Indian Journal of Entomology 84(2): 353-355 (2022) DoI No.: 10.55446/IJE.2021.110

POPULATION DYNAMICS OF MAJOR SUCKING PESTS OF OKRA

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ABSTRACT

The present study was carried out during kharif 2019 at the experimental site of College of Agriculture, Indore, Madhya Pradesh. The incidence of *Amrasca biguttula biguttula* was observed from 30th Standard Meterological Week (SMW) to 41th SMW, while *Aphis gossypii* was from 31st to 40th SMW, and *Bemisia tabaci* from 32nd to 40th SMW. The peak incidence of *A. biguttula biguttula* was observed @25.5 jassid/ 6 leaves in 35th SMW followed by *A. gossypii* @30.15 aphids/ 6 leaves in the 36th SMW, and *B. tabaci* @20.5 whitefly/ 6 leaves in 37th SMW. Correlation coefficients of incidence with t,he weather factors revealed that *A. biguttula biguttula* and *B.emisia tabaci* exhibit a significant positive correlation with morning relative humidity (r = 0.58 and 0.57, respectively), while *A gossypii* showed a non-significant relationship with weather parameters.

Key words: *Abelmoschus esculentus, Amrasca biguttula biguttula, Aphis gossypii, Bemisia tabaci*, incidence, weather factors, standard meterological week, seasonal incidence

Okra [*Abelmoschus esculentus* (L.) Moench] is an important vegetable. Its roots and stems are helpful for clearing sugarcane juice (Chauhan, 1972). In India, its productivity is around 11.6 mt/ ha, while in Madhya Pradesh it is 13.38 mt/ ha (Anonymous, 2017). Insect pests are the reasons for its reduced productivity, and 72 species of insects have been recorded on the crop (Pal et al., 2013). *Amrasca biguttula biguttula* (Hemiptera: Cicadellidae) causes 54-66% yield loss while *Bemisia tabaci* (Hemiptera: Aleyrodidae) leads to 54% decrease in yield (Rai et al., 2014). Sucking pests such as *A. biguttula biguttula, Aphis gossypii* (Hemiptera: Aphididae) and *B. tabaci* cause damage by sucking the cell sap. During feeding they inject venomous saliva into plant tissues with attacked leaves turning yellow, twist downwards, desiccated and fall down. The affected plants show an undersized growth. This study evaluates the population dynamics of these major sucking pests of okra.

MATERIALS AND METHODS

The field experiment was carried out during kharif season 2019 at the Sorghum Research Centre of RVSKVV, College of Agriculture Indore, Madhya Pradesh (22°43'N, 75°56'E, 555.7 masl) in the 'Malwa Plateau' which is in IX agro-climatic zone of Madhya Pradesh. The experiment was laid out in randomized block design with eight treatments replicated thrice which sums up to a total of 24 plots. The seeds of variety i.e. Nidhi 98 were sown manually at 5 cm depth on 16th July 2019 at a row distance of 45 cm and plant to plant of 30 cm. The mean weekly meteorological data (maximum and minimum temperature, morning and evening relative humidity, rainfall and wind speed) were sourced from the All India Coordinated Research Project for Dry land Agriculture, College of Agriculture, Indore, Madhya Pradesh. Observations on the incidence of nymphs and adults of *A. biguttula biguttula, A. gossypii* and *B. tabaci* were made from two leaves each from the top, the middle, and the bottom portion of plant from five randomly selected plants in untreated plot twice in a standard meteorological week (SMW) starting from germination and continued as long as incidence was there (Akhila et al., 2019). All the data were subjected to statistical analysis and correlation and regression of the weather factors with incidence worked out using Microsoft Excel.

RESULTS AND DISCUSSION

Amrasca biguttula biguttula was first observed on 28th July 2019 second week after sowing (2.09 jassids) during the 30th standard meteorological week (SMW) i.e. 23rd to 29th July; and it continued up to October till harvesting (Fig. 1). These observations corroborate with those of Khating et al. (2016) who reported it from 29th to 40th SMW. The peak incidence (25.5 jassid) was during 35th SMW (i.e. 27th August to 2nd September), and after 36th SMW it declined. These results confirm

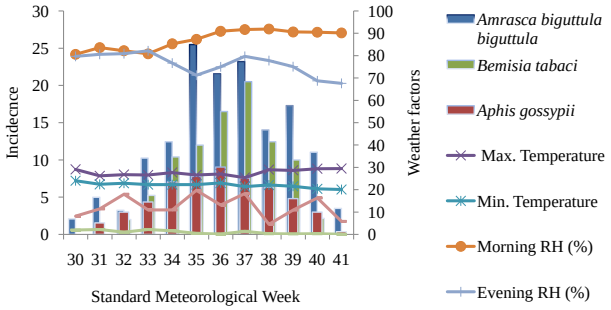

Fig. 1. Seasonal incidence of major sucking pests in okra (kharif 2019)

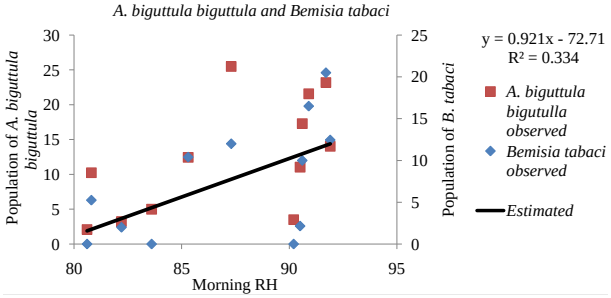

Fig. 2. Population dynamics of major sucking pests in okra (kharif 2019)

those of Anitha (2008) and Dabhi and Koshyia (2014). The correlation with weather factors given in Fig. 2 reveal that morning relative humidity (RH) showed a significant and positive correlation (r = 0.58) with *A. biguttula biguttula* incidence; and rainfall showed positive effect non-significant correlation. Further other factors such as maximum temperature, minimum temperature, evening RH and wind velocity exhibited negative correlation and found statistically but non-significant. These results agree with those of Bishnoi et al. (1996) on RH, and Prasad and Logiswaran (1997) on the positive association with RH in brinjal. These are in contrast with those of Kumawat et al. (2000) who reported a negative and non-significant correlation with RH. Khating et al. (2016) observed a negative but non-significant correlation with maximum temperature.

As regards *A. gossypii*, first appearance was on 2nd August 2019, at 3rd week after sowing during the 31st SMW (5.15 aphids), and continued up to October (Fig 1), with peak (30.15 aphids) being during 36th SMW. Ahir et al. (2017) observed that *A. gossypii* appeared during 32nd SMW, and Khating et al. (2016) observed that it continued till 40th SMW. Aarwe et al. (2016) from Jabalpur, Madhya Pradesh revealed that it was observed from August to October with two distinct peaks- on 36th and 37th SMW; and Khating et al. (2016) observed peak activity in 36th SMW. Ahir et al. (2017) confirmed that aphid appeared during 32nd SMW with peak in the 38th SMW. In contrast, Bhatt and Karnatak (2018) observed its occurrence from 35th SMW and up to 43rd SMW, with peak being at 39th SMW. Singh et al. (2013) observed its peak during the second week of October. The correlation coefficients with minimum temperature, morning and evening RH and rainfall showed positive relationships but statistically non-significant. These findings are in conformity with those of Khating et al. (2016), Ahir et al. (2017), and Aarwe et al. (2016).

About *B.tabaci*, first appearance was during the 32nd SMW (2.00 whiteflies) with peak (20.5 whitefly) during 37th SW, then declined sharply up to 40th SMW to disappear (Fig. 1). These observations corroborate with those of Kumar et al. (2018). Khating et al. (2016) observed its peak during the second week of September. In contrast, Patel et al. (2018) observed a peak at 41th SMW and Singh and Thakur (2018) during 42nd - 43rd SMW. The correlation coefficients with weather factors revealed statistically non-significant results except morning RH, which showed a significant and positive correlation (r = 0.57) (Fig. 2). These agree with those of Singh and Thakur (2018).

ACKNOWLEDGEMENTS

Authors thank the Professor and Head, Department of Entomology, COA, Indore for their guidance, and acknowledge the Dean of College of Agriculture, Indore for providing facilities.

Financial Support: The financial support and assistance received has been acknowledged.

Author Contribution Statement: S S conceived and designed research and also conducted experiments; S S and S S contributed to analytical tools and analyzed data. N and N Y wrote the manuscript. All authors read and approved the manuscript.

Conflicts of Interest / Competing Interests: There are no conflicts of interest among the parties involved and among authors.

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(Manuscript Received: May, 2021; Revised: September's, 2021;
Accepted: September, 2021; Online Published: November, 2021)
Online published (Preview) in www.entosocindia.org Ref. No. e21103