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SEASONAL INCIDENCE OF INSECT PESTS OF OKRA

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ABSTRACT

The field experiments were conducted on Agriculture Farm, Bhagwant University, Ajmer during kharif season 2018 and 2019 to study the seasonal incidence of insect pests of okra viz., defoliators, sap feeders and other arthropods associated with okra. The results on seasonal incidence of insect pests of okra revealed that the activity of leafhopper, aphid, whitefly and *Helicoverpa armigera* and *Earias vittella* more infestation in kharif season.

Keywords: Insect Pest, Okra, Seasonal incidence

Introduction

Okra (*Abelmoschus esculentus* L. Moench) is an important vegetable crop in our food vitamins, carbohydrates and minerals needed for a balanced diet. In India, Okra is grown during rabi and kharif seasons and have first ranks in the world with 6,950 MT of the total production of the bhendi (Anon, 2017-18). In Rajasthan the crop occupies 3619 ha with the production of 18152 MT in the state (Anon, 2018-19).

It is infested by 72 insect pests (Srinivasa and Rajenran, 2003). Especially in between the major pest during rabi season in Rajasthan. The explication of damage caused by pests varies from 45 to 57.10% (Srinivasan and Kumar, 1983 and Nderity *et al.*, 2008). The okra crop is damaged by many insect pests right from sowing to harvest (Sharma *et al.*, 1997; Jagtab *et al.*, 2007). Fruit borers, *E. Vittella* Fabricius, *E. Insulana* Boisduval and *H. Armigera* (Hübner) in the later stage cause extensive damage to fruits and result in 69 per cent yield loss (Atwal and Singh, 1990). The fluctuation of the pest population depending upon the host availability and weather parameters. Management of pests on okra is becoming very difficult due to changes in climate etc.

Material and Methods

The research work was carried out at field of Department of Entomology, Faculty of Agriculture Sciences, Bhagwant University, Ajmer during kharif season 2018 and 2019. The climate of this region is typically semi-arid, characterized by extremes of temperature both during the summer and winter with low rainfall and moderate humidity. Maximum temperature in summer reaches as high as 47°C and minimum temperature in winter falls down below 0°C.

The average annual rainfall of locality varies from 400-500 mm occurring mostly from the last week of June to September.

The Okra variety Ankur was sown during July month of second week. The crop was raised with a spacing of 60X45 cm with drip irrigation conditions and all the agronomic practices as per the recommendation except plant protection measures (Anon, 2014). After the germination of the crop, observations were recorded at weekly intervals to determine the seasonal incidence of important insect pest of okra crop till the harvest of crop during Kharif of 2018 and 2019. The incidence of sucking insect pests, viz., leafhopper, aphid, whitefly, mites and dusky cotton bug were recorded on top three leaves at weekly interval on randomly selected fifty plants. The per cent damage of *Helicoverpa armigera* and *Earias vittella* were estimated by counting both damaged and total number of fruits. The observations were recorded at weekly intervals starting from 30 days after sowing up to maturity of the crop.

Results and Discussion

Studies on the seasonal incidence of insect pests of okra was carried out during Kharif 2018 and 2019 results of the observations recorded at weekly intervals on insect pests of okra are presented below.

Aphid, *A. gossypii* (Glover)

During kharif 2018, the activity of the aphid was noticed throughout the cropping season and varied between zero to 29.20 per top three leaves with mean population of 18.28 per top three leaves. The zero incidence was recorded in first and second week of August. However, the incidence started from third week of August (8.36/top three leaves) and

there was a gradual increase from August fourth week to October second week with a maximum population of 29.20 aphids per top three leaves. Later, population gradually decreased from third week of October (26.10/top three leaves) and there was no incidence from last week of October (Table 1). During next crop season 2019, the incidence started from same as previous year and maximum population of 28.2 /top three leaves (Table 2) in moth of fourth week of September. The present findings are proved by Slosser *et al.* (1998) who reported that population of *A. gossypii* increased during August and October.

Leafhopper, *A. biguttulabiguttula* (Ishida)

Adults were found during kharif 2018, the activity of the leafhoppers was noticed throughout the cropping season and varied between zero to 20.20 per top three leaves with mean population of 10.49 per top three leaves. There was no incidence recorded during first week of August. However, the incidence started from second week of August (13.43/top three leaves) and was a gradual increase from August fourth week to September fourth week (39th SMW) with a maximum population of 20.20 leafhoppers per top three leaves. Further, the population of leafhoppers gradually decreased from second week of October (10.90/3 leaves) and population declined from last week of October (Table 1). The activity of the pest might be related to the crop growth stage irrespective of the sowing time. During kharif season 2019 the population of leaf hopper varied from zero to 22.52 per top three leaves, which mean population of 10.94 per top three leaves. The maximum population of 22.52 leafhoppers per top three leaves found in last week of September month. The activity of the pest might be related to the crop growth stage irrespective of the sowing time. Present findings are in line with the findings of Srinivasa (1993) who reported that kharif, September and October months are very much congenial for leafhopper population buildup. Similarly, Damasia *et al.* (2013) also reported peak population of leafhoppers in fourth week of September (19.43/top three leaves).

Whitefly, *Bemisia tabaci*.

Both nymphs and adults of whitefly, *B. tabaci* were found feeding on ventral surface of leaves. During kharif 2018, the activity of the whiteflies was noticed throughout the cropping season and varied between zero to 13.50 per top three leaves with mean population of 6.20 per top three leaves. There was no incidence recorded in first, second and third week of August. Later, the incidence started from fourth week of August (1.25/top three leaves) and there was a gradual increase from September first week to October first week with a maximum population of 13.50 whiteflies per top three leaves (Table 1). During kharif 2019, the population of whiteflies varied from zero to 14.35 per top three leaves, with mean population of 6.82 per top three leaves. The zero incidence was recorded in 32, 33 and 34 MSW of September. Later, the incidence started from fourth week of August (2.25/top three leaves) and there was a gradual increase from September first week to October first week with a maximum

population of 14.35 whiteflies per top three leaves (Table 2). These results are in line with Singh *et al.* (2013) who reported peak population of whitefly during 39th standard week. Similarly, Damasia *et al.* (2013) also reported peak population of whitefly during third and fourth week of September.

Fruit borer, *Helicoverpa armigera* (Hubner)

The larvae of *H. Armigera* were found feeding on the leaves. During kharif 2018, the activity of the *H. Armigera* larvae was noticed throughout the cropping season and varied between zero to 3.45 larvae per plant with mean population of 1.42 larvae per plant. There was no incidence in August month. However, the incidence started from first week of September (1.57 larvae/ plant) and there was a gradual increase from September second week to October first week with a maximum population of 3.45 larvae per plant. Later, population gradually decreased from second week of October (2.25 larvae/ plant) and there was no incidence from fourth week after October (Table 1). The incidence started from first week of September (2.57 larvae/ plant) and there was a gradual increase from September second week to October first week with a maximum population of 4.45 larvae per plant (Table 2). The present studies are supported by the observations recorded by Nath *et al.* (2011) and Kumaranag (2015). During kharif 2019,

Shoot and fruit borer, *Earias spp.* Fabricius

The larvae of *Earias spp.* were found feeding on the shoots and fruits. During kharif 2018, the activity of the *Earias spp.* was noticed throughout the cropping season and mean population of 1.36 larvae per plant. There was no incidence in August month. However, the incidence started from first week of September (0.62 larvae/ plant) and there was a gradual increase from September second week to October second week with a maximum population of 3.73 larvae per plant. Later, population gradually decreased from third week of October (2.36 larvae/ plant) and there was no incidence from last week of October onwards (Table 1). The larvae of *Earias spp.* were found during kharif 2019, throughout the cropping season and mean population of 1.82 larvae per plant. However, the incidence started from first week of September (1.62 larvae/ plant) and there was a gradual increase from September second week to October second week with a maximum population of 4.21 larvae per plant. Later, population gradually decreased from third week of October (1.36 larvae/ plant) and there was no incidence from last week of October onwards (Table 2). The observations are in accordance with findings of Yadav *et al.* (2009) who noticed the larval infestation on okra crop from the third week of August with its peak densities between the first and third week of September with slightly higher densities (24.70 to 20.50 larvae/ 5 plant). However, Bajad and Patil (2014) observed the initial infestation of okra shoot and fruit borer from 34th SMW and peak at 38th SMW.

Table 1: Seasonal incidence of insect pests of okra during Kharif, 2018

SMW	No. of aphids/ top 3 leaves	No. of leafhopper/ top 3 leaves	No. of whitefly/ top 3 leaves	No. of <i>Helicoverpa</i> larvae/ plant	No. of <i>Earias vittella</i> larvae/ plant
32	0	0	0	0	0
33	0	13.43	0	0	0
34	8.36	5.10	0	0	0
35	15.20	6.74	1.25	0	0
36	14.50	8.89	2.41	1.57	0.62
37	26.10	10.20	8.84	0.90	0.81
38	28.10	10.90	13.50	2.40	1.67
39	28.20	20.20	9.83	2.30	3.21
40	25.30	17.70	11.60	3.45	2.58
41	29.20	11.30	11.90	2.77	3.73
42	26.10	10.90	8.88	2.25	2.36
Mean	18.28	10.49	6.20	1.42	1.36
Max	29.2	20.2	13.5	3.45	3.73
Min	0.00	0.00	0.00	0.00	0.00
SD±	11.30	5.58	5.44	1.29	1.41

Table 2: Seasonal incidence of insect pests of okra during Kharif, 2019

SMW	No. of aphids/ top 3 leaves	No. of leafhopper/ top 3 leaves	No. of whitefly/ top 3 leaves	No. of <i>Helicoverpa</i> larvae/ plant	No. of <i>Earias vittella</i> larvae/ plant
32	0	0	0	0	0
33	0	10.43	0	0	0
34	7.36	5.21	0	0	0
35	14.2	7.74	2.25	0	0
36	15.5	9.89	3.41	2.57	1.62
37	24.1	11.12	7.84	1.9	2.81
38	26.1	11.55	14.35	3.4	3.67
39	28.2	22.52	10.83	3.3	4.21
40	25.3	18.7	12.56	4.45	3.58
41	27.2	13.3	13.9	1.77	2.73
42	25.1	9.9	9.88	2.25	1.36
Mean	17.55	10.94	6.82	1.79	1.82
Max	28.2	22.52	14.35	4.45	4.21
Min	0.00	0.00	0.00	0.00	0.00
SD±	10.84	6.05	5.82	1.60	1.66

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