Plant Archives Vol. 26, Supplement 2, 2026 pp. 1157-1160 e-ISSN:2581-6063 (online), ISSN:0972-5210

Plant Archives

Journal homepage: http://www.plantarchives.org
DOI Url : https://doi.org/10.51470/PLANTARCHIVES.2026.v26.supplement-2.136

SEASONAL ABUNDANCE OF SUCKING INSECT-PESTS OF OKRA AND THEIR CORRELATION WITH ABIOTIC PARAMETERS

Rahul Raj, Amarendra Pratap Singh, Aditya Kumar Sharma* and Ankit Kumar
Department of Ag. Entomology, Baba Raghav Das Post Graduate College, Deoria - 274 001, Uttar Pradesh, India
*Corresponding author E-mail: adisharmajmd098@ gamil.com
ORCID ID – 0009 0009 7058 4789
(Date of Receiving : 02-03-2026; Date of Revision : 12-04-2026; Date of Acceptance : 07-05-2026)

ABSTRACT

The experiments were conducted during *kharif* season of 2022 at Agricultural Research farm of B.R.D. P. G. College Deoria to study the seasonal abundance of phloem sucking-pest infesting okra in relation to abiotic parameters. The results showed that the population of sucking-pest *viz.*, whitefly, leafhopper and mealy bug appeared from 31st SMW with a mean population of 3.04/3leaves, 1.26/3leaves and 1.66/plant and reached to its peak at 37th SMW with a mean population of 10.56/3leaves, 12.02/3leaves and 5.04/plant, respectively. During this period the abiotic parameter was maximum and minimum temperature (28°C; 26°C), maximum and minimum relative humidity (92%; 81%) and rainfall (120 mm) recorded. The population of Whitefly, leafhopper and Mealy bug showed the negative correlation with temperature, while positive correlations with relative humidity and rainfall.
***Keywords*:** Abiotic parameters, *Amrasca biguttula biguttula*, *Bemisia tabaci*, *Phenacoccus solenopsis* and Seasonal abundance.

Introduction

Okra [*Abelmoschus esculentus* (L.) Moench] popularly known as Bhindi or Lady's finger is an important vegetable crop grown in India. It is a short duration crop, belongs to the family Malvaceae. Okra is one of the major cash crops in the country providing a good source of income and livelihood to the farmers. The edible portion of the okra crop is immature capsule. These tender capsule/ fruits are used as vegetable. It's good source of vitamins A, B and C, proteins, minerals and excellent source of iodine; linoleic acid an essential fatty acid has also been reported to be present abundantly in okra seed oil (Chin and Nushirwan, 1990). It's widely cultivated in tropical areas and mostly in India, Nigeria, Pakistan, Cameroon, Iraq and Ghana. Worldwide 8.90 million tons of the okra is produced per year. India is the largest okra producer in the world with 5.50 million tons production volume per year followed by Nigeria with 1.97 million tons yearly production. (FAO, 2022). The productivity of okra is low due to many factors and one of the most important constraints in production is the attack of insect-pests. Okra crop, right from germination to harvesting is attacked by about 72 species of insect-pests. (Rao and Rajendran, 2003). The whitefly (*Bemisia tabaci*), leaf hopper *(Amrasca biguttula biguttula)* and shoot and fruit borer (*Earias vitella* and *Earias insulana)* are the major insect-pests of Okra (Singh *et al.*, 2014). The whitefly (*Bemisia tabaci*) also sucks the cell sap from the leaves which reduces the vitality of the plants. They excrete honey dew on which shooty mould develops which interferes with the process of normal photosynthesis. This insect also acts as vector of yellow vein mosaic virus in the plant (Nath and Sinha, 1992).

The leaf hopper *(Amrasca biguttula biguttula)* sucks the cell sap from lower surface of the leaves and toxic substance in it resulting in yellowing and curling of leaf margins and stunted plant growth. The severe infestation causes burning of leaves which fall down later and results 40-60 percent decrease in yeald (Narke and suryawanshi, 1987).

Mealy bug (*Phenacoccus solenopsis*) is cottony in appearance small oval soft bodied sucking insects. They suck the phloem sap from leaves and stem. Excess sap is excreted as honey dew which attracts ants develops sooty mould inhibiting the plants ability to manufacture food. Heavy infestation can be caused exfoliation and even death of the plant. They cause up to 45-58% losses in okra crop (Raj *et al*., 2026). Incidence of insect-pests has undergone a tremendous change as recorded in pest two decades due to change in climate, cropping pattern, insecticide application pattern and introduction of high yielding varieties. It is necessary to have basic information on the incidence of the pests in relation to weather parameters which in turn helps is determining time of action and suitable management method to be adopted. Meteorological factors tend to modify the activities of insects. Farmers always desire quick curative action for controlling pests.

Materials and Methods

The present study was conducted at Agricultural Research Farm of B.R.D.P.G. College Deoria, Department of Entomology during *Kharif* season of 2022. The vegetable okra variety Ankur-40 was showed in 20×10 m^2. Plant spacing is 60×30 cm, 60 cm distance row to row and 30 cm plants to plants in plots size. Recommended crop management practices were adopted to raise good crop stand, except that no insecticide was sprayed. The population of whitefly and leafhopper were recorded early in the morning at weekly interval on per three leaves *i.e*. upper, middle and bottom leaves from randomly selected five plants. In observation techniques of Mealy bug both nymph and adult suck the sap from leaves, flower buds, petioles, twigs, fruits and even from the stem of the plants. The bugs were abundant on apical portion of the plant so that their population per plant was counted. Total population of mealy bug nymph and adults recorded on randomly selected 5 plants from the plot. In experiment to assess the effect of different abiotic parameters on phloem sucking pest infesting okra and weekly recorded the meteorological observation to determine correlation coefficient.

Results and Discussion

Seasonal incidence of whitefly, *Bemisia tabaci*

The population of whitefly on okra crop in relation to abiotic parameters has been presented in Table-1 and Figure-1. The population of whiteflies commenced the 31st standard meteorological week with 3.04 whiteflies/3 leaves. Their population was observed throughout the crop period after the incidence. The population of whiteflies was noticed in an increasing trend in subsequent weeks and reached its peak during the 37th SMW (10.56 whiteflies/3 leaves) followed by a gradually decline in subsequent weeks. Peak population of whiteflies coincided with a maximum temperature of 28°C, a minimum temperature of 26°C, maximum relative humidity of 92%, minimum relative humidity of 81%, rainfall 120mm and wind speed 9km/h.

These observations are in accordance with the earlier findings of Singh *et al*. (2013) the whitefly population gradually increased and reached the peak level of 12.4 whitefly/leaf during fourth week of September (39th standard meteorological week). An average maximum and minimum temperature (29.7°, 26.4°and 28.0°C), relative humidity (80.00 and 77.00%) and rainfall (144.36 mm) were observed during this peak period.

Correlation analysis (table-2) revealed that the population of whitefly showed a negative correlation with maximum and minimum temperatures, with correlation values of -0.418 and -0.138, respectively. A positive correlation was recorded with maximum and minimum relative humidity and rainfall, showing correlation values of 0.833, 0.863 and 0.450 respectively. These result are confirmed by Singh *et al*. (2013), who found that whitefly showed negative correlation with maximum (r = -0.6679), minimum (r = -0.3590), temperature and maximum (r = -0.1807), and minimum (r = -0.1856), relative humidity whereas, it showed positive correlation with rainfall (r = 0.2252).

Seasonal incidence of leaf hopper, *Amrasca biguttula biguttula*

The population of leafhoppers commenced the 31st standard meteorological week with 1.26 leafhopper/3 leaves. Their population was observed throughout the crop period after the incidence. The population of leafhoppers was noticed in an increasing trend in subsequent weeks and reached its peak during the 37th SMW (12.02 leafhopper/3 leaves) followed by a gradually decline in subsequent weeks (table-1; fig-1). Peak population of leafhopper coincided with a maximum temperature of 28°C, a minimum temperature of 26°C, maximum relative humidity of 92%, minimum relative humidity of 81% and rainfall of 120mm.

These result conformed with present finding Mishra *et al.*, 2025; Ghuge *et al.* 2020 observed that Leaf hopper/jassid population incidence initiated in the fourth week of July (29th SMW) with 3.6 jassid per 3 leaves and the population increased gradually and touched its peak (22.2 jassid/leaf) during 37th SMW.

Our results are more or less in agreement with Singh *et al*. (2013) Then the pest population went to peak during the fourth week of September (39th standard meteorological week) with 18.43 leafhopper/plant. Correlation analysis data recorded in table-2 revealed that the population of leafhoppers showed a negative correlation with maximum and minimum temperature, showing a correlation value of -0.509 and -0.135 respectively; while a significant positive correlation was recorded with maximum relative humidity, minimum relative humidity and rainfall showing correlation values of 0.792, 0.880 and 0.492. These result are confirmed by Singh *et al*. (2013) leafhopper showed negative correlation with maximum (r = -0.6023) and minimum (r = -0.3988), temperature, and maximum (r = -0.2184), and minimum (r = -0.2340) relative humidity whereas positive correlation with rainfall (r = 0.2359).

Seasonal incidence of mealy bug, *Phenacoccus solenopsis*

The population of mealy bug started from the 31st standard meteorological week with 1.66 mealy bug/3 leaves. Their population was observed throughout the crop period after the incidence. The population of mealy bug was noticed in an increasing trend in subsequent weeks and reached its peak during the 37th SMW (5.04 mealy bug/3 leaves) followed by a gradually decline in subsequent weeks. Peak population of mealy bug was recorded when there was a maximum temperature of 28°C, a minimum temperature of 26°C, maximum relative humidity of 92%, minimum relative humidity of 81% and rainfall of 120mm (Table-1; Figure-1).

These observations are in partial agreement with the earlier findings of Zia and Haseeb (2019) who found that the infestation of cotton mealy bug was studied on okra at weekly interval from May to September 2017. The results showed that the population of mealy bug started building up from the month of May and reached its peak in 3rd (34 SMW) and 4th (35 SMW) week of August. Correlation analysis revealed that population of mealy bugs showed a negative correlation with maximum and minimum temperatures, with correlation values of -0.551 and -0.180, respectively (Table-2).

Mealy bug population showed positive significant correlation with maximum and minimum relative humidity and rainfall, showing correlation values of 0.692 and 0.833 and 0.512 respectively. These result corroborate with Zia and Haseeb (2019) revealed that mealybug population showed significant negative correlation (-0.581) with maximum temperature and significant positive correlation (0.691) with minimum temperature. Whereas relative humidity and rainfall showed significant positive and negative correlation with population of mealy bug (0.337 and -0.101).

Conclusion

The fluctuation of sucking insect-pest of okra viz., whitefly, leafhopper and mealy bug appeared from 31st SMW with a mean population of 3.04/3leaves, 1.26/3leaves and 1.66/plant and reached to its peak at 37th SMW with a mean population of 10.56/3leaves, 12.02/3leaves and 5.04/plant, respectively. After this populations gradually decline in subsequent weeks. All major sucking insect-pest showed the negative correlation with temperature, while positive correlations with relative humidity and rainfall.

Table 1 : Weekly mean population of phloem sucking insect during *Kharif* season, 2022

SMW	Whitefly	Leaf hopper	Mealy bug	Temperature°C		Relative humidity (%)		Rainfall (mm)
				Max.	Min.	Max.	Min.	
31	3.04	1.26	1.66	33.00	26.00	34.00	27.00	0.00
32	4.15	3.25	2.12	33.00	28.00	78.00	58.00	0.00
33	8.12	6.86	3.12	35.00	27.00	84.00	54.00	0.00
34	8.8	8.15	3.78	33.00	27.00	89.00	66.00	0.00
35	9.0	9.08	4.17	32.00	27.00	89.00	72.00	10.00
36	9.38	11.18	4.72	33.00	27.00	86.00	70.00	7.00
37	10.56	12.02	5.04	28.00	26.00	92.00	81.00	120.00
38	9.11	10.42	4.56	32.00	27.00	90.00	65.00	0.00
39	7.87	7.09	2.58	33.00	27.00	89.00	62.00	0.00

Table 2: Correlation among sucking insect-pest population with abiotic parameters during *Kharif* season, 2022.

Sucking Insects	Temperature°C		Relative humidity (%)		Rainfall (mm)
	Max.	Min.	Max.	Min.	
Whitely	-0.418	-0.138	0.833**	0.863**	0.450
Leaf hopper	-0.509*	-0.135	0.792**	0.880**	0.492
Mealy bug	-0.551*	-0.180	0.692**	0.833**	0.512*

*Marks significant at 5%, ** Marks significant 1%

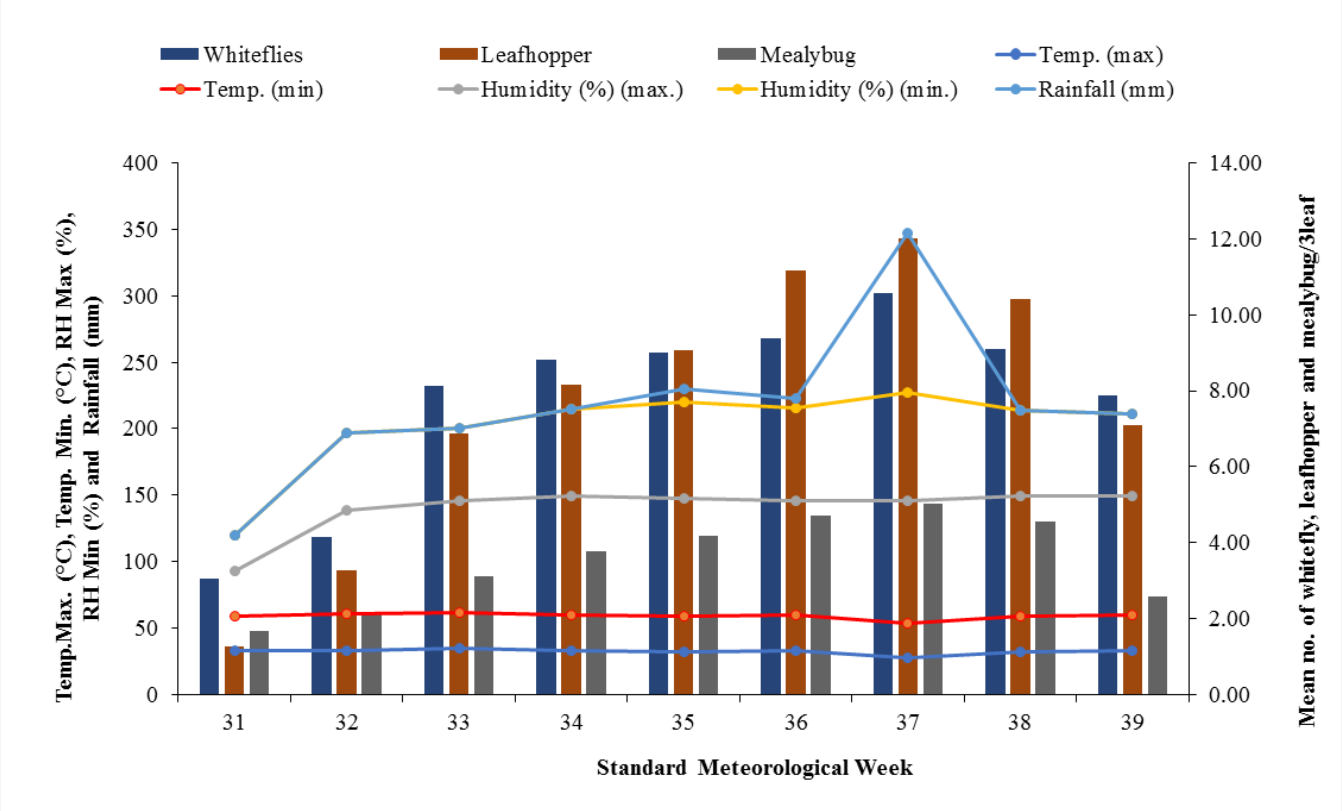

Fig. 1: Incidence of whitefly, leafhopper and mealy bug in relation to abiotic factors

Acknowledgements

I would like to express our sincere gratitude to Prof. Rajnish Kumar (Professor & Head) and Dr. Devendra Kumar Yadav (Associate Professor), Department of Ag. Entomology, for his unwavering support and assistance throughout the experiment.

References

Rao, N.S. and Rajendran, R. (2003). Joint action potential of neem with other plant extracts against the leafhopper, *Amrasca devastans* (Distant) on okra. *Pest Manage. Econ. Zool*, **10**(2), 131-136.

Chin, A.H.G. & Nushirwan, Z. (1990). Properties of vegetable oils from some unemployed sources in Malaysis. *MARDI*. **18**(2), 261-265.

FAO. (2022). Access date 23 August 2022 https://www.atlasbig .com/en-in/countries-by-okra-production .

Raj, R., Singh, A. P., Sharma, A. K., Kumar, A., Yadav, A. K. and Gupta, A. (2026). Efficacy of bio-pesticides and insecticides against sucking insect-pest of okra. Int. J. Adv. Biochem. IJABR; **10**(3), 784-787

Singh, U.K., Singh, D.V., Sachan, S.K., Bhatnagar, A. and Singh, R. (2014). Insect pest complex of okra and biology of shoot and fruit borer, *Earias vittella* (Fab). *Indian. J. Entomol.*, **76** (1), 29 – 31.

Mishra, S. K., Kumar, R., Tiwari, B., Sharma, A. K. and Kumar, P. (2025). Seasonal fluctuations of phloem-feeding insect pests in relation to microclimatic variables in brinjal. *J. Entomol. Res*., 49(3), 585-589.

Nath, V. and Sinha, S.R. (1992). IPM in okra through neonicotinoids insecticides and their mixtures. *Ann. Plant Sci.* **19** (1): 33 - 36.

Narke, C.G. and Suryawanshi, D.S. (1987)**.** Chemical control of major pests of okra. *Pesticides*, **21** (1):37-42.

Noureen, N., Hussain, M., Fatima S. and Ghazanfar, M. (2016). Cotton mealy bug management: A Review. *J. Entomol. Zool. Stud*. **4**(4): 657- 663.

Singh, Y., Jha, A., Verma, S., Mishra, V. K. and Singh, S. S. (2013). Population dynamics of sucking insect pests and its natural enemies on okra agro-ecosystem in Chitrakoot region. *Afri. J.Agric. Res.*, 8(28), 3814-3819.

Ghuge, D. K., Gosalwad, S. S. and Patil, S. K. (2020)**.** Effect of weather factors on the incidence of major insect pest on okra. *J. Entomol. Zool. Stud.* **8**(1): 1474-9.

Zia, A. and Haseeb, M. (2019). Seasonal incidence of cotton mealybug, *Phenacoccus solenopsis* (Tinsley) on okra, (L.) and comparative efficacy of insecticides on the mortality. *J. Entomol. Zool. Stud.***7** (4), 421-425.