	24 Sep – 30 Sep	14.38	32.57	23.00	27.78	94.00	72.14	83.07	5.29
11.	40	01 Oct – 07 Oct	10.07	35.86	20.71	28.28	96.14	58.86	77.50	0.00
12.	41	08 Oct – 14 Oct	8.54	34.14	18.71	26.42	87.00	55.00	71.00	0.49
13.	42	15 Oct – 21 Oct	2.59	34.43	15.00	24.71	90.00	51.00	70.50	0.20
14.	43	22 Oct – 28 Oct	0.00	32.71	13.43	23.07	90.57	49.14	69.85	0.00
15.	44	29 Oct – 04 Nov	0.00	31.71	12.00	21.85	91.14	45.43	68.28	0.46

Table 2: Population build-up of rice leaf folder, *C. medinalis* in relation to abiotic factors during *Kharif*, 2019

S. No.	S. W.	Dates	Leaf damage (%)	Meteorological parameters						
				Temperature (^{0}C)			Relative Humidity (%)			Rainfall (mm)
				Max.	Min.	Mean	Morn.	Eve.	Mean	
1.	30	23 July – 29 July	0.00	35.29	24.50	29.89	93.71	68.00	80.85	21.43
2.	31	30 July – 05 Aug	0.00	35.86	25.24	30.55	90.00	46.57	68.28	6.86
3.	32	06 Aug – 12 Aug	2.14	34.03	25.19	29.61	94.76	67.63	81.19	13.14
4.	33	13 Aug – 19 Aug	3.92	32.00	24.39	28.19	94.99	86.69	90.84	9.14
5.	34	20 Aug – 26 Aug	5.79	33.71	24.53	29.12	94.83	71.34	83.08	3.20
6.	35	27 Aug – 02 Sep	6.54	34.83	25.21	30.02	93.34	70.73	82.03	12.84
7.	36	03 Sep – 09 Sep	7.86	34.37	25.37	29.87	95.76	75.99	85.87	0.00
8.	37	10 Sep – 16 Sep	9.94	34.53	25.01	29.77	94.77	71.40	83.08	0.00
9.	38	17 Sep – 23 Sep	12.20	33.50	23.21	28.35	93.66	62.41	78.03	0.33
10.	39	24 Sep – 30 Sep	11.52	31.40	22.59	26.99	94.84	72.31	83.57	2.06
11.	40	01 Oct – 07 Oct	8.98	31.21	20.56	25.88	95.19	60.71	77.95	3.27
12.	41	08 Oct – 14 Oct	6.76	31.94	18.94	25.44	93.53	57.01	75.27	0.00
13.	42	15 Oct – 21 Oct	1.14	32.04	18.47	25.25	94.74	60.96	77.85	0.00
14.	43	22 Oct – 28 Oct	0.00	30.07	15.87	22.97	94.19	50.86	72.52	0.00
15.	44	29 Oct – 04 Nov	0.00	29.77	15.76	22.76	93.74	53.74	73.74	0.00

Table 3: Pooled data for population build-up of rice leaf folder, *C. medinalis* in relation to abiotic factors during *Kharif*, 2018 and 2019

S. W.	Dates	Leaf damage (%)	Meteorological parameters						
			Temperature (^{0}C)			Relative Humidity (%)			Rainfall (mm)
			Max.	Min.	Mean	Mor.	Eve.	Mean	
30	23 July – 29 July	0.00	34.64	25.60	30.12	92.5	63.78	78.14	37.10
31	30 July – 05 Aug	0.00	36.21	25.97	31.09	92.14	49.00	70.57	3.43
32	06 Aug – 12 Aug	2.56	35.60	26.24	30.91	94.16	60.24	77.20	10.59
33	13 Aug – 19 Aug	4.34	35.50	26.34	30.91	94.14	64.63	79.38	6.21
34	20 Aug – 26 Aug	6.33	35.35	25.76	30.56	93.63	62.90	78.25	3.17
35	27 Aug – 02 Sep	7.22	36.90	26.89	31.93	92.38	57.43	74.90	20.54
36	03 Sep – 09 Sep	8.51	35.75	26.04	30.90	95.02	64.42	79.72	5.91
37	10 Sep – 16 Sep	11.12	36.55	26.43	31.49	91.74	60.99	76.36	0.69
38	17 Sep – 23 Sep	12.60	34.32	22.55	28.43	90.76	59.13	74.94	1.09
39	24 Sep – 30 Sep	13.29	31.90	22.80	27.38	94.42	72.22	83.32	3.67
40	01 Oct – 07 Oct	9.52	33.53	20.63	27.08	95.66	59.78	77.72	1.63
41	08 Oct – 14 Oct	7.65	33.04	18.82	25.93	90.26	56.00	73.13	0.24
42	15 Oct – 21 Oct	1.86	33.23	16.73	24.98	92.37	55.98	74.17	0.10
43	22 Oct – 28 Oct	0.00	31.39	14.65	23.02	92.38	50.00	71.18	0.00
44	29 Oct – 04 Nov	0.00	30.74	13.88	22.30	92.44	49.58	71.01	0.23

Conclusion

The infestation of leaf folder on basmati rice was appeared during 32nd standard week and continued till harvest of the crop. The maximum infestation (14.38 per cent leaf damage) was observed in 39th standard week (last week of September) and the leaf folder infestation recorded first on 32nd standard week and continued till harvest of the crop with maximum infestation (12.20 % leaf damage) in 38th standard week (fourth week of September) during *Kharif*, 2018 and 2019, respectively. From the present investigation it may be concluded that infestation of leaf folder (*C. medinalis*) was influenced by one or more abiotic factors and crop stages which can be utilized for decision making.

References

1. Dhaliwal GS. Agricultural pests of South Asia and their management. Kalyani Publishers, New Delhi. 2005, 181-182.
2. Directorate of Economics and Statistics, DAC & FW 2019. www.dac&ew.gov.in.com
3. Teng PS, Heong KL, Keith M. Advances in tropical rice pest management research. In: New frontiers in rice research (Eds.: K. Muralidharan and E. A. Siddiq). Directorate of Rice Research, Hyderabad, India. 1993, 255.
4. Kakde AM, Patel KG. Seasonal incidence of rice leaf folder in relation to SRI and conventional methods of planting and its correlation with weather parameters. Plant Archives. 2015;15(1):121-126.
5. Sulagitti A, Raghuraman M, Reddy MSS, Sathua SK. Seasonal variation in major insect-pests incidence on rice and impact of various abiotic factors on their incidence under Varanasi conditions. Journal of Entomology and Zoology Studies. 2017;5(3):1060-1063.
6. Sabir AM, Ahmad S, Hassan M, Qadir A. Pest weather interaction of major insect pests in rice ecosystem. South Asian Association for Regional Cooperation Journal of Agriculture. 2006;4:203-212.
7. Nigam VD. Effect of abiotic factors on the population fluctuation of rice leaf folder, *Cnaphalocrocis medinalis* (Guenee) in eastern Uttar Pradesh. Agricultural and Biological Research. 2009;25(2):128-134.