



E-ISSN: 2278-4136

P-ISSN: 2349-8234

JPP 2018; 7(5): 3287-3289

Received: 04-07-2018

Accepted: 06-08-2018

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To evaluate the efficacy of insecticides and bio-pesticides against brinjal shoot and fruit borer (*Leucinodes orbonalis*, Guenee)

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Abstract

The field trial was conducted at the Central field, Department of Entomology, SHUATS, Allahabad during *Kharif* from August to November 2017 investigation entitled "Efficacy of certain insecticides and bio-pesticides against brinjal shoot and fruit borer (*Leucinodes orbonalis* Guenee)". In shoot infestation the pest was commenced from 34th standard week (August third week) with an average 3.66% infestation and gradually reached peak level of 30.31% infestation at 42nd SW (October third week). In fruit infestation the pest was commenced from 39th SW (third week of September) with an average 4.41% infestation and gradually reached peak level of 40.31 % infestation at 46th SW (November second week).

Keywords: Brinjal shoot and fruit borer, insecticide, bio-pesticides, *Leucinodes orbonalis*, seasonal incidence

1. Introduction

Vegetable cultivation is one of the most profitable and dynamic branches of agriculture. It has become an important source of income for both farmers and field labours, serving as a vehicle for reducing poverty in rural areas. Brinjal (*Solanum melongena* Linnaeus) also known as eggplant is referred as the "King of vegetables" originated from India and now grown as a vegetable throughout the tropical, sub-tropical and warm temperate areas of the world. It is a most important vegetable in the Indian Subcontinent that accounts for almost 50% of the world's area under its cultivation area under its cultivation. However, in India, the area is estimated as 7.5% of the total area of vegetables with 8% of the total production of vegetables [3]. It is an important vegetable grown in all the seasons. It is an important vegetable grown in all the seasons. Due to its nutritive value, consisting of minerals like iron, phosphorous, calcium and vitamins like A, B and C, unripe fruits are used primarily as vegetable in the country. It is also used as a raw material in pickle making and as an excellent remedy for those suffering from liver complaints. It has been reported as Ayurvedic medicine for curing the diabetes. In addition, it is used as a good appetizer, good aphrodisiac, cardio tonic, laxative and reliever of inflammation. [2]

Leucinodes orbonalis Guenee (Lepidoptera: Pryralidae) is an internal borer which damages the tender shoots and fruits. Attack of this pest causes considerable damage to brinjal crop each year, affecting the quality and yield of the crop. The Larvae of this pest cause 12-16% damage to shoots and 20-60% damage to fruits. The pest is very active during rainy and summer season and often causes more than up to 95% in India. It is also reported that the infestation of fruit borer causes reduction in Vitamin C content to an extent of 68 % in the infested fruits. Soon after hatching from eggs, young caterpillars search for and bore into tender shoots near growing points into flower buds or into the fruits. Caterpillars prefer fruits over other plant parts. Larvae go through at least five instars and there are reports of the existence of six larval instars. Larval period lasts from 12 to 15 days in the summer and up to 22 days in winter. Climatic conditions are important in the life cycle of the borer. As temperature increases and humidity decreases fecundity increases and duration of life cycle decreases. Within one hour after hatching, the larvae bore into the nearest tender shoot, flower or fruit, they plug the entrance hole with excreta. In young plants, caterpillar bores midrib of large leaves. As a result, the affected leaves may drop off. Larvae feeding inside shoots result in wilting of young shoots. Presence of wilted shoots in a brinjal field is a symptom of damage by this pest. The damaged shoots ultimately wither and drop off. This reduces plant growth, which in turn, reduces fruit number and size. New shoots can arise but this delays crop maturity and the newly formed shoots are also subjected to larval damage.

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Larval feeding in flowers is a relatively rare occurrence resulting in failure to form fruits from damaged flowers. Larval feeds inside the fruit which results in destruction of the fruits tissue. The feeding tunnels are often clogged with frass. This makes even slightly damaged fruit unfit for marketing. The yield loss varies from season to season and from location to location. Damage to fruits particularly in autumn, is very severe and the whole crop can be destroyed. [1]

It alone causes damage as high as 85.90% and even up to 100% damage is also recorded. The larvae bore into tender shoots and cause wilting and dead heart and in later stage, they bore the tender fruits rendering them unfit for human consumption. So far, *L. orbonalis* is considered as a major pest of brinjal as shoot and fruit borer in established crop in main field. [4]

2. Materials and Methods

The present investigation was conducted at the Central Research field of Sam Higginbottom University of Agriculture, Technology and Sciences, Allahabad, Uttar Pradesh during *Kharif* season 2017. The research farm is situated on the right side of Allahabad Rewa road at 20 degrees and 15° North, 60° east longitude city and is about 129.2 cm above sea level. The site selected was uniform, cultivable with typical sandy loam soil having good drainage.

The seeds of 'Banaras purple round' variety were sown to raise the seedling in nursery. Regular watering and weeding were done up to transplanting of seedling to the main field. The seedlings were transplanted approximately after 5 weeks, in the main field and gap filling was done to maintain the plant population, keeping one plant per hill.

The spraying was done after the population reaching its ETL. The incidence of the borer on the shoot and the fruit were recorded from the five randomly selected plants. Observations were recorded one day before spray, 3rd, 7th, 14th days after spraying. The assessment of the shoot damage was done by calculating the number of damaged shoots and total number of the healthy shoots observed from five randomly selected plants per plot and expressed in percentage.

The percent fruit damage was total number of affected fruits from each plot. The total yield of the marketable fruits obtained from different treatments was calculated and converted by considering the additional cost (cost of insecticides and operational charges) and benefit (compared to untreated control) in the respective treatments.

Methods of recording observations

Seasonal incidence: The damage percentage of brinjal shoot and fruit borer observation were recorded at 7 days' interval, from the occurrence or initiation of the pest infestation and were continued up to harvest. The incidence and damage of brinjal shoot and fruit borer were recorded from the five randomly selected and tagged plants by correlating with weather parameter. Weather data were recorded simultaneously from the Department of Agriculture Meteorology, SHUATS, Allahabad. Among weather parameters, relative humidity, maximum temperature, minimum temperature, sunshine hour and rainfall were considered for correlating with the occurrence and damage of brinjal shoot and fruit borer.

3. Results and Discussion

Percentage of shoot infestation

Studies on the incidence of shoot and fruit borer population with weather parameters given in table 4.1 below. Shoot infestation of *Leucinodes orbonalis* Guenee 2017 *Kharif* season was commenced from 34th standard week (August third week) on shoot with an average 3.66% infestation. The borer population increased and gradually reached peak level of 30.31% of larval population at 42nd standard week (October third week). Thereafter, declined trend was observed due to fall of maximum and minimum temperatures as optimum weather condition are decreasing. Therefore, percent infestation was positively correlated with the maximum and minimum temperature. Hence, decline of temperature leads to the decline of the shoot and fruit borer population.

Percentage of fruit infestation

Fruit infestation of (*Leucinodes orbonalis*, Guenee) 2017 *Kharif* season was commenced from 39th standard week (third week of September) on fruit with an average 4.41% infestation. The borer population increased and gradually reached peak level of 40.31% of larval population at 46th standard week (November second week) and decline in the trend was noticed this may be due to fail in congenial weather parameters.

There was positive role of temperature, rainfall, relative humidity (morning) on its infestation and intensity on shoots as well as on fruit but relative humidity (evening) responded negatively.

Table 3. 1: Seasonal incidence of shoot and fruit borer of brinjal during *Kharif* 2017. (% Infestation of *Leucinodes orbonalis*)

Standard week	% Infestation of <i>Leucinodes orbonalis</i>		Temperature °C		Humidity %		Rainfall (mm)	Wind Velocity (Km/hr)	Sunshine (hr/day)
	% Shoot Infestation	% Fruit Infestation	Max.	Min.	Morning	Evening			
32 nd	0	0	34.82	28	90.57	53.28	7.2	1.11	3.91
33 rd	0	0	34.08	29.51	90	53	0	1.11	7.6
34 th	3.66	0	35.25	29.34	87.57	52.48	0.6	2.35	7.02
35 th	6.06	0	35.14	29.00	89.85	49.47	2.43	1.95	7.11
36 th	11.31	0	36.77	30.31	83.43	45.14	0.00	1.64	7.21
37 th	15.61	0	37.00	30.40	83.14	44.00	0.00	1.37	7.51
38 th	16.66	0	36.00	28.60	89.71	56.57	3.31	1.22	7.89
39 th	18.29	4.41	36.40	29.86	86.14	48.86	0.14	1.23	8.21
40 th	22.8	5.31	36.03	30.23	71.00	49.57	0.00	0.96	8.63
41 st	26.8	8.31	36.34	22.69	78.00	43.57	0.00	0.99	8.79
42 nd	30.31	14.66	36.83	22.77	80.57	42.29	0.00	1.12	8.91
43 rd	27.31	26.61	35.03	18.86	81.71	34.57	0.00	0.91	8.92
44 th	26.67	32.31	32.54	18.83	84.29	39.14	0.00	1.07	8.91
45 th	17.31	38.61	32.14	17.83	86.57	35.57	0.00	0.76	8.83
46 th	10.11	40.31	31.40	15.97	90.00	42.29	0.00	0.75	8.83
47 th	8.11	29.31	28.89	11.71	92.00	43.00	0.00	0.82	8.90
48 th	2.31	18.56	27.48	8.84	92.43	40.14	0.00	0.74	8.72

% Shoot Infestation	R	0.371	-0.059	-0.718	-0.428	-0.408	-0.277	0.591
	t =	1.555	0.211	3.924	1.802	1.71	1.119	2.864
	Results	NS	NS	S	NS	NS	NS	S
% Fruit Infestation	R	0.640	-0.823	-0.100	-0.785	-0.385	-0.637	0.600
	t =	3.268	5.644	0.429	4.905	1.613	3.188	2.959
	Results	S	S	NS	S	NS	S	S

Reference: Meteorological Department SHUATS, Allahabad.

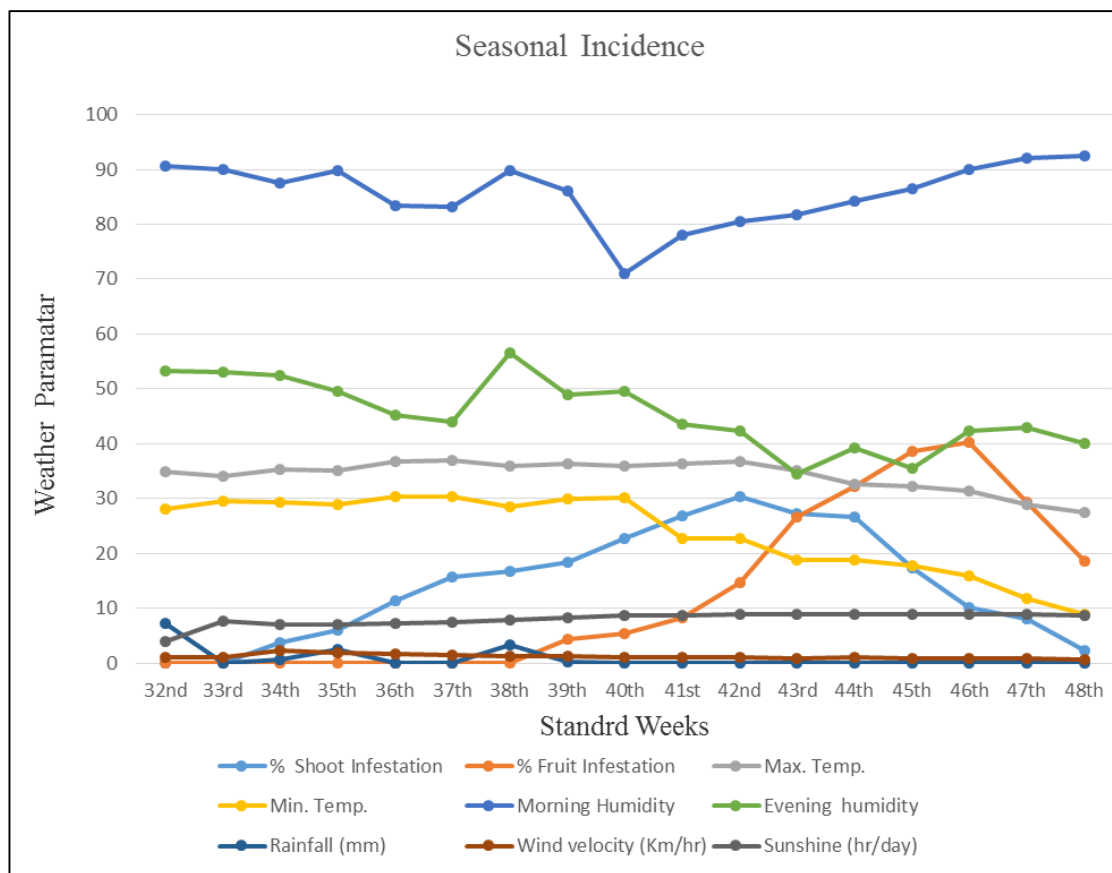


Fig 3.1: Seasonal incidence of shoot and fruit borer of brinjal during Kharif 2017 (% Infestation of *Leucinodes orbonalis*).

4. Conclusion

From the critical analysis of the present findings it can be concluded that Brinjal shoot and fruit borer infestation was positively correlated with maximum temperature and sunshine hours but negatively correlated with Evening Relative Humidity.

5. Acknowledgment

We are thankful to Head, Department of Entomology, Sam Higginbottom University of Agriculture Technology and Sciences, Allahabad-211007 for providing the facilities during the course of investigation.

6. References

- Anwar S, Mari JM, Khanzada MA, Ullah F. Efficacy of insecticides against infestation of brinjal fruit borer, (*Leucinodes orbonalis* Guenee) (Pylalidae: Lepidoptera) under field conditions Journal of Entomology and Zoology Studies. 2015; 3(3):292-295.
- Kalawate A, Dethé MD. Bio efficacy study of biorational insecticide on brinjal J Biopest. 2012; 5(1):75-80.
- Roy G, Gazmer R, Sarkar S, Laskar N, Das G, Samanta A. Comparative bioefficacy of different insecticides against fruit and shoot borer, *Leucinodes orbonalis* Guenee of brinjal and their effect on natural enemies, International Journal of Green Pharmacy. 2016; 10(4):257.

- Halder J, Kushwaha D, Singh A, Tiwari SK, Rai AB, Singh B. Whether *Leucinodes orbonalis* Guenee is becoming a serious problem to brinjal seedlings in nursery? Pest Management in Horticultural Ecosystems. 2015; 21(2):231-232.