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Seasonal incidence of major insect pests of Brinjal in relation to weather parameters

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Abstract
An experiment seasonal incidence of major insect pests of brinjal in relation to weather parameters was conducted during *kharif* 2021-22 Agricultural Research Farm, Department of Entomology, College of Agriculture, Vasantrao Naik Marathwada Krishi Vidyapeeth, Parbhani (M.S.) Seasonal incidence of aphids on brinjal ranged from aphids during 46th to 5th standard meteorological week during 2021-22. The aphid population variation observed from 8.60 (46th SMW) to 7.80 (5th SMW) aphids / 3 leaves. Peak incidence of aphid recorded (12.00 aphids /3 leaves) at 47th SMW. The population of jassids ranged from 46th SMW (9.27 jassids/3 leaves) to 5th SMW (6.40 jassids/3 leaves). The peak incidence of 10.40 jassids /3 leaves (46th SMW). The population of whitefly on brinjal was ranged from 12.53 (46th SMW) to 3.87 (5th SMW) whiteflies/3 leaves plant. Highest population of whitefly 12.53 whitefly during 46th SMW. The infestation was ranged from 46th SMW (9.13%) to 5th SMW (4.82%). The peak incidence of shoot borer was observed during 46th SMW i.e. 9.13 per cent. The infection of *L. orbonalis* on brinjal was ranged from 46th SMW (8.27%) to 5th SMW (9.67%). The peak incidence of fruit borer was observed during 52th SMW (29.13%).

Keywords: Incidence, brinjal, SMW, jassids, peak, ranged

Introduction
Brinjal (*Solanum melongena* Linnaeus) also known as eggplant or Aubergine, in France, brinjal in India, melongena in the West Indies, and Guinea squash in America It is cultivated plant belongs to the family solanaceae. The name brinjal comes from Arabic and Sanskrit words. The fruit is berry with many kidney shaped brown seed inside it. 2n=24 is the chromosome number of brinjal crop. Its fruits are high in nutrition and commonly consumed as a vegetables. The fruits and other parts of the plant are used in traditional medicine. The main goals of eggplant breeding are to create high-yielding, early, high-quality, and disease-resistant variants. Although edible, the seeds are bitter due to the presence of nicotinoid alkaloids. In the brinjal field, various pests prevail during seed-ling to harvesting stage and the losses caused by brinjal pests vary from season to season depending upon environmental factors (Anjali *et al.* 2012) [1]. It is grown throughout the year under irrigated condition and is attacked by a number of insect pests right from the nursery stage till harvesting. Several biotic and abiotic factors are responsible for lowering down the yield of brinjal. Among them, insect pests are the important factors which greatly affect the quality and productivity of brinjal crop. There are various factors that contribute to a reduction in brinjal yield, one of which is insect pests. More than 70 insect pests attack brinjal; among these, the destructive pest of brinjal (*Leucinodes orbanalis* Guen.) damages the crop throughout the year. However, the brinjal shoot and fruit borer, as well as sucking pests including aphid, jassid, and white fly, are the main causes of infestation. According to Patel *et al*. (2015) [9] .the losses caused by brinjal bugs fluctuate from season to season dependent on environmental circumstances. Due to the bug, 70-90 per cent of the yield is lost. Shoot and fruit borer: *Leucinodes orbanalis* (pyraustidae: Lepidoptera) larva bores into tender shoots and causes withering of terminal shoots/dead hearts. It also bores petioles of leaves, flower buds, and developing buds, causing withering of leaves, shedding of buds.

Material and Method
Field experiments were carried out during *Kharif* 2020-21 at the Research Farm of Department of Agricultural Entomology. Vasantrao Naik Marathwada Krishi Vidyapeeth, Parbhani (Maharashtra). This is situated 19°16’ North latitude and 76°47’ East longitudes with an altitude of 500 meters above mean sea level.

The mean annual rainfall of Parbhani is about 800-900 mm receiving mostly during June to September Summer is hot and dry while winter is cool. The mean daily maximum temperature varied from 29 °C in December to 40 °C in May. The minimum temperature varies from 11.32 °C (winter) to 25.77 °C (summer). The mean relative humidity ranges from 26-66 per cent. The climate is subtropical.

Observations on the population of sucking pests was recorded on three leaves one each from top, middle and bottom canopy of the five plants selected randomly from each plot. The incidence of brinjal shoot and fruit borer also recorded by counting total number of shoots and fruits with the damaged ones. Five observations plants will be selected randomly from net plot of each treatment in each replication. The observations on total number of natural enemies was recorded at one day before and 2, 7, and 14 days after the application of insecticides

Result and Discussion

The data on seasonal incidence of major insect pests of brinjal in relation to weather parameters are presented in table No. 1. The investigation was carried out during *kharif* 2021-22 in order to know the incidence of pests of brinjal. The weather parameters *viz*., maximum temperature, minimum temperature, morning relative humidity, evening relative humidity, rainfall, evaporation, bright sunshine hours and wind velocity were taken for consideration.

The data on population of aphids during 46th to 5th standard meteorological week 2021-22 revealed that the aphid population fluctuation observed from 8.60 (46th SMW) to 7.80 (5th SMW) aphids / 3 leaves. Peak incidence of aphid recorded (12.00 aphids /3 leaves) at 47th SMW. The second peak was noticed at 46th SMW (8.00 aphids /3 leaves), the third peak was noticed at 49th SMW (8.00 aphids /3 leaves), respectively. The earlier researchers reported a similar result of sucking pest incidence during *kharif* season, Berani *et al.*(2020) [2] who reported, the highest peak activity of aphid was noticed during 1st week of November (45th SMW). Rohokale *et al*. (2019) [10] showed that *A. gossypii* population attained peak (8.5 aphids/three leaves) during the 46th SMW. Khan *et al*. (2015) [6] has reported that the incidence of aphid. The occurrence started from first week of October and reached its peak (37.70 aphid/5 plant) in first week of November during the year 2007-08.

The data on population fluctuation of jassids per 3 leaves, (*Amrasca biguttula*), during *kharif* 2021-22 observed that the infestation of jassids was noticed from during 46th SMW. The peak incidence of 10.40 jassids /3 leaves (46th SMW). The fluctuation of jassid population was observed from 46th SMW (9.27 jassids/3 leaves) to 5th SMW (6.40 jassids/3 leaves).The above result is in accordance with the results reported by Berani *et al.* (2020) [2] has investigated that the highest peak activity of aphid and jassids was noticed during 1st week of November (45th SMW). Lal *et al.* (2019) [8] resulted that jassid, population activity peaked on the 1st SMW (January).

The data from (Table 1) revealed that the population of whitefly on brinjal was ranged from 12.53 (46th SMW) to 3.87 (5th SMW) whiteflies/3 leaves plant. After observation of whitefly population, it showed the decreasing trends. The peak infestation 1st, 2nd, 3rd observed 12.53, 11.00, 8.30 whitefly/ 3 leaves during 46th, 47th, 48th SMW respectively. The present results are in conformity with the earlier researchers, Lal *et al.* (2019) [8] revealed that the incidence of whitefly reached their population peaks. The results showed that whitefly population activity peaked on the 1st SMW (January). Indirakumar *et al*., (2016) [4] investigated the Whitefly incidence was highest in January (2nd SMW) and lowest in March, according to him (12th SMW).

The data on the infestation of *L. orbanalis* on developing shoots of brinjal crop during *kharif* 2021-22, which is shown in Table 1. The infestation was ranged from 46th SMW (9.13%) to 5th SMW (4.82%). The peak incidence of shoot borer was observed during 46th SMW (9.13%) and after that the population was in decreasing and pests might be shifted to fruits. Salve *et al.* (2021) [11] reported that, the first peak incidence of brinjal shoot and fruit borer was noticed 9.15 (shoots) in the 32nd SMW. Kolhe *et al.* (2020) [7] investigate that the borer population increased and gradually reached peak level of 33 per cent of larval population at 42nd standard week (Third week of October) and decreased in the trend was observed this may be due to decrease in congenial weather parameters and the per cent fruit data noticed that from 39th standard week (third week of September) on shoot with an average 4.6 per cent infestation

The incidence of *L. orbonalis* on fruits of brinjal during *kharif* 2021-22 is presented in Table 1. The infection of *L. orbonalis* on brinjal was ranged from 46th SMW (8.27%) to 5th SMW (9.67%). The peak incidence of fruit borer was observed during 52th SMW (29.13%).The above results corroborate the findings of earlier researchers; Humane *et al.* (2021) [3] reported that the maximum damage (40.6%) to brinjal fruits due to *L. orbonalis was* observed during 42nd SMW. Kadgonkar *et al.* (2018) [5] revealed that the fruit borer, *Leucinodes orbonalis* Guenee, was first spotted in November and December, with a peak infection in January (4th SW).

Table 1: Seasonal incidence of major insect pests of brinjal during *kharif* 2021-22

Std. Met. Week	Duration	Aphid / 3 leaves	Jassids / 3 leaves	Whitefly / 3 Leaves	Shoot borer (% fruit infested)	Shoot borer(% fruit infested)
46	16- 23 Nov.	8.60	9.27	12.53	9.13	8.27
47	24- 31 Nov.	12.00	10.40	11.00	8.63	16.10
48	1-8 Dec.	7.90	8.60	8.33	6.94	13.00
49	9-16 Dec.	8.00	6.43	6.07	7.27	18.80
50	17-23Jan.	7.60	4.00	5.13	5.58	22.20
51	24-31Jan.	8.30	6.00	7.13	6.81	25.07
52	1-7Jan.	6.30	3.53	8.03	5.62	29.13
1	8-15Jan.	4.23	4.00	6.17	4.80	21.87
2	16-23Jan.	6.30	5.20	5.10	5.53	18.33
3	24-31Jan.	6.80	3.27	3.73	4.93	21.27
4	1-7 Feb.	5.20	4.00	4.40	4.67	17.50
5	8-14 Feb.	7.80	6.40	3.87	4.82	9.67

Aphid (*Aphis gossypii*)
Simple correlation
It is evident from the data (Table 2) of the relationship between weather parameters and aphids population indicated a non – significant positive correlation of with rainfall (0.478), minimum temperature (r= 0.516), morning relative humidity (r= 0.113), evening relative humidity (r= 0.182), evapotranspiration (r= 0.143), and wind speed (r= 0.177). While bright sunshine hours (r= - 0.107) shows non-significant negative correlation with the aphid population and maximum temperature shows significant positive correlation (r= 0.583*).

Jassids (*Amrasca biguttula biguttula*)
Simple correlation
It is evident from the data (Table 2) of the relationship between weather parameters and jassids population indicated a non – significant positive correlation of with rainfall (0.23), evening relative humidity (r= 0.21), evapotranspiration (r= 0.38), and wind speed (r= 0.52), morning relative humidity (r= -0.37), While bright sunshine hours (r= - 0.04) shows non-significant negative correlation with the jassids population, and minimum temperature (r= 0.68*) shows the positive significant, maximum temperature shows highly significant positive correlation (r= 0.71**).

Whitefly (*Bemisia tabaci*)
Simple correlation
It is evident from the data (Table 2) of the relationship between weather parameters and whitefly population indicated a non – significant positive correlation of with rainfall (0.05), evening relative humidity (r= 0.48), evapotranspiration (r= 0.09), and wind speed (r= 0.46). Morning relative humidity (r= -0.17), While bright sunshine hours (r= - 0.32) shows non-significant negative correlation with the whitefly population. And minimum temperature (r= 0.78**) shows the highly positive significant, maximum temperature shows significant positive correlation (r= 0.66*).

Shoot borer (*Leucinodes orbonalis* L.)
Simple correlation
It is evident from the data (Table 3) of the relationship between weather parameters and shoot borer population indicated a non – significant positive correlation of with rainfall (0.35), evening relative humidity (r= 0.48), evapotranspiration (r= 0.09), and wind speed (r= 0.45), morning relative humidity (r= -0.12), While bright sunshine hours (r= - 0.39) shows non-significant negative correlation with the shoot borer population. And minimum temperature (r= 0.61*) shows the positive significant, maximum temperature shows highly significant positive correlation (r= 0.81**).

Fruit borer (*Leucinodes orbonalis* L.)
Simple correlation
It is evident from the data (Table 3) of the relationship between weather parameters and fruit borer population indicated a non – significant positive correlation of evening relative humidity (r= 0.02), and. While with rainfall (- 0.02), maximum temperature (r= -0.46), minimum temperature (r= - 0.29), evapotranspiration (r= -0.58), bright sunshine hours (r= - 0.21), wind speed (r= -0.56) shows non-significant negative correlation with the fruit borer population .Morning relative humidity (r= 0.70*) shows significant positive correlation (r= -0.46.

Table 2: Simple correlation of brinjal sucking pests between weather parameters

Sr. No.	Parameters	Aphid (2021-22)			Jassids			Whitefly		
		Intercept (a)	Slope (b)	'r' Value	Intercept (a)	Slope (b)	'r' Value	Intercept (a)	Slope (b)	'r' Value
1.	Rainfall	7.205	0.477	0.478	5.722	0.451	0.23	6.737	0.120	0.05
2.	Max.Temp	-14.169	0.753	0.583*	-23.089	1.012	0.71**	-24.487	1.091	0.66*
3.	Min.Temp	3.752	0.260	0.516	0.519	0.384	0.68*	-0.477	0.516	0.78**
4.	RH morning	6.223	0.014	0.113	23.066	-0.199	-0.37	15.836	-0.105	-0.17
5.	RH evening	6.258	0.029	0.182	3.993	0.048	0.21	1.574	0.130	0.48
6.	Evaporation	4.893	0.667	0.143	1.567	1.151	0.38	5.566	0.324	0.09
7.	BSS	7.399	0.003	-0.107	6.238	-0.052	-0.04	10.018	-0.539	-0.32
8.	WS	5.245	0.636	0.177	0.822	1.494	0.52	1.574	1.527	0.46

Table 2: Simple correlation brinjal shoot and fruit borer between weather parameters

Sr. No.	Shoot borer			Fruit borer		
	Intercept (a)	Slope (b)	'r' Value	Intercept (a)	Slope (b)	'r' Value
1.	6.033	0.435	0.35	18.467	-0.076	-0.02
2.	28.610	0.112	0.61*	65.458	-1.641	-0.46
3.	2.104	0.293	0.81**	24.367	-0.421	-0.29
4.	9.799	-0.042	-0.12	-64.369	0.964	0.70*
5.	3.382	0.071	0.48	17.855	0.014	0.02
6.	5.540	0.182	0.09	35.317	-4.457	-0.58
7.	8.385	-0.360	-0.39	23.94	-0.778	-0.21
8.	3.432	0.819	0.45	32.341	-4.072	-0.56

Conclusion
On the basis of results and discussion of the present investigation the following recommendations/conclusions are proposed. Aphids, jassids, whitefly and brinjal shoot and fruit borer were found to be major insect pests of brinjal there incidence was found to be medium or high. Simple correlation and regression studies revealed that the there was significant and highly significant effect of different weather parameters on incidence of insect pests of brinjal.

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References
1. Anjali M, Singh NP, Mahesh M, Swaroop S. Seasonal incidence and Effect of abiotic factors on population dynamics of major insect pests on brinjal crop. Journal Environment Research Development. 2012;7(1):431-435.

2. Berani NK, Patel JJ. Population fluctuation of sucking insect pest of brinjal and its relation with weather parameters. Journal of Entomology and Zoology Studies. 2020;8(6):1613-1617.
3. Humane AN, Zanwar PR, Sonkamble MM. Influence of weather parameters on incidence of major pests of brinjal. International Journal of Ecology and Environmental Sciences. 2021;3(1):179-184.
4. Indirakumar K, Devi M, Loganthan R. Seasonal incidence and effect of abiotic factors on population dynamics of major insect pests on brinjal crop. Internation Journal of Plant Protection. 2016;9(1):142-145.
5. Kadgonkar TS, Bagde AS, Deshmukh VJ, Mali AS. Seasonal Incidence of Major Pests of Brinjal. International Journal Current Microbiology Applied Science. 2018;7(09):2727-2731.
6. Khan FS, Borikar PS, Sangle PM. Population dynamics of major insect pests of brinjal. Bioinfolet. 2015;12(2A):408-412.
7. Kolhe PS, Warghat AN, Mahajan SS. Seasonal incidence of shoot and fruit borer (*Leucinodes orbonalis* Guenee) on brinjal (*Solanum melongena* L.) During *Kharif* season in Trans Yamuna region of Allahabad. Journal of Entomology and Zoology Studies. 2020;8(2):1917-1921.
8. Lal B, Bhadauria NS, Singh P, Tomar SPS. Seasonal incidence of sucking insect pests in brinjal and their natural enemies in gird region of Madhya Pradesh, India. Journal of Pharmacognosy and Phytochemistry. 2019;8(4):2077-2079.
9. Patel HV, Radadia GG, Chavda SK. Seasonal incidence of major insect pests of brinjal crop during summer season. Insect environment. 2015;20(4):149-151.
10. Rohokale YA, Sonkamble MM, Waghmare YM, Bokan SC. Seasonal incidence of major insect pests of brinjal and their correlation with weather parameters. International Journal of Chemical Studies. 2019;7(4):1989-1992.
11. Salve RS, Sonkamble MM, Patil SK. Population dynamics of major insect pests of Brinjal. Indian Journal of Entomology. 2021;83:1-5.