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Seasonal incidence of brinjal shoot and fruit borer (*L. orbonalis*) during kharif season (2019 -2021) under agro climatic condition Prayagraj UP

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Abstract

Seasonal incidence of brinjal shoot and fruit borer (*Leucinodes orbonalis*) on brinjal crop were studied during Kharif season 2019-2021 on brinjal variety Pusa Purple long at central research field, Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj. The research farm is situated on the right side of Prayagraj. The maximum numbers of larvae were commenced from July third standard week on shoot with an average 1.2% infestation. The borer populations increased gradually reach peak level 4.25% larval population and decline in the trends was noticed this may be due to fail congenial weather parameter. The incidence of brinjal shoot and fruit borer was recorded by counting total number of shoots and fruits with damaged once. The weather parameters were recorded weekly. The correlation of between the *L. orbonalis* population and weather parameters showed that infestation was negatively and non-significantly correlated with the maximum temperature (r-0.410). Non-significant but negative correlation was recorded between infestations with minimum temperature (r-0.254). The incidence of *L. orbonalis* on brinjal showed significant positive correlation with the maximum temperature, sunshine and evening humidity. While the minimum temperature in the morning, relative humidity, rainfall and wind velocity recorded non-significant negative correlation.

Keywords: Seasonal incidence, *Leucinodes orbonalis*, brinjal shoot and fruit infestation

Introduction

Brinjal (*Solanum melongena* L.) also known as eggplant or aborigine belongs to the night shade family "*Solanaceae*", referred as the "King of vegetables" originated from India. It is one of the most common vegetable grown throughout the tropical, sub-tropical and warm temperate areas of the world. Brinjal is the second important vegetable crop next to tomato grown in 0.68 million hectares with annual production of 12.9 million tonnes, accounting about 8.3 percent of total vegetable production of the country. The brinjal shoot and fruit borer is active during the rainy and summer seasons and has specific nature of feeding behaviour. In early stage of the crop growth, the larva bores into the shoots resulting in drooping, withering and drying of the affected shoots due to disruption of the vascular system and translocation of food materials. At later stage of the plant growth, the larvae bore generally through calyx and later into the flower buds and fruits, the bored holes are invariably plugged with excreta (Butani and Jotwani, 1984) [3].

The brinjal shoot and fruit borer has been reported to be the serious pest which reduces the crop yield up to 60-70% and inflicts the colossal loss in production (Singh and Nath, 2010) [7]. This pest has a very wide host range. Besides brinjal, it attacks other solanaceous plants such as Potato, Tomato, Bell pepper and some weeds (Anonymous, 2011). The infested fruits become unfit for human consumption due to loss of quality and lose their market value. It has also been reported that there could be reduction in vitamin C content in the infested fruits (Ali *et al.*, 1980; Dhandapani *et al.*, 2003) [1,4].

Material and Method

The present investigation was conducted at the Central Research Field of "Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj, Uttar Pradesh. The geographical co-ordinates of Prayagraj is 25° 57' N latitude and 87° 19' E longitude and an altitude of 98 m above mean sea level. The Prayagraj regions have sub-tropical and semi-arid climate with monsoon commencing from July and with drawing by the end of September. The temperature goes up to 48 °C during summer and goes down to 2.5 °C in winter.

The site Selected was uniform, cultivable with typical sandy loam soil having good drainage. For conducting studies we were used biopesticides and chemical insecticides, agricultural implements, organic manure and fertilizers. whereas equipment's knapsack sprayer, measuring cylinder, buckets, labels, threads, polythene bags, weighing balance, labours etc. provided by the Department of Entomology.

Data collection: Five plants were randomly selected from each plot and tagged. Weekly observations were throughout the cropping season.

On Shoot

Number Basis: The total number of shoots and number of shoots infested of five selected plants from each treatment replication wise were recorded.

$$\% \text{ Shoot infestation} = \frac{\text{No. of shoot infested}}{\text{Total no. of shoot}} \times 100$$

On Fruit

Number Basis: at each picking, the total number of fruits and number of fruits infested of five selected plants from each treatment replication wise were recorded.

$$\% \text{ Fruit infestation} = \frac{\text{No. of fruit infested}}{\text{Total no. of fruit}} \times 100$$

Result and Discussion

Percent shoot infestation: The present studies on the incidence of shoot and fruit borer population with weather parameters given in table 1 below. Shoot infestation of *Leucinodes orbonalis* Guenee 2019 - 20 Kharif season was commenced from July 4th standard week (July twenty eight week) on shoot with an average 1.2% infestation. The borer population increased and gradually reached peak level of 4.25% of larval population at 1st week of November (November first week). The population increased and gradually reached peak level SS 4.25% larval population and decline in the trend was noticed this may be due to fail in congenial weather parameters. The pest builds up was correlating with max temperature and declined as it falls.

Percent fruit infestation: The present studies on the incidence of shoot and fruit borer population with weather parameter. The fruit infestation of *Leucinodes orbonalis* Guenee 2019 - 20 kharif seasons was commenced from 30th standard week (August 2nd week) on fruit with an average 3.57% infestation. The borer population increased and gradually reached peak level of 31.97% of larva population at 41st standard week of November (November 1st week). The population increased and gradually reached peal level 31.97% larval population and decline in the trend was noticed this may be due to fail in congenial weather parameters. The current results are consistent with the Shukla and Khatri (2010) [6] and Kumar and Singh (2012) [8]. The shoot and fruit borer increased consistently in the months of October and November and it reduced in the month of December. The third weeks of October had highest fruit infestation.

Table 1: Seasonal incidence of shoot and fruit borer of Brinjal (*L. orbonalis*) during kharif season 2019- 20

Month / Weeks	% shoot infestation of <i>Leucinodes orbonalis</i>	Temperature 0C		Rainfall (mm)	R. H. (%)		
		Maximum	Minimum		Maximum	R. H. Maximum	
Jul-19	1 st Week	0	41.63	29.09	4.57	79.14	40.00
	2 nd Week	0	36.60	25.60	20.26	90.00	54.71
	3 rd Week	0	37.80	28.77	0.11	84.86	48.14
	4 th Week	1.2	35.40	27.29	26.57	88.29	61.43
Aug-19	1 st Week	1.8	34.83	27.00	8.77	90.00	54.14
	2 nd Week	1.33	35.60	27.77	7.69	93.43	57.57
	3 rd Week	1.4	33.94	27.86	9.06	94.29	59.86
	4 th Week	2.25	33.67	27.14	24.17	93.14	58.43
September	1 st Week	2.23	35.14	28.06	1.74	67.71	58.71
	2 nd Week	2.21	33.89	28.43	18.17	93.14	63.71
	3 rd Week	2.25	33.66	27.74	8.03	91.71	66.14
	4 th Week	2.66	31.74	26.77	28.69	94.14	71.57
Oct-19	1 st Week	3.44	30.74	22.83	17.51	93.29	67.71
	2 nd Week	3.15	34.44	25.09	0.91	90.57	49.14
	3 rd Week	3.63	32.94	24.71	0.00	90.71	60.14
	4 th Week	4.15	32.31	22.51	0.00	90.57	61.86
Nov-19	1 st Week	4.25	33.26	21.20	0.00	90.43	57.86
	2 nd Week	2.33	32.20	18.03	0.00	90.43	59.29
	3 rd Week	4.21	31.49	15.57	0.00	91.00	59.00
	4 th Week	2.36	30.71	15.46	0.00	92.00	62.29
Dec-19	1 st Week	4.22	29.14	12.99	0.00	92.00	64.00
	2 nd Week	2.25	27.09	12.91	2.63	91.86	62.71
	3 rd Week	1.66	22.20	23.03	0.00	92.71	69.43
	4 th Week	2.22	24.51	10.83	0.00	93.57	56.86

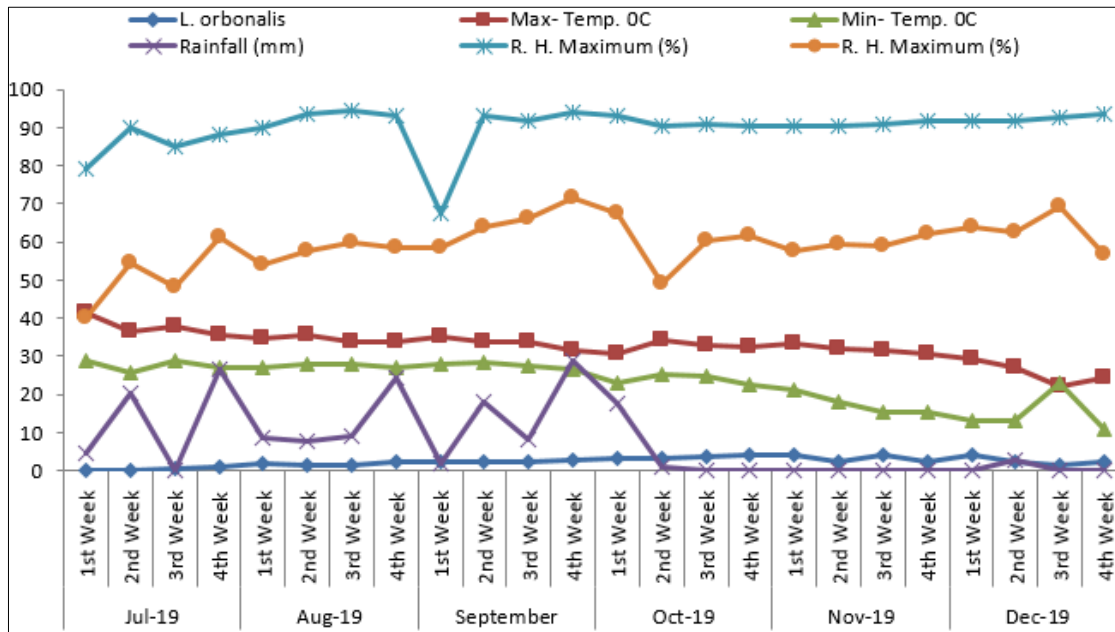


Fig 1: Graphical representation of seasonal incidence of shoot and fruit borer (*L. orbonalis*) during kharif season 2019- 20

Percent shoot infestation: The present studies on the incidence of shoot and fruit borer population with weather parameters given in table 2 below. Shoot infestation of *Leucinodes orbonalis* Guenee 2020 - 21 Kharif season was commenced from August 3rd standard week (31th standard week of August) on shoot with an average 1.36% infestation. The borer population increased and gradually reached at peak level of 4.63% of larval population at 3rd week of November (43rd standard weeks of November). The population increased and gradually reached peak level SS 4.63% larval population and decline in the trend was noticed this may be due to fail in congenial weather parameters. The pest builds up was correlating with max temperature and declined as it falls.

Percent fruit infestation: The present studies on the incidence of shoot and fruit borer population with weather parameter. The fruit infestation of *Leucinodes orbonalis* Guenee 2020 - 21 kharif seasons was commenced from 30th standard week of August (August 2nd week) on fruit with an average 4.87 infestation. The borer population increased and gradually reached peak level of 30.78% of larval population at 43th standard week of November (November 3rd weeks). The population increased and gradually reached peak level 30.78% larval population and decline in the trend was noticed this may be due to fail in congenial weather parameters.

Table 2: Seasonal incidence of shoot and fruit borer of Brinjal (*L. orbonalis*) during kharif season 2020- 21

Month / Weeks		% shoot infestation <i>L. orbonalis</i>	Temperature 0C		Rainfall (mm)	R. H. (%)	
			Maximum	Minimum		Maximum	R. H. Maximum
Jul-2020	1 st Week	0	36.74	24.83	8.09	86.29	49.43
	2 nd Week	0	36.11	25.71	15.09	82.71	49.86
	3 rd Week	0	35.79	26.37	4.29	76.00	49.00
	4 th Week	0	36.60	26.77	0.00	80.57	44.86
Aug-2020	1 st Week	0	36.00	27.00	12.60	91.86	50.43
	2 nd Week	0	34.63	25.57	9.74	92.14	54.57
	3 rd Week	1.36	34.09	25.74	7.66	90.00	53.86
	4 th Week	2.55	35.00	26.23	3.77	88.71	51.00
September-2020	1 st Week	1.36	36.43	27.34	1.43	83.71	48.86
	2 nd Week	1.63	37.17	27.37	3.26	80.86	47.71
	3 rd Week	2.15	35.71	27.43	3.09	80.29	47.43
	4 th Week	3.14	33.57	26.77	17.34	90.00	54.71
Oct-2020	1 st Week	2.33	35.23	27.31	0.00	84.43	54.00
	2 nd Week	4.15	36.11	25.69	0.00	86.00	50.71
	3 rd Week	3.25	36.86	24.06	0.00	85.86	50.00
	4 th Week	4.11	36.29	23.83	0.00	86.43	50.14
Nov-2020	1 st Week	4.16	33.74	17.17	0.00	90.86	56.14
	2 nd Week	4.15	32.43	13.69	0.00	90.14	60.14
	3 rd Week	4.63	30.83	12.63	0.00	89.71	59.86
	4 th Week	4.15	31.86	11.29	0.00	90.57	57.86
Dec-2020	1 st Week	4.22	30.54	11.69	0.00	91.14	62.14
	2 nd Week	1.36	29.26	9.91	0.00	92.29	64.57
	3 rd Week	1.44	27.97	9.34	2.63	93.14	72.29
	4 th Week	1.88	22.43	8.03	0.00	93.14	77.14

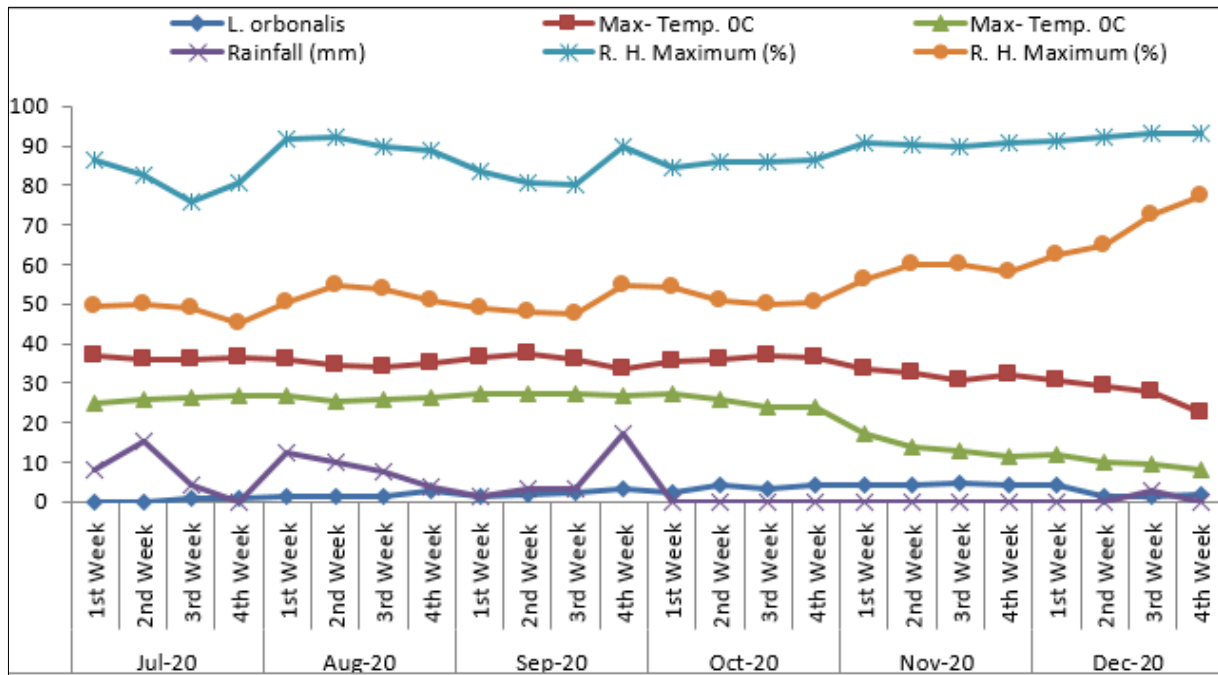


Fig 2: Graphical representation of seasonal incidence of shoot and fruit borer (*L. orbonalis*) during kharif 2020 -21

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