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SEASONAL INCIDENCE OF MAJOR INSECT PESTS OF SESAME

Neeraj Kumar*, M L Sharma and Naveen

Department of Entomology, College of Agriculture,
Rajmata Vijayaraje Scindia Krishi Vishwa Vidyalaya, Gwalior 474002, Madhya Pradesh, India
*Email: neeraj333yadav@gmail.com (corresponding author)

ABSTRACT

This study explores the seasonal incidence of major insect pests of sesame at the Entomology Research Farm of the College of Agriculture, RVSKVV, Gwalior, Madhya Pradesh during kharif, 2019. The results revealed that- among the sucking pests, the incidence of leafhopper *Orosius albicinctus* exhibited a positive and significant correlation with evening relative humidity (RH) and rainfall; and with evaporation it was significantly negative. The whitefly *Bemisia tabaci* did not show any significant correlation with weather factors. Of the other major pests, incidence of horned caterpillar *Acherontia styx* was observed to be significantly positively correlated with rainfall, evening RH and minimum temperature whereas it was a significant negative one with evaporation. With leafroller and capsule borer *Antigastra catalaunalis* it was a significant positive correlation with morning/ evening RH and rainfall, and a significant negative one with evaporation. Pod damage by *A. catalaunalis* was significantly negatively correlated with maximum and minimum temperature. The mirid *Nesidiocoris tenuis* showed a positive correlation with morning RH, and a significantly negative one with maximum temperature and evaporation. The incidence of gall fly *Asphondylia sesami* revealed a significant positive correlation with morning RH, while it was a significant negative one with evaporation and maximum temperature.

Key words: *Sesamum indicum*, sesamum, seasonal incidence, *Antigastra catalaunalis*, *Orosius albicinctus*, *Bemisia tabaci*, *Nesidiocoris tenuis*, *Acherontia styx*, *Asphondylia sesami*, weather factors, seasonal incidence

Sesame (*Sesamum indicum* L.) is an indigenous oilseed crop of India with Madhya Pradesh, Gujarat, Rajasthan and Uttar Pradesh being the major sesame growing states. In Madhya Pradesh, it has a yield of 293 kg/ ha (Anonymous, 2017), which is seriously affected by both biotic and abiotic factors. Of the biotic factors, the major constraint is the damage by insect pests (Egonyu et al., 2005; Ahirwar et al., 2010), causing 25 to 90% loss in seed yield (Ahuja and Kalyan, 2001). The crop is attacked by 29 insect pests in different stages of its growth (Biswas et al., 2001). Ahuja and Bakhetia (1995) documented 65 insect pests and one species of mite. Among various insect pests viz., leaf roller and capsule borer, *Antigastra catalaunalis* (Duponchel); Jassid, *Orosius albicinctus* (Distant); whitefly, *Bemisia tabaci* (Gennadius), mirid bug, *Nesidiocoris tenuis* (Reuter), til hawk moth, *Acherontia styx* (Westwood); Bihar hairy caterpillar, *Diacrisia obliqua* (Walker); sesame gall fly, *Asphondylia sesami* (Felt) are the key pests of regular occurrence (Sasikumar and Sardana, 1988; Nath et al., 2002; Ahirwar et al., 2009; Biswas and Das, 2011; Thangjam and Vastrad, 2015). Nymphs and adults of *O. albicinctus* and *B. tabaci* suck the plant sap in addition to transmitting phyllody and leaf curl diseases (Ahirwar et al., 2010); *A. catalaunalis* is the most serious pest causing yield losses of up to 90% (Ahuja and Bakhetia, 1995). The concept of IPM requires the basics of pest ecology, and area or region-specific strategies will need details of seasonal incidence. The present study explores the seasonal incidence of major insect pests of sesame in Madhya Pradesh.

MATERIALS AND METHODS

The study was conducted at the farm of the College of Agriculture, RVSKVV, Gwalior (26°14'N, 78°15'E, 211.52 masl) during kharif 2019. The healthy seeds of sesame variety TKG-506 were sown manually on 27th July 2019 with a spacing of 30 cm between rows and 10 cm between plants. The weather data were sourced from the Department of Agricultural Meteorology, College of Agriculture, Gwalior. The incidence of insect pests was recorded at weekly intervals on ten randomly selected tagged plants starting from germination till harvest. Counts of *B. tabaci* and *O. albicinctus* were made from the upper, middle and lower leaves, while that of *A. styx* moth larvae were just counted/ plant; for *A. sesami*, randomly selected 50 capsules/ plot were observed to count healthy and damaged ones; number of larvae on webbed leaves

was counted for the *A. catalaunalis* with 50 capsules/ plot used for assessing damaged capsules/ 10 plants. Observation on shoot tips infected by *N. tenuis* count was recorded on 10 randomly selected plants. All the data were subjected to ANOVA with critical difference values computed. Correlation of incidence of pests was done with weather factors using Microsoft Excel.

RESULTS AND DISCUSSION

During the study six insect pests were observed viz., *B. tabaci*, *O. albicinctus, A. styx, A. catalaunalis, N. tenuis* and *A. sesame.* The incidence of *B. tabaci* was first observed during the 32nd standard meteorological week (SMW) (2 whiteflies) and it gradually increased and reached its peak during 36th SMW (20) and thereafter started decreasing and reached its lowest level during the 44th SMW (8) (Fig. 1). These observations corroborate with those of Thakur et al. (2019), in Bundelkhand Zone of Madhya Pradesh. Similar findings have been reported by Choudhary et al. (2015), Sharma (2017), Ahirwar et al. (2009) and Mishra et al. (2015). The correlation coefficient of incidence of *B. tabaci* population with weather parameters were non-significant. Choudhary et al. (2015) and Sharma (2017) too observed a non-significant positive correlation with rainfall. Thakur et al. (2019), Patidar (2010) and Sharma (2017) also reported similar relationships. The first incidence of *O. albicinctus* was during the 32nd SMW with (12 jassids), and it reached its maximum during 36th SMW (42), and reached its lowest during the 44th SMW (14). These observations are in agreement with those of Ahirwar et al. (2009), Gangwar et al. (2014), Choudhary et al. (2015), Mishra et al. (2015), and Sharma (2017). The seasonal incidence of *O. albicinctus* in the Bundelkhand Zone of Madhya Pradesh started in 31st SMW with a peak in 38th SMW as shown by Thakur et al. (2019); incidence of this pest was observed to be positively and significantly associated with evening RH (0.45) and rainfall (0.59) while its correlation with evaporation (-0.48) was significantly negative. Gangwar et al. (2014), Mishra et al. (2015) and Sharma (2017) observed a non-significant correlation with maximum temperature; and Patidar (2010) and Choudhary et al. (2015) observed a significant correlation with minimum temperature and RH.

The first occurrence of larva of *A. styx* was during the 33rd SMW with 5 larvae; this increased from 33rd SMW and reached its peak during 36th SMW (16 larvae) and thereafter started decreasing and reached its lowest during 43rd SMW (1 larva) (Fig. 1). Bondre et al. (2016) observed a peak activity of *A. styx* during the 2nd week of October (41st SMW) with a maximum number of larvae observed during the vegetative stage. These corroborate with the observations of Biswas et al. (2001). The correlation analysis of its incidence revealed a significant positive correlation with rainfall (0.62), evening RH (0.56) and minimum temperature (0.53), whereas it was a significant negative one with evaporation (-0.44) (Table 1). Bondre et al. (2016) observed such significant correlation with maximum and minimum temperature, RH, vapour pressure and evaporation. Results of Ahuja and Kalyan (2001) also are in line with the present ones. Incidence of *A. catalaunalis* was first observed during the 32nd SMW with 4 larvae; it increased from 32nd SMW with peak during 37th SMW (21) and it was minimum during 43rd and 44th SMW (5) (Fig. 1); in capsules (8.0%) it was observed during the 36th SMW with a peak during the 41st SMW (53% damage). These results corroborate with those of Thakur et al. (2019). Mishra

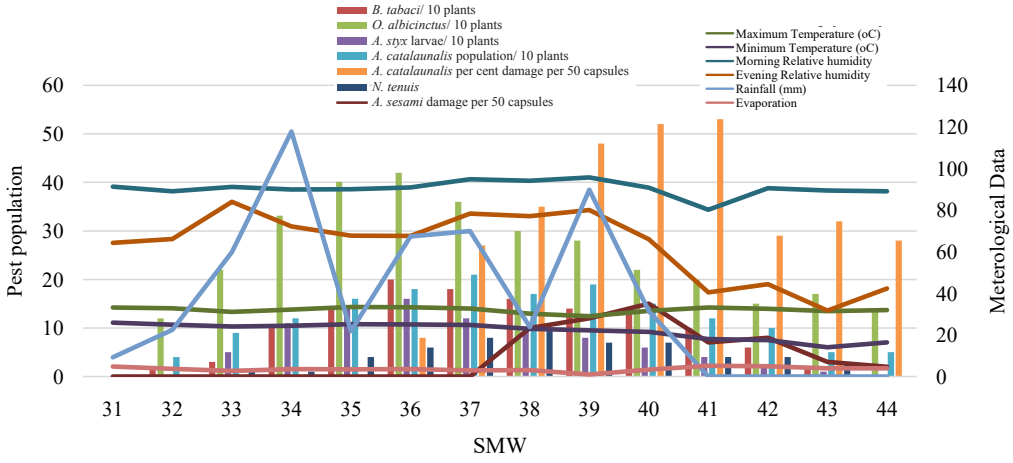

Fig. 1. Seasonal incidence of major insect pests of sesame (kharif, 2019)

Table 1

S. No.	Weather factor	Major insect pests of sesame (kharif, 2019)						
		B. tabaci	*O. albicinctus*	*A. styx*	*A. catalaunalis*		*N. tenuis*	*A. sesami*
					Incidence	Damage		
1	Maximum temperature	-0.09^{NS}	-0.02^{NS}	0.05^{NS}	-0.23^{NS}	-0.45*	-0.37*	-0.37*
2	Minimum temperature	-0.01^{NS}	0.35^{NS}	0.53**	0.28^{NS}	-0.59**	0.07^{NS}	0.07^{NS}
3	Morning RH	0.22^{NS}	0.27^{NS}	0.33^{NS}	0.38*	-0.11^{NS}	0.42*	0.42*
4	Evening RH	0.13^{NS}	0.45*	0.56**	0.49*	-0.32^{NS}	0.31^{NS}	0.31^{NS}
5	Rainfall	0.29^{NS}	0.59**	0.62**	0.53**	-0.22^{NS}	0.18^{NS}	0.18^{NS}
6	Evaporation	-0.32^{NS}	-0.48*	-0.44*	-0.56**	-0.10^{NS}	-0.42^{NS}	-0.42*

*Significant at p=0.05; ** p=0.01; NS- Non significant.

et al. (2015) and Muzaffar et al. (2002) also provide similar conclusions. A significant positive correlation of its incidence was observed with morning (0.38) and evening RH (0.49) and rainfall (0.53); while it was a significant negative correlation with evaporation (-0.56) (Table 1); with capsule damage it was a significant negative correlation with maximum (-0.45) and minimum temperature (0.59). Kumar and Goel (1994) observed such a significant negative correlation of larval counts with minimum temperature. Kumar et al. (2012), Vishnupriya et al. (2003) and Bondre et al. (2016) corroborate these observations. However, Thakur et al. (2019) revealed a significant positive correlation with maximum temperature (0.48) and a significantly negative correlation with RH (-0.71).

The *N. tenuis* first appeared during the 33rd SMW (1 nymph) reached its peak at 38th SMW (10 nymphs) and reached its least at 43rd and 44th SMW (3 and 0) (Fig. 1); in Bundelkhand Zone it started appearing in 31st SMW with a peak in 35/ 36th SMW (Thakur et al., 2019; Mishra et al., 2015). The correlation analysis revealed a positive correlation of its incidence with morning RH (0.42), and a significant negative one with maximum temperature (-0.37) (Table 1), as observed by Mishra et al. (2015),and Thakur et al. (2019). The incidence of *A. sesami* was observed during the 38th SMW (10% capsules damage), which reached its maximum at 40th SMW (15%), and the least during 44th SMW (Fig. 1). These results are in accordance with those of Kumar et al. (2010). Bondre et al. (2016) revealed that the activity of *A. sesame* was during the 2nd week of November (41st SMW). The correlation analysis revealed a significant positive correlation between its damage and morning RH (0.42), and a significant negative one with evaporation (-0.42) and maximum temperature (-0.37) (Table 1). Ahuja and Kalyan (2001), Kumar et al. (2010) and Bondre et al. (2016) support these results.

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