The Pharma Innovation Journal 2022; 11(12): 1774-1776

www.ThePharmaJournal.com

The Pharma Innovation

ISSN (E): 2277-7695
ISSN (P): 2349-8242
NAAS Rating: 5.23
TPI 2022; 11(12): 1774-1776

www.thepharmajournal.com
Received: 22-10-2022
Accepted: 25-11-2022

SR Thakur
AICRP on Oilseeds (Sesame & Niger) JNKVV, College of Agriculture, Tikamgarh, Madhya Pradesh, India

MK Nayak
AICRP on Oilseeds (Sesame & Niger) JNKVV, College of Agriculture, Tikamgarh, Madhya Pradesh, India

Shiv Ratan
AICRP on Oilseeds (Sesame & Niger) JNKVV, College of Agriculture, Tikamgarh, Madhya Pradesh, India

Corresponding Author:
SR Thakur
AICRP on Oilseeds (Sesame & Niger) JNKVV, College of Agriculture, Tikamgarh, Madhya Pradesh, India

Seasonal incidence of major insect pests of sesame with relation to weather parameters in Bundelkhand zone of Madhya Pradesh

SR Thakur, MK Nayak and Shiv Ratan

Abstract
A field experiment was conducted at AICRP (Sesame) centre, College of Agriculture, JNKVV, Tikamgarh (M.P.) during two consecutive kharif seasons (2015 and 2016) to assess the seasonal incidence of major insect pests of sesame and its correlation with weather parameters. The incidence of Antigastra, Jassid, Mirid bug and white fly were started during from 29th standard meteorological week (SMW) and continued up to 38th SMW. The highest incidence (0.20 larvae/plant) of Antigastra was recorded in 35th SMW. Incidence of all three sucking pests jassid, whitefly and mired bug were at peak during 33th, 35th and 31th SMW (0.48 jassid, 2.61 white fly and 0.75 mirid bug/plant) respectively.The correlation study revealed that the Antigastra larvae had significantly positive correlation with maximum temperature(r = 0.43) and significantly negative correlation with relative humidity (r = -0.84). While significant and negatively correlated was observed between population buildup of jassid & white fly and maximum temperature(r = -0.70, r = -0.74) while significantly positive correlation with relative humidity (r = 0.86, r = 0.83). Whereas the mirid bug population exhibited Significant correlation with maximum and minimum temperature (r = -0.70, r=-0.74) and significantly negatively correlated with rainfall (r= -0.84). The correlation study between population and weather parameters revealed that the positive correlation with maximum and minimum temperature and negatively correlated with relative humidity and rainfall.

Keywords: Pest incidence, correlation, weather parameters

Introduction
Sesame (*Sesamum indicum* Lin.) known as the "queen of oil seeds" is one of the most ancient oilseed crop of the world. In India, it is grown in the entire crop growing season's viz., *kharif*, late kharif, rabi, and summer seasons Ahirwar *et al.* (2009) [1]. Its seeds contain 52-57 percent oil and 25 percent protein (Smith *et al.*, 2000) [9]

The total globally area held on sesame in 128.21 lakh ha with their production 65.49 lakh tones and productivity 511 kg/ha. (Anonymous, 2021) [2]. India ranks first in area of, production and export of sesame in the world. It is grown in India with an area of 16.22 lakh ha, 6.57 lakh tonnes production and 405 kg/ha^{-1} productivity. In Madhya Pradesh an area of about 3.15 lakh ha with as production of 1.26 lakh tones and productivity of 400 kg/ha. In Tikamgarh district it occupies 8714 ha with the production of 4174 metric tones and productivity of 479 kg/ha. Anonymous, 2019-21) [2, 3]. The biotic and abiotic factors are the major constraints of Sesame production. Among the biotic factors insect pest and diseases surely cause yield loss of sesame

In India, sesame is cultivated in an area of 16.03 lakh ha with a total production of 7.08 lakh tonnes with average productivity of 442 kg/ha^{-1} Anonymous (2019-21) [2, 3] compared to the world average productivity of 518 kg/ha^{-1} Anonymous (2019-21) [2, 3]. The main reasons of low productivity of sesame are its rain fed cultivation in marginal and sub marginal lands under poor management practices. Damage due to insect pests is also one of the major factors causing low productivity. The crop is attacked by 29 species of insect pests in different stages of its plant growth Biswas *et al.* (2001) [3]. Among these, leaf roller and capsule borer (*Antigastra catalaunalis* Dup.) are major insect pest in all sesame growing areas in India. It damages the crop at all three stages viz., vegetative, flowering and maturity. Newly hatched larvae feed the young leaves and shoot tips and at a later growth stage they roll the leaves together and feed inside. There after feed on flowers, pods and seeds. In Bundelkhand zone of Madhya Pradesh sesame is grown in kharif season. Activity of Antigastra is observed high during the month of August to October.

Therefore, in Bundelkhand region Antigastra is a key insect pest of sesame and causing economical loss to an extent of 43.1%. Gupta *et al*. (2002) [6]. Nymph and adults of some sucking insect pests, jassid (*Orosius albicinctus* Distant), mirid bug (*Nesidiocoris tenuis* Rent.) and white fly (Bemisia tabaci Gennadius) suck the cell sap from leaf, flower, and pods. This leads to curling of leaf margin downwards, stunted the growth of the plant and ultimately reduce the yield. Jassid and white fly are also responsible to transmit phyllody and leaf curl diseases in sesame, respectively. Keeping these facts in view, present study on incidence of Antigastra, jassid, mirid bug and white fly was undertaken and seasonal incidence of insect pests was estimated under natural condition at AICRP (sesame) centre of College of Agriculture, JNKVV, Tikamgarh (M.P.).

Material and Methods

The experiment was conducted during two consecutive *kharif* seasons of 2015 and 2016. The periodical observations on the incidence of insect pests were recorded in the variety JT-7 at each meteorological week from 15 days after germination to harvest on 200 m2 plot without any insecticidal treatment. The variety was sown in first fortnight of July during each season with spacing of 30 cm between rows and 10 cm between plants and other recommended agronomic practices. Observations on the Antigastra larvae population were recorded on randomly selected 10 plants from 10 spots of plot and mean pest population was computed per plant. Incidence of nymph and adult of sucking pests (jassid, mirid bug and white fly) were recorded on three leaves from upper canopy of randomly selected 10 plants from 10 spots of plot and mean pest population was computed per plant.

Statistical analysis: In addition, a simple correlation was computed between population of insect pest and abiotic factors of environment (maximum and minimum temperature, relative humidity and rainfall). The following formula was used for calculating correlation coefficient (r).

$$r = \frac{N \sum xy - (\sum x)(\sum y)}{\sqrt{N\sum x^2 - (\sum x)^2 . N \sum y^2 - (\sum y)^2}}$$

Where,
r = Simple correlation coefficient
x = Independent variables, *i.e.* abiotic components
y = Dependent variables, *i.e.* pests
N = Number of observations

Results and Discussion

Pooled data of weather parameters and incidence of major insect pest of sesame during *kharif* 2015 and 2016 presented in Table 1 and indicated that incidence of *Antigastra* was observed from 29th standard meteorological week (SMW) and continued up to 38th SMW. The highest incidence (0.20 larvae/plant) of *Antigastra* was recorded in 35th SMW. The incidence of *Antigastra* larvae was high when the maximum and minimum temperatures were high and the rainfall was low (Anonymous, 2019-21) [2, 3]. Incidence of all three sucking pests jassid, whitefly and mired bug were at peak during 33th, 35th and 31th SMW (0.48 jassid, 2.61 white fly and 0.75 mirid bug/plant) respectively. Correlation study revealed that *Antigastra* larvae and three sucking pests jassid, white fly and mirid bug population with abiotic factors viz. minimum, maximum temperature, relative humidity and rainfall is given in Table 2. There was a significant and negative correlation between *Antigastra* larval population and relative humidity was observed these results are in confirmatory with Ahirwar *et al.* (2009) [1], Kumar *et al.* (2012) [7], Thakur *et al*. (2019) [9] and Mishra *et al.* (2015) [8]. The population gradually increased and reached to its peak in 35th SMW (0.20 larvae/plants). A fluctuating decline in the population was evident thereafter and again increased (0.11 larvae/plants) in the 32th SMW and observed in traces thereafter. The highest leaf roller and capsule borer population (0.20 larvae/plants) was observed at 23.0 °C minimum temperature, 32 °C maximum temperature, 77 percent relative humidity and 16 mm rainfall. Incidence of all three sucking pests jassid, whitefly and mired bug were at peak during 33th, 35th and 31th SMW (0.48 jassid, 2.61 white fly and 0.75 mirid bug/plant) respectively the highest jassid population 33th SMW and observed at 24.0 °C minimum temperature, 31 °C maximum temperature, 69 percent relative humidity and 69 mm rainfall. Respectively white fly was highest population 35th SMW and observed at 23.0 °C minimum temperature, 30 °C maximum temperature, 78 percent relative humidity and 70 mm rainfall and mired bug was highst population 32th SMW and observed at 240 °C minimum temperature, 310 °C maximum temperature, 93 percent relative humidity and 37 mm rainfall. The present findings are corroborate with those of Kumar *et al*. (2010) [9] and Mishra *et al*. (2015) [10], who reported that the population of leaf roller and capsule borer commenced from the 33rd SMW and its population reached to maximum in 35th SMW. Whereas, incidence of jassid and white fly population had significant and negative correlation with maximum temperate and negative correlation with maximum, minimum temperate and rainfall.

Table 1: Mean weather parameters and incidence of major insect pest of sesame during *kharif* 2015 and 2016

SMW	Temperature (°C)		RH (%)	Rainfall (mm)	*Antigastra* Larvae/plant	Population of sucking insects		
	Maximum	Minimum				Jassid adult/plant	Whitefly adult/plant	Mirid bug adult/plant
29	32	23	94	31	0.04	0.18	0.38	0.37
30	33	24	93	37	0.05	0.28	0.59	0.39
31	31	24	91	47	0.04	0.35	1.01	0.75
32	33	25	77	16	0.11	0.30	1.22	0.56
33	31	24	96	69	0.03	0.48	2.51	0.69
34	31	24	92	53	0.05	0.46	1.70	0.48
35	30	23	78	70	0.20	0.43	2.61	0.66
36	33	22	91	2	0.00	0.15	0.35	0.41

Table 2: Correlation of insect pests population of sesame with meteorological factors.

Insect pests	Temperature (°C)		Relative humidity (%)	Rainfall
	Maximum	Minimum		
Antigastra	-0.43	0.19	-0.84*	0.40
Jassid	-0.70*	0.41	-0.07	0.86*
Whitfly	-0.74*	0.16	-0.28	0.83*
Mirid bug	-0.53	0.30	-0.24	0.60

*Significant at 5% level

Conclusion

The incidence of leaf roller and capsule borer, *A. catalaunalis* commenced from 29th SMW (0.04 leaf roller and capsule borer/plants) and continued till 35st SMW. The population reached its peak in 35th SMW (0.20 leaf roller and capsule borer/plants). The correlation coefficient worked out revealed that the infestation of leaf roller and capsule borer on sesame crop showed a significant negative correlation at maximum temperature (r= -0.43) with relative humidity (r= -0.84). Incidence of all three sucking pests jassid, whitefly and mired bug were at peak during 33th, 35th, and 31th SMW (0.48 jassid, 2.61 white fly and 0.75 mirid bug/plant) respectively. while significant negative correlation with maximum temperature (r = -0.70) jassi, (r = 0.74) white fly and mirid bug (r= -0.53) with significantly positive correlation (r = 0.86, r= 0.83) and (r= 0.60) with rain fall. A correlation study revealed that *Antigastra* larvae and three sucking pests jassid, white fly and mirid bug populations with abiotic factors viz. minimum, maximum temperature, relative humidity and rainfall.

References

1. Ahirwar RM, Banerjee S, Gupta MP. Seasonal incidence of insect pests of sesame in relation to abiotic factors. Ann. Plant Protect. Sci. 2009;17(2):351-356.
2. Anonymous. OILSEEDS A Statistical Compendium; c2021.
3. Anonymous. 4th Advance Estimates, Agriculture Statistics Division, Directorate of Economics and Statistics, New Delhi; c2019.
4. Biswas GC, Kabir SMH, Das GP. Insect pest of sesamum (*Sesamum indicum* Linn.) in Bangladesh, their succession and natural enemies. Indian J Entomol. 2001;63:117-124.
5. Sarda C, Alivelu K, Rao Sambasiva V, Sudhakar Babu SN, Varaprasad KS. Oilseeds Statistics A Compendium ICAR-Indian Institute of Oilseeds Research; c2015. p. 181-185.
6. Gupta MP, Rai HS, Chourasia SK. Incidence and avoidable loss due to leaf roller/capsules borer, *Antigastra catalaunalis* Dup. in sesame. Ann. Plant Protect. Sci. 2002;10:202-206.
7. Kumar R, Ali S, Chandra RKDU. Incidence of *Antigastra catalaunalis*, Dup. in different varieties of sesame. Molecular Entomol. 2012;3(1):15-17.
8. Mishra MK, Gupta MP, Thakur SR, Raikwar RS. Seasonal incidence of major insect pests of sesame in relation to weather parameters in Bundelkhand zone of Madhya Pradesh Journal of Agrometeorology. 2015;7(2):263-264.
9. Thakur SR, Nayak MK, Ratan Shiv, Tiwari UK. Seasonal incidence of major insect pests of sesame with relation to weather parameters in Bundelkhand Zone of Madhya Pradesh Bull. Env. Pharmacol. Life Sci. 2019;8(10):125-127.
10. Smith DT, Grichar WJ, McCallum AA. Texas Agricultural Experiment Station, College Station and Yoakum prepared; c2000. p. 1-19.