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## Population dynamics of brinjal insect pests with abiotic factor

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#### Abstract

The field trial was conducted at the Organic research farm Kargua Ji, Department of Entomology, institute of Agricultural Science, Bundelkhand University Jhansi, (Uttar Pradesh) during Rabi November to March 2021-2022 investigation entitled "Population dynamics of brinjal insect pests with abiotic factor" the population results showed that the *Aphis gossypii* was commenced from 45<sup>th</sup> standard week (November first week) with an average 0.33 aphids/plant and increased and gradually reached peak level of 83aphids/plant at 49<sup>th</sup> standard week (December first week). White fly, *Bemisia tabaci* (Genn.) was commenced from 46<sup>th</sup> standard week (November second week) with an average 0.67 no. of white fly per plant and increased and gradually reached peak level of 14 no. of white fly / plant at 51<sup>th</sup> standard week (December third week. Hadda beetle, *Epilachna* spp. was commenced from 49<sup>th</sup> standard week (December first week) with an average 0.67 larvae & Adult/ plant and reached peak level of 3.33 larvae/plant at 4<sup>th</sup> standard week (January fourth week). Shoot and fruit borer, *Leucinodes orbonalis* was commenced from 3<sup>rd</sup> standard week (January Third week) with an average 1.67 larvae per plant and reached peak level of 4.33 larvae per plant at 6<sup>th</sup> standard week (February second week). Lady Bird beetle *Harmonia conformis* was commenced from 50<sup>th</sup> standard week (December second week) with an average 1.67 larvae/plant and reached peak level of 8.33larvae/plant at 4<sup>th</sup> standard week (January fourth week). Grass hopper, *Melanoplus differentialis* was commenced from 47<sup>th</sup> standard week (August third week) with an average 0.33 larvae/plant and reached peak level of 5.67larvae/plant at 52<sup>th</sup> standard week (December last week).

**Keywords:** Brinjal, vitamin, crop, Shoot and fruit borer, abiotic

#### Introduction

Brinjal (*Solanum melongena*), is a popular and important vegetable crop grown in the subtropical and tropical region of world. Brinjal also known as eggplant or aubergine belonging to the family Solanaceae, is one of the common and popular vegetables grown throughout the world including India.

Total vegetable production in India 191.77million metric tons. China is the largest producer of brinjal and contributes about 68.7% of the world's brinjal production while India occupies second position in production with a share of 23.3%. In India, brinjal occupies fourth position in area among the vegetable crop and contributed 8% of the total production. In Uttar Pradesh brinjal occupies 13 Position in area among the vegetables crop and contributed 2.16% of the total production (Anonymous- 2020) [1].

The brinjal is a staple vegetable in our diet since ancient times and consumed as a green vegetable by most of the people. The un-ripped fruits are primarily used as a cooked vegetable for the preparation of various dishes and recipes. It is importance due to its nutritional, medicinal as well as commercial value per 100 gram, calories 25 g, total fat 0.2 g, sodium 2 g, potassium 229g total carbohydrate 6 g, dietary fiber 3 g, sugar 3.5 g, protein 1 g, vitamin C 3%, Iron 1%, vitamin B 6-5%, magnesium 3%. It possesses Ayurvedic properties. In addition leaves and seeds have also some derivable medico chemical properties (Watson *et al.*, 2021) [20].

Though brinjal is known as summer crop and it is being cultivated throughout the year under irrigated condition. This important crop is attacked by various insect pests right from nursery stage till harvesting *viz.*, shoot and fruit borer (*Leucinodes orbonalis* Guenee), Grass hopper (*Melanoplus differentialis* T.), aphid (*Aphis gossypii* Glov.). Whitefly, (*Bemisia tabaci* Genn.), Hadda beetle, *Epilachna* spp. (Fab.), Lady Bird beetle (*Coccinella septempunctata* L.) (Ragupathy *et al.*, 1997) [14].

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**Methods and Material**

The present investigations were carried out on “Population dynamics of brinjal insect pests with abiotic factor” at experimental field of Organic research farm kargua ji, institute of Agricultural Science, Bundelkhand University Jhansi, (Utter Pradesh) during *Rabi* season of 2021-2022. To record the population dynamic of the major insect pests on brinjal variety Dev-kiran (614), will be sown in the last week of October in for plots size 1.80 × 2.40 m<sup>2</sup> size keeping row to row and plant to plant distance of 60 cm and 45 cm. The material and methods to be adopted for the present investigations are presented as below

1. The populations of sucking insect pests *viz.*, Aphids and whitefly was recorded visually (absolute count.) on tagged plant in early morning hours. The population was recorded first on upper surface of leaves and then on lower surface by gentle turning taking all possible care not to disturb them. The observations on shoot and fruit borer will be recorded on the same tagged plants. The shoot infestation will be recorded by counting the total number of damaged shoots at weekly interval and fruit infestation by counting the infested fruits at each picking (on number basis). The population of natural enemies will be recorded on the same randomly selected and tagged plants. The data recorded on major insect pests and meteorological parameters will be used for statistical analysis. To infer the results of seasonal incidence, simple correlation will be worked out between pest population of insect pests, natural enemies and abiotic parameters, *viz.*; maximum and minimum temperatures, relative humidity and rainfall.
2. The observation by the paper bag on per plant.

$$\text{Population dynamic \%} = \frac{\text{No. of insect pest per plant}}{\text{Total no. of insect pest}} \times 100$$

**Results and Discussion**

The results obtained from the present investigation as well as relevant discussion are summarized under following heads:

**Population dynamics of insect pests on brinjal during *Rabi* season in 2021-22**

Studies on the population dynamics of brinjal insect pests with weather parameters given in table below. The occurrence

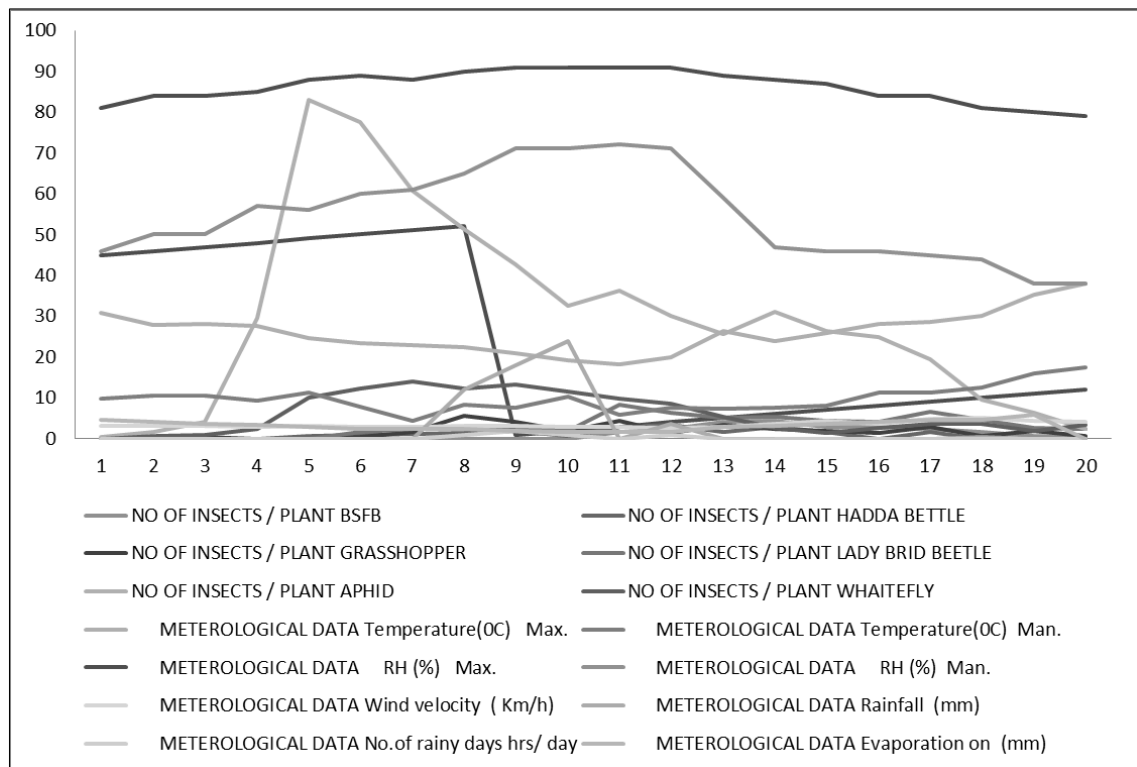
of aphid, *Aphis gossypii* in 2021-22 *Rabi* season was commenced from 45<sup>th</sup> standard week (November first week) with an average 0.33 aphids/plant. The aphid population increased and gradually reached peak level of 83aphids/plant at 49<sup>th</sup> standard week (December first week). The occurrence of white fly, *Bemisia tabaci* (Genn.) in 2021-22 *Rabi* season was commenced from 46<sup>th</sup> standard week (November second week) with an average 0.67 no. of white fly per plant. The white fly population increased and gradually reached peak level of 14 no. of white fly / plant at 51<sup>th</sup> standard week (December third week). The occurrence of Hadda beetle, *Epilachna* spp. in 2021-22 *Rabi* season was commenced from 49<sup>th</sup> standard week (December first week) with an average 0.67 larvae & Adult/ plant. The Hadda beetle population increased and gradually reached peak level of 3.33 larvae/plant at 4<sup>th</sup> standard week (January fourth week). The occurrence of shoot and fruit borer, *Leucinodes orbonalis* in 2021-22 *Rabi* season was commenced from 3<sup>rd</sup> standard week (January Third week) with an average 1.67 larvae per plant. The shoot and fruit borer population increased and gradually reached peak level of 4.33 larvae per plant at 6<sup>th</sup> standard week (February second week). The occurrence of Lady Bird beetle *Harmonia conformis* in 2021-22 *Rabi* season was commenced from 50<sup>th</sup> standard week (December second week) with an average 1.67 larvae/plant. The Lady Bird beetle population increased and gradually reached peak level of 8.33larvae/plant at 4<sup>th</sup> standard week (January fourth week). The occurrence of Grass hopper, *Melanoplus differentialis* in 2021-22 *Rabi* season was commenced from 47<sup>th</sup> standard week (August third week) with an average 0.33 larvae/plant. The Grass hopper population increased and gradually reached peak level of 5.67larvae/plant at 52<sup>th</sup> standard week (December last week). The present investigation supports the observation of Devi *et al.*, (2016) <sup>[4]</sup> they also reported that Aphid was at maximum during January 2<sup>nd</sup> SW and lowest in March 12<sup>th</sup> SW. The incidence of whitefly (*Bemisia tabaci*) was maximum during January (2<sup>nd</sup> SW) and lowest in March (12<sup>th</sup> SW). The incidence of leaf hopper (*Amrasca biguttula biguttula*) was maximum during December, 52<sup>nd</sup> Standard Week (SW) and minimum during March (12<sup>th</sup> SW). The incidence of shoot and fruit borer, *Leucinodes orbonalis* Guenee was observed during Nov. – Dec. with peak infestation during Feb. (6<sup>th</sup> and 7<sup>th</sup>).

**Table 1:** Population dynamics of insect pests on brinjal crop during *Rabi* season in 2021-22.

No of insects / plant in brinjal crop						
SMW	BSFB	Hadda Beetle	Grasshopper	Lady bird beetle	Aphid	Whitefly
45	0.00	0.00	0.00	0.00	0.33	0.00
46	0.00	0.00	0.00	0.00	1.67	0.67
47	0.00	0.00	0.33	0.00	4.00	1.00
48	0.00	0.00	0.00	0.00	29.67	2.33
49	0.00	0.67	0.00	0.00	83.00	10.00
50	0.00	1.00	0.33	1.67	77.67	12.23
51	0.00	1.10	1.67	2.33	60.67	14.00
52	0.00	1.33	5.67	3.00	51.33	12.34
1	0.00	2.00	4.00	2.33	42.67	13.36
2	0.00	0.67	2.00	2.00	32.67	11.56
3	1.67	3.00	4.33	8.33	36.33	9.86
4	2.33	3.33	1.33	6.33	30.00	8.69
5	4.00	1.67	3.33	5.00	25.67	5.33
6	4.33	3.00	2.33	5.33	31.00	2.67
7	3.00	1.67	2.00	4.33	26.33	1.33
8	3.00	0.00	1.33	4.00	25.00	2.67
9	2.45	1.67	3.00	6.67	19.33	3.67
10	1.75	0.00	0.67	4.67	9.67	3.67
11	0.68	0.00	2.00	2.67	6.33	2.00
12	0.35	0.00	0.67	2.33	2.50	3.33

**Table 2:** Meteorological data at organic research form Kargua Ji Bundelkhand University, Jhansi (U.P.) during *Rabi* season in 2021-22

SMW	Meteorological Data							
	Temperature(°C)		RH (%)		Wind velocity	Rainfall	No. of rainy days	Evaporation on
	Max.	Man.	Max.	Man.	(Km/h)	(mm)	hrs/ day	(mm)
45	30.8	9.9	81	46	3.1	0	0	4.6
46	27.9	10.6	84	50	3.1	0	0	4
47	28.1	10.6	84	50	3.1	0	0	3.6
48	27.5	9.3	85	57	2.8	0	0	3.3
49	24.7	11.2	88	56	3.2	0	0	2.8
50	23.4	7.8	89	60	3	0	0	2.5
51	22.9	4.4	88	61	2.8	0	0	2.4
52	22.3	8.4	90	65	3.2	12	1	2.3
1	20.9	7.7	91	71	3.1	18	2	2
2	19.2	10.4	91	71	2.9	23.8	1	1.7
3	18.3	5.8	91	72	2.8	0	0	1.6
4	19.9	7.6	91	71	2.6	3.6	1	1.6
5	26.4	7.3	89	59	2.9	0	0	3
6	24	7.5	88	47	3.6	0	0	3.2
7	25.8	8	87	46	4.4	0	0	3.7
8	28	11.3	84	46	3.7	0	0	4.1
9	28.5	11.3	84	45	4.8	0	0	4.6
10	30	12.6	81	44	5.1	0.4	0	4.7
11	35.2	16	80	38	4.4	0	0	5.9
12	38	17.4	79	38	4.2	0	0	0



**Fig 1:** Graphical representation of Population dynamics of insect pests on brinjal during *Rabi* season in 2021-22.

**Conclusion**

It may be concluded from the results that peak numbers of insect pests on brinjal developing shoots and fruits was observed during first week of November (45<sup>th</sup> SMW) and second week of March (12<sup>th</sup> SMW), It can also be concluded that Population dynamics of brinjal insect pests with abiotic factor.

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**References**

1. Anonymous. National Horticulture Board (NHB), 2020. Source of <http://apeda.in>.
2. Bokan SC, Rohokale YA, Sonkamble MM, Waghmare YM. Seasonal incidence of major insect pests of brinjal and their correlation with weather parameters. International Journal of Chemical Studies. 2019;7(4):1989-1992.
3. Chatterjee Subrata, Kunda Soumya Sarasti, Chettri Dhiren, Mukhopadhyay Ajoy Kumar. Population dynamic of sucking pests in brinjal ecosystem under new genetic alluvial zone. Journal of Entomology and Zoology Studies. 2018;6(5):2157-2161.

4. Indira Kumar K, Devi M, Loganathan R. Seasonal incidence and effect of abiotic factors on population dynamics of major insect pests on brinjal crop. *International journal of plant protection*. 2016;9(1):142-145.
5. Kariyanna B, Prabhuraj A, Bheemanna M, Mohan M, Basavaraj Kalmath, Pampanna Yand, *et al.* Influence of cultivars on population dynamics of brinjal shoot and fruit borer *Leucinodes orbonalis*. *Indian journal of entomology*. 2021;83(1):99-102.
6. Kumar Sandeep, Singh Sumit Kumar, Malik YP. population dynamics of brinjal shoot and fruit borer, *Leucinodes orbonalis* Guen. On brinjal at Kanpur agro climatic region. *Journal of Entomology and Zoology Studies*. 2018;6(6):91-93.
7. Kumar Sushil, Sachan SK, Kumar Vinod, Gautam MP, Kumar Suraj. population dynamics of whitefly (*Bemisia tabaci* Gennadius) jassid (*Amrasca biguttula biguttula* Ishida) and their correlation with abiotic parameters. *J Exp. Zool. India*. 2020;23(1):195-199.
8. Mane PD, Kulkarni SN. Population dynamics of whiteflies, *Bemisia tabaci* Genn. On brinjal. *International journal of plant protection*. 2011;4(1): 140-142.
9. Mathur A, Singh NP, Meena M, Singh S. Seasonal incidence and effect of abiotic factors on population dynamics of major insect pests on brinjal crop. *J of Enviro. Res. and Devel*. 2012a;7(1A): 431-435.
10. Memon Khalil Ahmed, Rustamani Farhad Ali, Bukero Abdul Aziz, Shaikh Hira Mannan, Soomro Habibullah, Aqlani Rasheed Ahmed. Population dynamics of lady beetle, *Menochilus sexmaculatus* and insect pests on brinjal crop. *Sci. Int. (Lahore)*. 2019;31(20):275-278.
11. Mohd Rasdi Z, Fauziah I, Fairuz K, Mohd Saiful MS, Md Jamaludin B. Population Ecology of Whitefly, *Bemisia tabaci*. (Homoptera: Aleyrodidae) on Brinjal. *Journal of agricultural Science*. 2009;1(1):33-35
12. Patel HV, Radadia GG, Chavda SK. Seasonal incidence of major insect pests of brinjal crop during summer season. *Insect Environment (a supplement of Current Biotica)*. 2015;20(4):149-151.
13. Patra Sandip, Chatterjee ML, Lalruatsangi K, Tripura Ajit. Seasonal Incidence of shoot and fruit Borer (*Leucinodes orbonalis* Guenee) of Brinjal in Mid-Hills of Meghalaya. *Indian Journal of Hill farming*. 2017;30(2):335-340.
14. Ragupathy A, Palanisamy S, Chandramohan N, Gunathilagaraj K. A guide on crop pests. Sooriya Desk Top, Coimbatore, 1997, 264p.
15. Saha Sumana, Adhikary Sushmita, Raychaudhuri Dinendra. Dynamics of pest complex of brinjal in the farmland of Ramakrishna Mission Ashrama Camous, Narendrapur, West Bengal, India. *An international Scientific journal*. 2020;146:255-273.
16. Shaikh AA, Patel JJ. Population dynamic of sucking pests on brinjal in relation to weather parameters. *An International e-Journal*. 2013;2(3):370-378.
17. Sharma Jai Hind, Tayde Anoorag R. Population dynamics of Brinjal fruit and shoot borer, *Leucinodes orbonalis* Guen. And Hadda beetle, *Epilachna vigintioctopunctata* Fab. On brinjal at Allahabad Agro climatic Region. *International journal of current microbiology and applied sciences*. 2017;6(6):2055-2060.
18. Singh DK, Datta RS, Singh SK. Seasonal incidence and insecticidal management of shoot and fruit borer (*Leucinodes orbonalis* Guenee.) in brinjal. *Annals of Horticulture*. 2009;2(2):187-190.
19. Verma AK, Chandra Umesh, Batham Pankaj, Shakya Anuj. population fluctuation of brinjal shoot and fruit borer (*Leucinodes orbonalis* Guenee) in Eastern Uttar Pradesh. *Journal of Entomology and Zoology Studies*. 2020;8(1):1080-1082.
20. Waston Stephanie. Health Benefits of Eggplant Web MD, 2021.