The Pharma Innovation Journal 2023; SP-12(7): 1264-1267

www.ThePharmaJournal.com

The Pharma Innovation

ISSN (E): 2277-7695
ISSN (P): 2349-8242
NAAS Rating: 5.23
TPI 2023; SP-12(7): 1264-1267

www.thepharmajournal.com
Received: 13-05-2023
Accepted: 19-06-2023

Suman Kumari
Department of Entomology, SKN College of Agriculture (SKNAU), Jobner, Jaipur, Rajasthan, India

DK Bairwa
Department of Entomology, SKN College of Agriculture (SKNAU), Jobner, Jaipur, Rajasthan, India

Arjun Lal Choudhary
Department of Entomology, SKN College of Agriculture (SKNAU), Jobner, Jaipur, Rajasthan, India

RG Samota
Department of Entomology, SKN College of Agriculture (SKNAU), Jobner, Jaipur, Rajasthan, India

Corresponding Author:
Suman Kumari
Department of Entomology, SKN College of Agriculture (SKNAU), Jobner, Jaipur, Rajasthan, India

Seasonal incidence of shoot and fruit borer, *Leucinodes orbonalis* (Guenee) on brinjal in relation to weather parameters

Suman Kumari, DK Bairwa, Arjun Lal Choudhary and RG Samota

Abstract
Investigation entitled "Seasonal Incidence of Shoot and Fruit Borer, *Leucinodes orbonalis* (Guenee) on brinjal in relation to weather parameters" was carried out at Horticulture farm, S.K.N. College of Agriculture, Jobner (Rajasthan) in Kharif, 2017. The infestation of shoot and fruit borer, *L. orbonalis* on shoots of brinjal (1.65%) commenced in the third week of July and reached to its peak (29.10%) in the last week of August and on fruits (13.20 and 10.80% both on number and weight basis) it started in the first week of October, reached to maximum (61.10 and 58.10% both on number and weight basis) in the last week of October. The infestation of *L. orbonalis* on shoots of brinjal and on fruits both on number and weight basis it had significant positive correlation (r= 0.670, r = 0.604 and r = 0.597, respectively) with maximum temperature.

Keywords: Seasonal incidence, *Leucinodes orbonalis*, weather parameters, correlation, brinjal etc.

Introduction
Brinjal (*Solanum melongena* L.) also known as eggplant, belong to family Solanceae, is an important vegetable crop grown throughout the world, especially in South Asia and it is the native of India. Brinjal is known for *ayurvedic* medicinal properties, especially white brinjal is said to be good for diabetic patients (Fageria *et al.*, 2003) [3]. It has high nutritive value and contains all the essential minerals, vitamins and amino acids.

India stand second in production and productivity in the world after china which is mainly grown in the states like West Bengal, Orissa, Bihar, Gujarat, Maharashtra, Andhra Pradesh, Karnataka, Uttar Pradesh and Rajasthan. In India the total area under brinjal cultivation is 6.80 lakh hectares with an annual production of 127.06 lakh tonnes (Anonymous, 2015) [1]. During 2014-15, the area and production of brinjal in Rajasthan was 64.60 thousand hectares and 21.23 million tonnes, respectively. It is generally grown in Alwar, Jaipur, Ajmer, Bharatpur, Bundi, Baran and Kota districts of Rajasthan during summer and rainy season.

The brinjal crop is attacking by a number of insect - pests right from germination to harvesting of the crop *viz.*; shoot and fruit borer, *Leucinodes orbonalis* (Guenee), jassid, *Amrasca* biguttula *biguttula* (Ishida), aphid, *Aphis gossypii* (Glover), whitefly, *Bemisia tabaci* (Genn.), lacewing bug, *Urentius echinus* (Distant), *epilachna* beetle, *Epilachna vigintioctopunctata* (Fabr.) and stem borer, *Euzophera perticella* (Ragonot). Listed 53 insects attacking on brinjal, out of them shoot and fruit borer, *L. orbonalis* is one of the major constraints in achieving potential yield. It remains active throughout the year with many overlapping generations.

The caterpillar initially attacks the terminal shoot and bore inside as a result of which, dropping and wilting of shoots occur. In the later stage, it also bores into the young fruits by making holes and feed inside. Such fruits, being partially unfit for human consumption and lose their market value (Butani and Jotwani, 1984) [2].

Various factors are responsible for low productivity and production of brinjal that include adverse climate, poor quality seeds, diseases, insect and mite pests. The insects and mites are of prime importance which significantly affects both the quality and production of brinjal. Due to variation in the agro climatic conditions of different regions insects show varying trends in their incidence, nature and extent of damage to the crop. Suitable understanding of the seasonal incidence of shoot and fruit borer is important due to variation in the weather conditions and changing pest status, in order to prevent the infestation of the insect pests and to produce a quality crop, it is essential to manage the pest population at appropriate time with suitable measures. So as such the studies were undertaken to find out the correlation between pest population and weather parameters to know the most favorable condition for buildup of pest population.

Materials and Methods

For the study of seasonal incidence of *L. orbonalis* on brinjal in relation to weather parameters, variety 'Pusa Purple Round' was transplanted on 6th July 2017 in five plots of 3.0 x 3.0 m^2 size keeping row to row and plant to plant distance of 60 and 50 cm, respectively.

Observation

For this purpose, the crop was left for natural infestation of *L. orbonalis*. Five plants per plot were randomly selected and tagged for observation. The observations on shoot infestation by *L. orbonalis* were recorded on tagged plants by visual counting of shoots from initiation of infestation on shoots to last picking of the fruits at weekly interval. The percent shoot infestation was calculated by counting the total number of shoots and the number of infested shoots. In case of fruit infestation observations were recorded on the percentage of infested fruits both on number and weight basis by counting and weighing infested and healthy fruits at each picking on tagged plants. The data recorded on shoot and fruit infestation and meteorological parameters were used for statistical analysis (Panse and Sukhatme, 1967) [13]. The simple correlation was computed between per centshoot and fruit infestation and weather parameters, *viz.;* maximum and minimum temperatures, relative humidity and rainfall. The following formula was used for calculating correlation coefficient (Gupta, 1996) [4].

$$r = \frac{N \Sigma xy - (\Sigma x)(\Sigma y)}{\sqrt{N \Sigma x^2 - (\Sigma x)^2 . N \Sigma y^2 - (\Sigma y)^2}}$$

Where,
r = Simple correlation coefficient
x = Independent variable *i.e.* abiotic component
y = Number of observations
N = Dependent variable *i.e.* pest

Results and Discussion

The data present in table -1 revealed that the infestation of shoot and fruit borer on shoots of brinjal was initiated in the third week of July (29th SMW) with 1.65 per cent infestation. The infestation increased gradually and reached to its peak with a mean of 29.10 per cent infestation in the last week of August (35th SMW). Thereafter, infestation declined gradually from October and reached to the minimum (3.33%) in the second week of October (41th SMW). The infestation of shoot and fruit borer shifted on fruits of brinjal from shoots as the fruiting started. The infestation of pest on fruits (table -2) initiated in the first week of October (40th SMW) *i.e.,* 13.20 per cent on number and 10.80 per cent on weight basis, which gradually increased and reached to its peak (61.10% on number and 58.10% on weight basis in the last week of October (43th SMW). Thereafter the infestation in fruits started decaling *i.e.,* 10.25 per cent on number basis and 7.33 per cent on weight basis) in the second week of December (50th SMW).

The correlation data presented in table- 3 revealed that the shoot infestation had a significant positive correlation with maximum temperature (r= 0.670) and significant negative correlation with minimum temperature (r = -0.570), relative humidity (r = -0.695) and rainfall (r = -0.556). The fruit infestation had a significant positive correlation with maximum temperature (r = 0.604 on number and r = 0.597 on weight basis), which showed that when temperature increased, the infestation of pest in fruits were also increased. Whereas, it had non-significant correlation with minimum temperature (r = 0.490 on number basis and 0.485 on weight basis), and significant negative with relative humidity (r = -0.557 and -0.553). During the crop season rainfall is not occurred.

The present results are in partial agreement with Singh *et al.* (2000) [14] who observed the infestation of pest on the top shoots of brinjal during the end of August with peak in the third week of September. They found positive role of temperature and negative role of humidity on the multiplication of the pest fully support the present findings. Kushwaha *et al.* (2015) [9] reported the incidence of pest during July to December. Jat *et al.* (2002) [5] reportedthe Infestation of pest on the fruits of brinjal in the third week of September and peak in the first week of November and positively correlated with maximum temperatureand non-significant with minimum temperature support the present findings. The results were also in agreement with Mahesh and Men (2007) [10] observed peak infestation of *L. orbonalis* on the fruits during mid of October. Singh *et al.* (2006) [15] reported that infestation of *L. orbonalis* on brinjal started in the first week of October and reached to its peak in the second the fortnight of October. Oommen and Kumar (2004) [12] reported that the infestation of *L. orbonalis* on brinjal fruits commenced from the last week of September and reached to the maximum during the third week of October, thereafter, declined corroborate the present findings. Kumar *et al*. (2017) [8] reported that incidence of *L. orbonalis* on brinjal was significantly affected by temperature and less by other environmental factors, support the present findings. The present findings also get support with the findings of Kumar and Singh (2013) [7] and Kumar *et al.* (2014) [6].

Table 1: Seasonal incidence of shoot and fruit borer, *Leucinodes orbonalis* (Guenee) on shoots of brinjal in relation to weather parameters

S. No.	SMW	Date of observations	Shoot infestation (%)**	Temperature (^{0}C)		Relative humidity (%)	Rainfall (mm)
				Maximum	Minimum		
1	29	20.7.17	1.65	34.20	25.60	79.00	26.00
2	30	27.7.17	3.50	31.50	24.80	81.00	24.20
3	31	3.8.17	7.18	29.40	24.00	81.00	5.00
4	32	10.8.17	11.40	32.60	24.00	71.00	0.00
5	33	17.8.17	16.35	34.10	21.70	59.00	0.00
6	34	24.8.17	23.67	34.80	24.70	71.00	28.60
7	35	31.8.17	29.10	32.80	24.50	75.00	9.80
8	36	7.9.17	21.87	33.30	23.20	65.00	0.00
9	37	14.9.17	17.30	36.00	23.90	69.00	17.60
10	38	21.9.17	11.75	36.60	21.20	53.00	0.00
11	39	28.9.17	8.10	36.00	18.40	52.00	0.00

12	40	5.10.17	5.00	35.60	15.60	37.00	0.00
13	41	12.10.17	3.33	36.20	15.40	39.00	0.00

*Significant at 5 per cent level of significance
** Mean of five plots
SMW: Standard Meteorological Weeks

Table 2: Seasonal incidence of shoot and fruit borer, *Leucinodes orbonalis* (Guenee) on fruits of brinjal in relation to weather parameters

S. No.	SMW	Date of observations	Fruit infestation (%) **		Temperature (^{0}C)		Relative humidity (%)	Rainfall (mm)
			Number basis	Weight basis	Maximum	Minimum		
1	40	05.10.17	13.20	10.80	35.60	15.60	37.00	0.00
2	41	12.10.17	33.80	30.75	36.20	15.40	39.00	0.00
3	42	19.10.17	50.20	48.50	35.80	13.80	40.00	0.00
4	43	26.10.17	61.10	58.10	36.00	12.60	42.00	0.00
5	44	02.11.17	52.80	50.90	30.30	11.90	43.00	0.00
6	45	09.11.17	38.20	36.33	31.90	11.20	45.00	0.00
7	46	16.11.17	27.20	25.50	29.60	11.60	51.00	0.00
8	47	23.11.17	21.67	19.75	25.70	5.60	51.00	0.00
9	48	30.11.17	17.45	15.10	28.80	5.90	51.00	0.00
10	49	07.12.17	13.20	10.95	25.10	6.80	53.00	2.20
11	50	14.12.17	10.25	7.33	24.50	7.20	57.00	0.00

*Significant at 5 per cent level of significance
** Mean of five plots
SMW: Standard Meteorological Weeks

Table 3: Correlation coefficient between the infestation of shoot and fruit borer, *Leucinodes orbonalis* (Guenee) on brinjal and weather parameters

Correlation coefficient(r)			
Particulars	Shoot infestation (%)	Fruit infestation (%)	
		Number basis	Weight basis
Maximum temperature	0.670	0.604	0.597
Minimum temperature	-0.570	0.490	0.485
Relative humidity	-0.695	-0.557	-0.553
Rainfall	-0.556	-	-

* Significant at 5 per cent level significance

Conclusion

On the basis of results, it may be concluded that the infestation of *L. orbonalis* on shoots of brinjal and on fruits both on number and weight basis it had significant positive correlation with maximum temperature, means when rise in temperature then increases the in infestation of this insect on shoots as well as fruits of brinjal

Acknowledgement

The authors are thankful to the Dean, S.K.N. College of Agriculture and Head, Department of Entomology, S.K.N. College of Agriculture, Jobner for providing all the necessary facilities to carry out the present investigation.

References

1. Anonymous. Indian Horticulture Database. National horticulture Board. Ministry of Agriculture, Krishi Bhawan, Government of India, New Delhi, 2015.
2. Butani DK, Jotwani MG. Insects in vegetables. Periodical Expert Book Agency, Delhi, 1984, 5-7.
3. Fageria MS, Choudhary BR, Dhaka RS. Vegetable crops (3rd Ed.). *Kalyani publishers*, New Delhi, 2003, 41-49.
4. Gupta SC. Correlation, Fundamentals of Statistics. Himalaya Publishihers House, Mumbai, 1996, 510-587.
5. Jat KL, Pareek BL, Singh S. Seasonal incidence of shoot and fruit borer, *Leucinodes orbonalis* (Guen.) on eggplant (*Solanum melongena* L.) in Rajasthan. Annals of Biology. 2002;18(2):165-169.
6. Kumar B, Singh IB, Yadav AK, Verma SK. Seasonal incidence and extent of damage of *Leucinodes orbonalis* (L.) Guen. on brinjal. Journal of Experimental Zoology, India. 2014;17(2):789-791.
7. Kumar S, Singh D. Seasonal incidence and economic losses of brinjal shoot and fruit borer, *Leucinodes orbonalis* (Guenee). Agric. Sd. Digest. 2013;33(2):98-103.
8. Kumar KR, Singh NN, Raju SVS, Mishra VK. Influence abiotic factors on seasonal incidence of brinjal shoot and fruit borer, *Leucinodes orbonalis* (Guen.) in Varanasi region International Journal of Current Microbiology and Applied Sciences. 2017;6(4):1513-1518.
9. Kushwaha AK, Kumar T, Sonwani BR. Seasonal incidence of shoot and fruit borer *L. orbonalis* on *Kharif* season brinjal (*Solenum melongena* L.) under field condition. International Journal of Agricultural Science and Research. 2015;5:117-120.
10. Mahesh P, Men UB. Seasonal incidence of *Leucinodes orbonalis* (Guen.) on brinjal. Annals of Plant Protection Sciences. 2007;15:498-499.
11. Nayer KK, Ananthakrishnan TN, David BV. General and Applied Entomology. Eleventh Edn. Tata Mc Graw-Hill Publ. Co. Ltd. 4/12, Asaf Ali Road, New Delhi 110002. 1995, 557.
12. Oommen S, Kumar A. Seasonal incidence of insect pest of brinjal. Indian Journal of Applied Entomology. 2004;18:65-66.
13. Panse VG, Sukhatme PV. Statistical Method of Agricultural Workers, 1967.
14. Singh SV, Singh KS, Malik YP. Seasonal abundance and economic losses of shoot and fruit borer *Leucinodes*

orbonalis (Guenee) on brinjal. Indian Journal of Entomology. 2000;62:247-252.
15. Singh S, Kumar A, Awashti BK. Seasonal fluctuations and extent of losses of brinjal shoot and fruit borer. Annals of Agricultural Research. 2006;27:49-52.
16. Singh SV, Singh KS, Malik YP. Seasonal abundance and economic losses of shoot and fruit borer *Leucinodes orbonalis* (Guenee) on brinjal. Indian Journal of Entomology. 2012;62:247-252.