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SHORT COMMUNICATION

Impact of weather parameters on incidence of major sucking pests of okra

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Okra or Lady's finger (*Abelmoschus esculentus* (L.) Monech) commonly known as "Bhindi" belongs to the family Malvaceae. It is native of tropical Africa. The crop can be grown throughout the year, commonly cultivated in *Kharif* and *Summer* seasons and resembles cotton in its habit. It is very popular due to its high nutritional and medicinal values. It is being cultivated all over India with major share in the states of Uttar Pradesh, Madhya Pradesh, Karnataka, Gujarat and Maharashtra. The major okra growing districts in Rajasthan are Alwar, Bundi, Kota, Chittorgarh, Jaipur, Sriganganagar and Dausa.

The production of okra in Rajasthan is static and poor per unit area. One of the main factors responsible for the low yield is due to insect pests, mainly sucking pests. Okra is also known as a house of pests and disease which require special attention to combat them at proper time and in proper manner. About 72 species of insects have been recorded on okra (Srinivas Rao and Rajendran, 2003), of which, the sucking pests comprising of leafhopper (*Amrasca biguttula biguttula* Ishida), whitefly (*Bemisia tabaci* Gennadius), thrips (*Thrips tabaci* Lindeman) and mite (*Tetranychus cinnabarinus* Boisduval) causes significant damage to the crop.

The development and population buildup of a pest is greatly affected by weather parameters like temperature, relative humidity and rainfall. Therefore the present investigation was undertaken to find out correlation between abiotic factors and sucking pests.

To study the seasonal incidence of major sucking pests the okra variety Parbhani Kranti was sown on 30th July 2012 in a plot of 10 x 10 m. keeping row to row and plant to plant distance of 30 cm and 10 cm, respectively. All the agronomic were followed as per recommendation of package of practices of zone IC.

The observations of major sucking pests *viz.*, jassid, *Amrasca biguttula biguttula* Ishida, whitefly, *Bemisia tabaci* Gennadius and thrips, *Thrips tabaci* Lindeman were recorded at weekly interval during morning hours.. The population of these pests was counted at fully opened leaves from five randomly selected plants. In all, three leaves (One from top, middle and lower canopy) from each plant were taken for recording the pest population.

Meteorological data regarding atmospheric temperature (maximum and minimum), relative humidity and total rainfall were obtained from meteorological observatory, Agriculture Research Station, Bikaner from July to November. Correlation coefficients (r-value) for jassid, whitefly and thrips and abiotic factors responsible for seasonal variations were worked out. The meteorological data are presented in Table-1.

Incidence of sucking pests

Jassid

The data presented in table 1 revealed that, the population of jassid appeared on crop in the 33rd standard week (1.68 jassid/3 leaves) and remained up to 46th standard week (0.60 jassid/3 leaves). The maximum incidence of jassid (32.96 jassid/3 leaves and 25.88 jassid/3 leaves) was observed in 38th and 37th standard week. Jassid population started from 33rd standard and increased up to the 38th standard week (third week of September) and declined gradually till the crop was matured in November. The population of jassid ranged from 0.60 to 32.96 jassid per three leaves. The results are in agreement to those of Meena *et al.* (2010) and Kumawat and Jat (2011) who reported peak of jassid on okra in the second and third week of September and then decline gradually.

Whitefly

Perusal of the data indicated that whitefly was active throughout the crop season. Whitefly incidence started in 33rd standard week and remained upto 46th standard week, population varied from 1.0 to 18.16 whitefly per three leaves. At vegetative growth stage the population was very low but it increased gradually and

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reached to its peak in the 41st standard weeks (18.16 whitefly/3 leaves) and then declined. The present results are in conformity with that of Kumawat and Jat (2011) who reported incidence of whitefly on okra crop in the month of August and peak activity was noticed in the month of October.

Thrips

The data presented in Table 1 and depicted in Fig.1 reveals that incidence of thrips was observed in the 33rd standard week (1.40 thrips/3 leaves). The population increased gradually with slight up and down and reached to its peak (12.12 thrips/3 leaves) in the 38th standard week thereafter, it was decreased gradually. The population of thrips on okra crop ranged from 1.40 to 12.12 thrips per three leaves throughout the crop period. Earlier Patel (1992) and Varandharajan and Veeravel (1995) observed the incidence of thrips in August and peak in the month of September support the present findings.

Correlation of sucking pests with weather parameters

Jassid

The incidence of jassid started when maximum and minimum temperature was 33.2 °C and 24.92 °C and relative humidity was 74.36 per cent and rainfall 43 mm. The jassid population increased gradually and reached to its peak (32.96 jassid/3 leaves) at 34.9 °C maximum and 23.31 °C minimum

Table 1. Seasonal incidence of major sucking pests of okra in relation toweather parameters.

Standard Meteorological Weeks	Duration		Temperature (0C)		Relative Humidity (%)	Total Rainfall (mm)	Sucking pests population /3 leaves		
	From	To	Max.	Min.			Jassid	Whitefly	Thrips
33	13.8.2012	19.8.2012	33.2	24.92	74.36	43	1.68	1.00	1.40
34	20.8.2012	26.8.2012	35.7	25.97	62.43	7	6.56	5.50	5.33
35	27.8.2012	2.9.2012	35.3	26.02	69.29	17	7.30	3.20	6.52
36	3.9.2012	9.9.2012	33.3	25.12	78.00	69	19.68	4.30	8.43
37	10.9.2012	16.9.2012	34.5	25.84	69.93	0	25.88	7.10	10.20
38	17.9.2012	23.9.2012	34.9	23.31	50.35	0	32.96	10.75	12.12
39	24.9.2012	30.9.2012	35.8	21.54	49.78	0	17.24	8.33	9.00
40	1.10.2012	7.10.2012	37.6	19.18	32.93	0	10.60	15.14	6.33
41	8.10.2012	14.10.2012	36.6	17.92	32.00	0	5.46	18.16	3.42
42	15.10.2012	21.10.2012	33.3	16.34	49.14	0	3.60	4.25	2.20
43	22.10.2012	28.10.2012	31.9	14.33	40.86	0	2.68	2.12	3.12
44	29.10.2012	4.11.2012	32.9	13.11	40.50	0	2.00	1.16	2.60
45	5.11.2012	11.11.2012	32.3	12.03	34.43	0	1.11	2.33	2.00
46	12.11.2012	18.11.2012	30.9	9.8	36.97	0	0.60	1.66	1.62

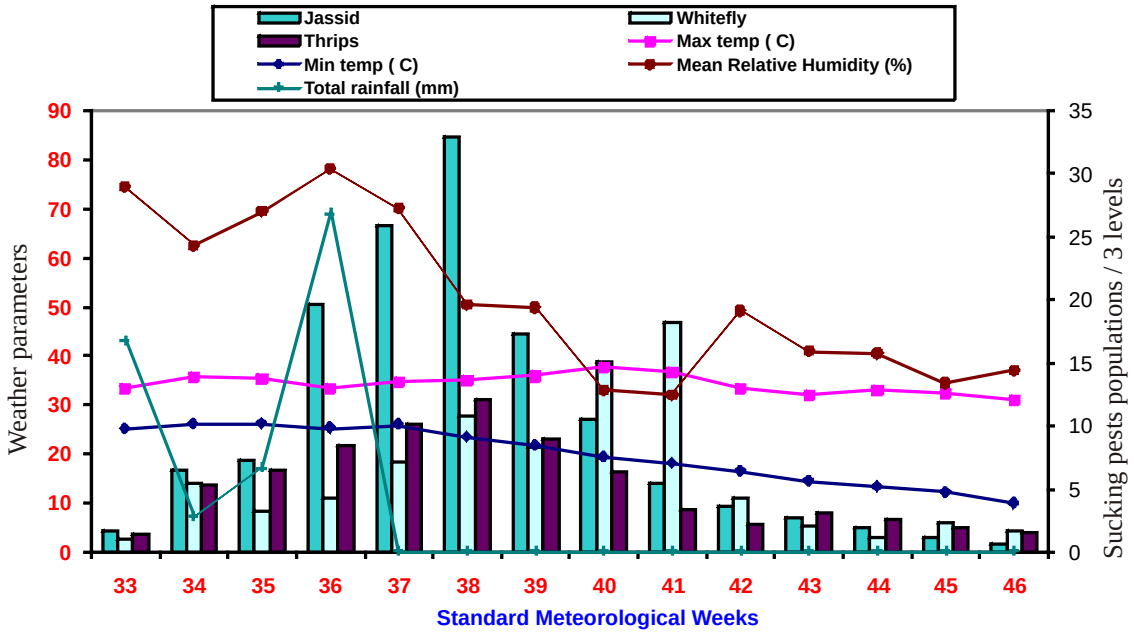

Fig 1. Meterological data and incidence of sucking pests.

temperature. The data presented in Table 2 revealed that the maximum and minimum temperature shows positive significant correlation (r = 0.38 and r = 0.58, respectively) with the jassid population, whereas, positive significant correlation (r = 0.36) was found between relative humidity however, rainfall shows positive non significant correlation (r = 0.10) with jassid population (Table 2). The present results are in conformity with Bhute *et al* (2012) who found a significant positive correlation with maximum temperature and jassid population. Patni and Pareek (2000) who reported significant positive correlation with the minimum temperature also support the present finding.

Whitefly

The data indicated in Table 2 shows that maximum (r =0.31) and minimum temperature (r =0.19) had significant positive correlation with whitefly. The present results are in conformity with those of Acharya and Singh (2007), Anitha and Nandihalli (2008) and Bhute *et al* (2012) who found a significant positive correlation with maximum temperature and whitefly population. These results corroborate with the findings of Patni and Pareek (2000) and Kumawat and Jat (2011) who reported significant positive correlation with the minimum temperature and whitefly population. The results obtained during the course of investigation indicated that the relative humidity (r = -0.34) and rainfall (r = -0.27) exhibited a significant negative correlation with whitefly population. The present results are in agreement with Anitha and Nandihalli (2008) and Bhute *et al* (2012) who reported significant negative correlation.

Thrips

The data indicated in Table 2 revealed that three weather parameters namely maximum (r =0.49), minimum temperature (r =0.64) and relative humidity (r =0.37) had significant positive correlation with thrips population. The present results are in conformity with Khan *et al* (2008) and Selvaraj and Adiroubane (2012) who found a significant positive correlation with temperature and thrips population. The average rainfall (r =0.07) exhibited non significant positive correlation with thrips population. The present results are in agreement with Chhatrola *et al*. (2003), and Khan *et al* (2008) who reported significant positive correlation, with mean relative humidity and rainfall with thrips population.

Table 2. Correlation co-efficient (r-value) between population of major sucking pest of okra and weather parameters.

S.No.	Weather Parameters	Jassid	Whitefly	Thrips
1.	Maximum Temperature (^{0}C)	0.38**	0.31**	0.49**
2.	Minimum Temperature (^{0}C)	0.58**	0.19*	0.64**
3.	Relative Humidity (%)	0.36**	-0.34**	0.37**
4.	Rainfall (mm)	0.10 NS	-0.27**	0.07 NS

*Significant at 5% level
**Significant at 1% level
NS = Non-significant

References

Acharya, V.S. and Singh, A.P. 2007. Effect of dates of sowing on incidence of whitefly on cotton, *J. Cotton Res. Dev.,* 21(2): 242-247.

Anitha, K.R. and Nandihalli, B.S. 2008. Seasonal incidence of sucking pests in okra ecosystem. *Karnataka Journal of Agricultural Sciences*.,21(1): 137-138.

Bhute, N. K., Bhosle, B. B., Bhede, B. V., More, D. G. 2012. Seasonal incidence of major sucking insect pests of Bt cotton and their natural enemies in Marathwada region. *Journal of Cotton Research and Development*.,26: 2, 238-242.

Chhatrola, D.P., Vyas, H.J. and Baraiya, K.P. 2003. Influence of abiotic factors on population build up of thrips, *Thrips tabaci* Lindeman in garlic. *Indian Journal of Plant Protection.*, 31 (2):98-100.

Khan, M. A., Abdul Khaliq, Subhani, M. N., Saleem, M. W. 2008. Incidence and development of *Thrips tabaci* and *Tetranychus urticae* on field grown cotton. *International Journal of Agriculture and Biology*.,10: 2, 232-234.

Kumawat, S.C. and Jat, B.L. 2011. Management of pest complex of okra (*Abelmoschns esculentus* L. Moench) with special reference to bio-rational approaches. M.Sc. (*Agri*.) thesis, submitted to Swami Keshwanand Rajasthan Agricultural University, Campus- Jobner.

Meena, N. K., Kanwat, P. M., Meena, A. and Sharma, J. K. 2010. Seasonal incidence of jassids and whiteflies on okra, *Abelmoschus esculentus* (L.) Moench in semi-arid region of Rajasthan. *Annals of Agri Bio Research*.,15: 1, 25-29.

Patel, V.N. 1992. Studies on insect pest of chillies, their association with leaf curl disease and evaluation of pest management tactis, Ph.D. (Agri.) thesis submitted to Rajasthan Agriculture University, Udaipur.

Patni, S.K. and Pareek, B. L. 2000. Effect of date of sowing and eco-friendly insecticides on the incidence and management of major insect pests of okra*(Abelmoschus esculentu* Moench) M.Sc. Thesis submitted to Swami Keshwanand Rajasthan Agricultural University, Campus Jobner.

Selvaraj, S. and Adiroubane, D. 2012. Influence of weather parameters on the incidence of thrips, *Thrips tabaci* Lindemann in cotton. *Journal of Cotton Research and Development.*,26: 2, 234-237.

Varadharajan, S. and Veeravel, R. 1995. Popualtion dynamics of chilli thrips *Scirtothrips dorsalis* Hood in Annamalianagar. *Indian J. Ecology.*,22:(5) 27-30.