RESEARCH ARTICLE

POPULATION DYNAMICS OF BIHAR HAIRY CATERPILLAR AND TIL HAWK MOTH ON SESAMUM IN NORTHERN HILLS OF CHHATTISHGARH

Vaibhav Kumar Jaiswal[1], P.K. Bhagat[2], G.P. Painkra[3]*, K.L. Painkra[4], Sachin Kumar Jaiswal[5] and Y.K. Meshram[6]

[1-5]Department of Entomology, Raj Mohini Devi College of Agriculture and Research Station, Ambikapur (497001) Surguja (C.G.) India
[6]CARS, Janjgir-Chapa (495671) Janjgir-Chapa (C.G.) India
Email: vaibhavjaiswal886@gmail.com

Received-04.07.2021, Revised-14.07.2021, Accepted-26.07.2021

Abstract: The field experiment was conducted at Raj Mohini Devi College of Agriculture and Research Station, Ambikapur (C.G.) during *kharif* 2020, to know the population dyamics of Bihar hairy caterpillar *Spilosoma oblique* and Til Hwak Moth *Acherontia styx* infesting on sesamum. Bihar hairy caterpillar appeared during 33rd SMW *i.e.* 12th - 18th August (2nd week). The peak population of Bihar hairy caterpillar was observed inthe second week of September with a mean population of 12.10 larvae/plant. The correlation between Bihar hairy caterpillar, *Spilosoma oblique* and weather parameters during *kharif* 2020 results indicated that the population demonstrated a significant positive correlation with maximum temperature (r =0.546) and Til Hawk Moth, *Acherontia styx* infesting on sesamum. Til Hawk Moth appeared during 34rt SMW *i.e.* 19th - 25th August (3rd week). The peak population of Til Hawk Moth was observed inthe second week of September with a mean population of 2.60 larvae/plant. The correlation between Til Hawk Moth, *Acherontia styx* and weather parameters during *kharif* 2020 results indicated that the population demonstrated a significant positive correlation with maximum temperature (r =0.698).

Keyword: Sesamum (*Sesamum indicum* L.), Correlation, *Spilosoma oblique, Acherontia styx*

INTRODUCTION

Sesame (*Sesamum indicum* L.) is one of the oldest crop and is under cultivation from ancient times. It gained high quality edible oil, rich source of carbohydrate, protein, calcium and phosphorous. Sesame (*Sesamum indicum* L.) commonly called as Til, is one of most ancient and important oilseed crops cultivated over 5000 years by human beings. It belongs to family Pedaliaceae and described as 'Queen of Oilseed crops' for its high oil content (46-52%) and high protein content (18-20). Sesame is grown in more than 55 countries of the world. Asia contributes more than 68 percent of the area and 67 percent production in the world In India, sesame currently lives in an area of about 1667 thousand hectares with an annual production of 747 thousand tonnes, with an average productivity of 448 kg/ha .The yield fluctuations are very wide.Sesame is mainly grown in *kharif* season under rainfed situation. Recorded 65 insect species and one species of mite on sesame crop. Leaf webber and capsule borer, (*Antigastra catalaunalis* (Duponchel)), bihar hairy caterpillar, (*Spilosoma oblique* (Walker), whitefly (*Bemisia tabaci* (Genadius), and mirid bug (*Crytopeltis tenuis* (Reuter), green stink bug (*Nezara virudula* (Linnaeus), til howk moth (*Acherontia styx* (Westwood) is considered a regular important pests of sesame. One of the major in sesame production is the heavy damage caused by various insect pests. One of the major constraints in the production of sesame is the colossal damage caused by various insect pests. Earlier, twenty nine insect species were reported to damage the crop but recently the scenario has greatly changed and new pest problems have emerged. When all the components are placed into the production system monitoring is required to obtain information on the status of the plant growth, pests and the current and potential damage along with natural enemies. Therefore, present investigation was planned with the objective to study the succession and population dynamics of major insect pests of sesame.

METHODOLOGY

The experiment was conducted at Research-Cum-Instructional Farm of the Raj Mohini Devi College of Agriculture and Research Station, Ambikapur (C.G.) during *kharif* 2020.In the field experiment, each treatment was demarcated during the seasons with the following technical program. In a plot of 5×3 m² area, sesamum variety " RT-351" was sown. Observation of til hawk moth, bihar hairy caterpillar and other insect-pest population were recorded from their appearance on plant till harvest at different intervals. Ten plants were selected at random per three plots for the study of til hawk moth, bihar hairy caterpillar and other insect- pest by the direct visual counting method at weekly intervals during morning hours, without disturbing the pest fauna. The observed population was correlated with the weather data during the study period.

*Corresponding Author

RESULTS AND DISCUSSION

Population dyamics of major insect pest Bihar hairy caterpillar and Til Hawk Moth on sesamum in northern hills of Chhattishgarh.

The Bihar hairy caterpillar appeared during 33rd SMW *i.e.* 12nd -18th August with a mean larval population of 0.06 larvae/plant. The population slowly increased and reached to its peak in the 37th SMW *i.e.* 09th- 15th September. with a mean larval population of 12.10 larva/plant. When, the maximum atmospheric temperature, minimum atmospheric temperature and relative humidity were 31.9 °C, 21.8°C and 94.1 per cent, respectively. Thereafter, the population declined gradually and reached to a minimum level of 0.8 larva/plant during 21th-27th October (43 SMW).

The larval stage of *Spilosoma obliqua* damage showed significant positive correlation with maximum temperature (r =0.546). The regression equation being y= 0.189x + 29.03 indicating that within increase in 1^0C maximum temperature there will be increase in population by 0.189.

The present findings Thakur and Kaistha (1994) reported that nine insect pests were observed causing damage to sesame. *Spilosoma obliqua* attacked thecrop at the vegetative growth to pod maturity stage from the 2nd week of August to 3rd week of September.

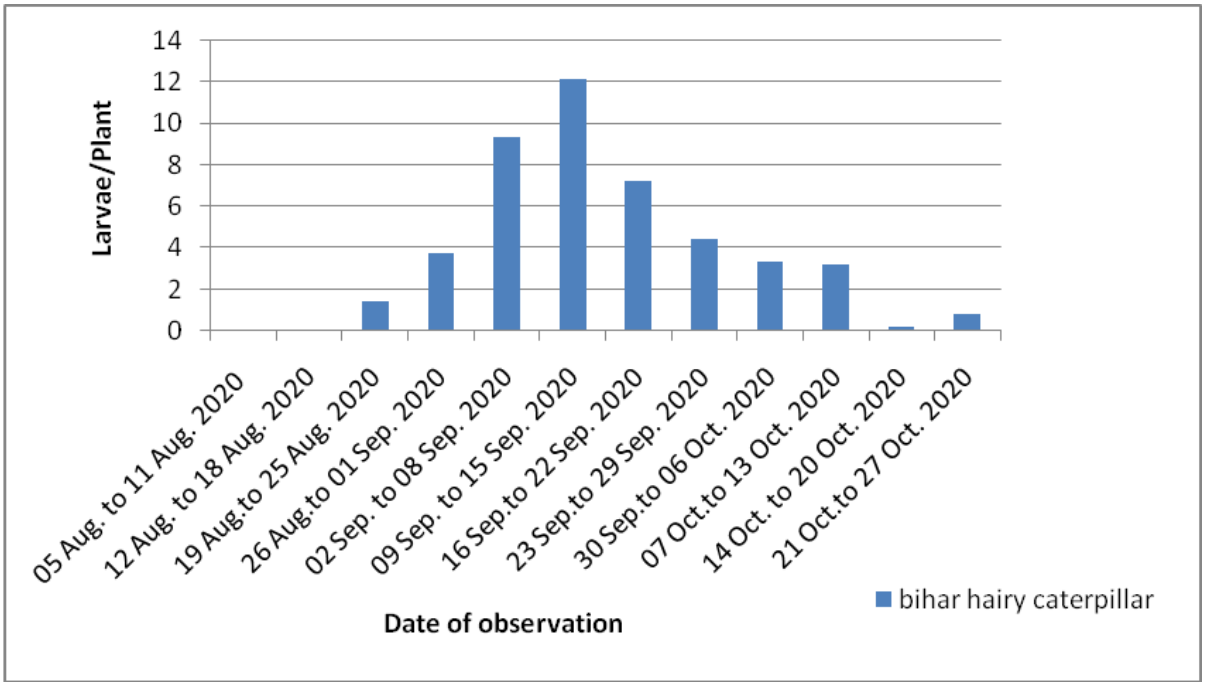

Fig.1. Mean population of Bihar hairy caterpillar, *Spilosoma obliqua* during *Kharif*, 2020.

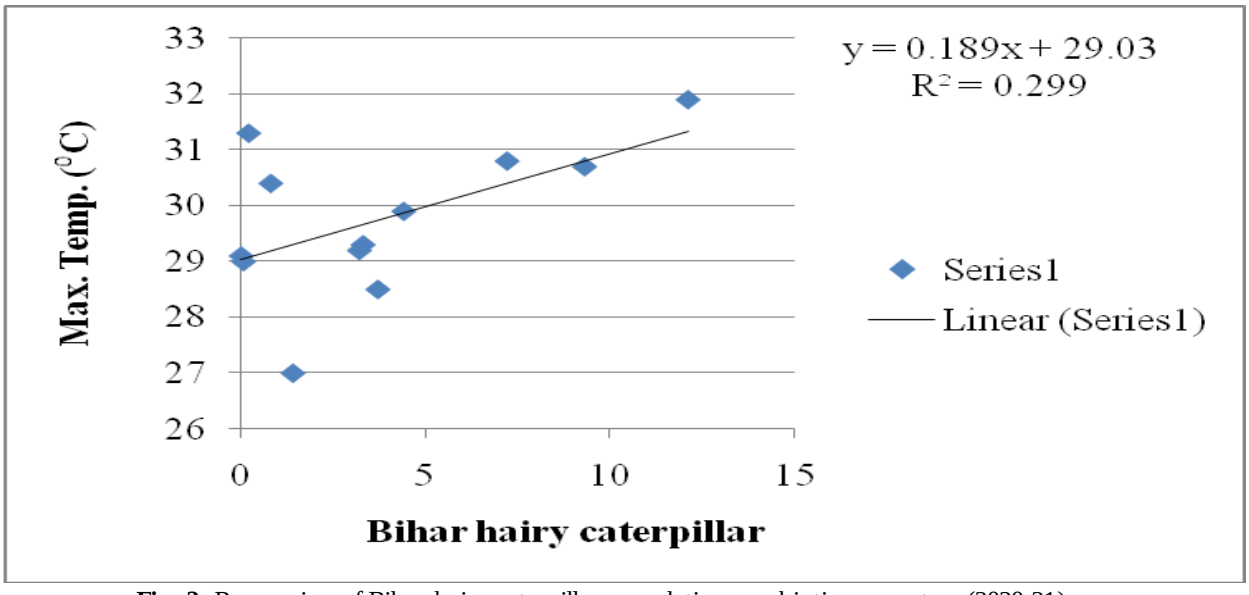

Fig. 2. Regression of Bihar hairy caterpillar population on abiotic parameters (2020-21).

The Til Hawk Moth appeared during 34rt SMW *i.e.* 19th-25th August with a mean larval population of 0.30 larvae/plant. The population slowly increased and reached to its peak in the 37th SMW *i.e.* 16th-22nd September. with a mean larval population of 2.60 larva/plant. When, the maximum atmospheric temperature, minimum atmospheric temperature and relative humidity were 27.0 °C, 21.4 °C and 95.7 per cent, respectively. Thereafter, the population declined gradually and reached to a minimum level of 0.90 larva/plant during 21st-27th October (43rd SMW).

The larval stage of *Acherontia styx* damage showed significant positive correlation with maximum temperature (r=0.698). The regression equation being y= 1.256x + 28.57 indicating that with in increase in 1^0C maximum temperature there will be increase in population by 1.256.

The findings of the present investigation are in agreement to that of Ahirwar *et al*., (2009) he found Maximum temperature were showed significant positive correlation with population of pest. Choudhary *et al*., (2020) til hawk moth larval population showed significant positive correlation with maximum temperature (r = 0.692).

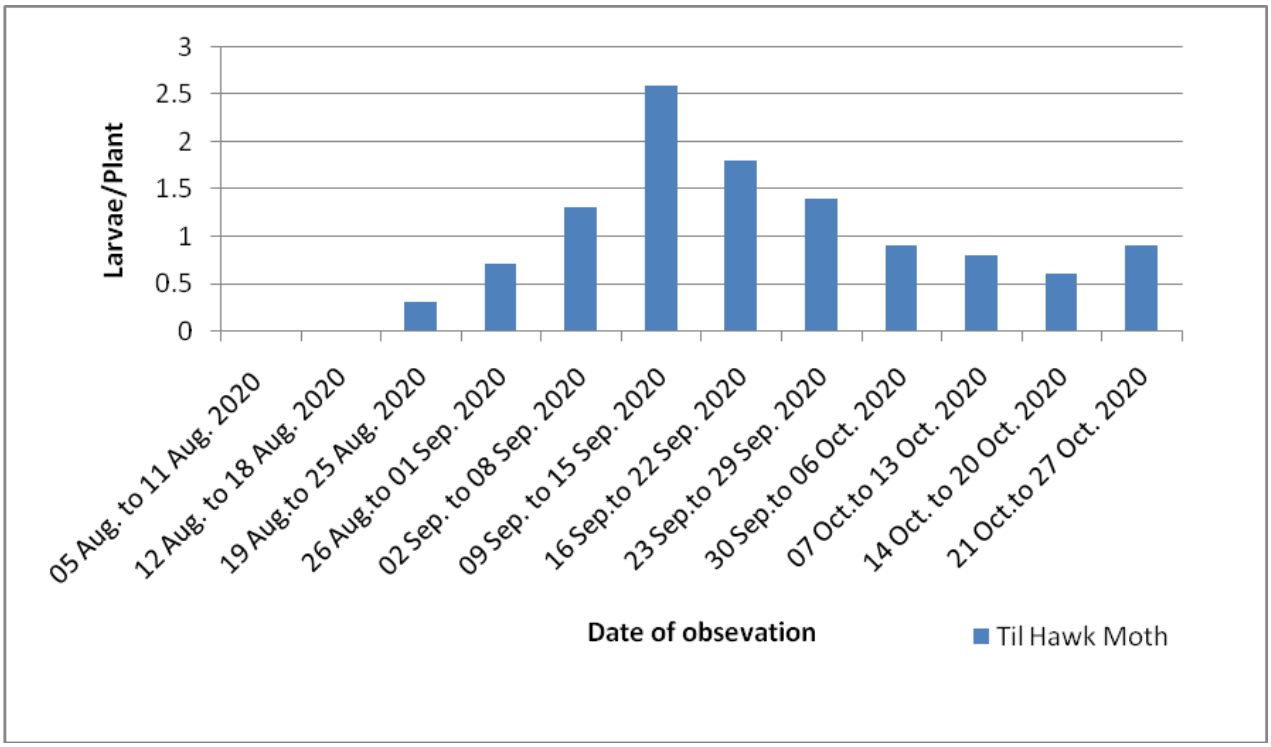

Fig. 3. Mean population of Til Hawk Moth, *Acherontia styx* during *Kharif*, 2020.

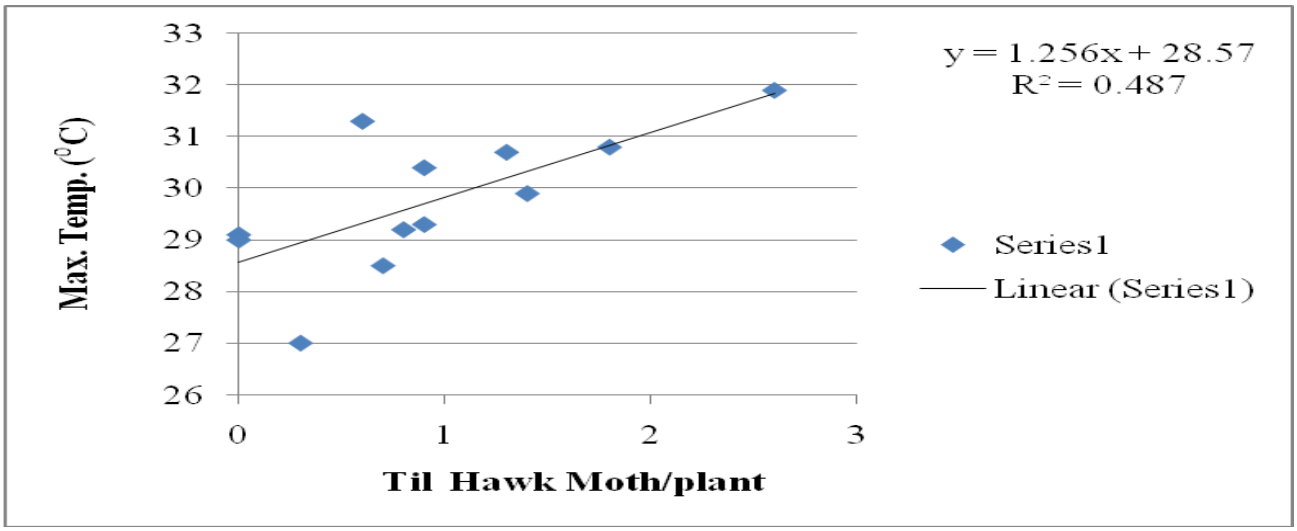

Fig.4. Regression of Til Hawk Moth population on abiotic parameters (2020-21).

Table 1.

SMW	Date of Observations	Average no. of larvae of bihar hairy caterpillar/ plant	Average no. of larvae of til hawk moth/plant	Mx. Tem.(^{0}C)	MinTem. (^{0}C)	RainFall (mm)	RH(%) Mor.	RH(%) Eve.	Wind Velocity (Km/h)	Sun Shine (hours)
32	05.Aug. to 11 Aug. 2020	0.00	0.00	29.1	22.0	144.2	95.9	76.3	3.1	3.0
33	12 Aug. to 18 Aug. 2020	0.06	0.00	29.0	22.1	99.1	95.6	81.9	2.6	3.4
34	19 Aug .to 25 Aug. 2020	1.40	0.30	27.0	21.4	49.1	95.7	90.3	4.1	3.0
35	26 Aug .to 01 Sep. 2020	3.70	0.70	28.5	20.1	71.4	93.6	75.6	4.6	5.2
36	02 Sep. to 08 Sep. 2020	9.30	1.30	30.7	21.4	56.1	94.3	67.0	2.3	6.5
37	09 Sep. to 15 Sep. 2020	12.10	2.60	31.9	21.8	1.8	94.1	67.7	1.8	6.4
38	16 Sep. to 22 Sep. 2020	7.20	1.80	30.8	21.4	40.6	97.9	77.9	2.3	4.0
39	23 Sep. to 29 Sep. 2020	4.40	1.40	29.9	20.0	19.5	95.0	60.7	3.4	6.7
40	30 Sep. to 06 Oct. 2020	3.30	0.90	29.3	20.2	43.2	95.6	73.6	1.6	4.5
41	07 Oct. to 13 Oct. 2020	3.20	0.80	29.2	20.2	59.2	95.9	67.6	1.3	5.5
42	14 Oct. to 20 Oct. 2020	0.2	0.60	31.3	18.9	0.1	89.7	54.5	2.3	9.1
43	21 Oct. to 27 Oct. 2020	0.8	0.90	30.4	14.2	0.0	91.0	31.6	1.6	8.0
Correlation of coefficient(r) for bihar hairy caterpillar population and abiotic factor				0.546*	0.334	-0.331	0.232	0.071	-0.209	0.130
Correlation of coefficient (r) for til hawk moth population and abiotic factor				0.698**	0.027	-0.624*	0.056	-0.215	-0.336	0.358

*Significant at 5% level of significance, **Significant at 1% level of significance

CONCLUSION

The highest number of *Spilarctia oblique* was seen during 37th SMW *i.e.* 09th- 15th September. with a mean larval population of 12.10 larva/plant. When, the maximum atmospheric temperature, minimum atmospheric temperature and relative humidity were 31.9 °C, 21.8°C and 94.1 per cent, respectively. Thereafter, the population declined gradually and reached to a minimum level of 0.8 larva/plant during 21th-27th October (43st SMW).

The highest number of *Acherontia styx* was seen during 37th SMW *i.e.* 16th- 22nd September. with a mean larval population of 2.60 larva/plant. When, the maximum atmospheric temperature, minimum atmospheric temperature and relative humidity were 27.0 °C, 21.4 °C and 95.7 per cent, respectively. Thereafter, the population declined gradually and reached to a minimum level of 0.90 larva/plant during 21st-27th October (43rd SMW).

ACKNOWLEDGMENT

The author is highly thankful to IGKV, Raipur and Raj Mohini Devi College of Agriculture and Research Station, Ambikapur, Department of Entomology for providing the technical support and guidance during the whole research work.

REFERENCES

Ahirwar, R.M., Banerjee, S. and Gupta, M.P. (2009). Seasonal incidence of Insect pests of Sesame in relation to Abiotic factors. *Ann. Pl. Protec. Sci. 17(2):* 351-356.

Ahuja, D.B. and Bakhetia, D.R.C. (1995). Bio ecology and management of insect pests of sesame. A review journal of Insect Science.; 8:1-19.

Anonymous (2017). Rajasthan Agricultural Statistics at a Glance, 2015-16. Commisionerate of Agriculture, Jaipur (Rajasthan) 87.

Ba Angood, S. A., Ghaleb, A. M. and Ali, A. M. (2000). Effect of sowing dates on the occurrence of the whitefly *Bemisia tabaci* and the jassid *Jacobiasca lybica* on two different local cultivars of sesame in Yemen. : *Univ. Aden. J. Nat. App. Sci. 4(1):* 103-110

Biswas, G.C. (2006). Incidence and management of hairy caterpillar (*Spilarctia obliqua*) on sesame. *J. Agric. Rural Dev. 4 (1-2):* 95-100.

Bondre, C.M. (2014). Studies on the population dynamics and management of major insect Pests of Sesame in Jabalpur district. M.Sc. Thesis. Jawaharlal Nehru Krishi Vishwa Vidyalaya, Jabalpur, 35-40.

Chadha, S.S. (1974). Effect of some climatic factor on the fluctuation population of *Antigastra catalauanalis Samura Miscellaneous paper no. 48 Apr.Univ.Nigeria:*pp. 32.

Joshi, A.B. (1961). Sesame-A Monograph, Indian Central Oilseeds Committee Hyderabad India, 267.

Kumar, S. and Goel, S.C. (1994). Population dynamics of a pyralid, *Antigastra catalauanalis* on Sesamum in relation to abiotic factors *J. Entomo. Res.18 (1):* 6-10.

Thakur and Kaistha (2001). Chemical control of bihar hairy caterpillar, *Spilosoma obliqua* Walker, damaging *sesamum Himachal Journal of Agricultural Research*; 2001. *27(1/2):* 51-58.

Thangjam, R. and Vastrad, A.S. (2018). Studies on pest complex of sesame and their natural enemies in North Karnataka, India. Journal of Entomology and Zoology Studies. 6(6):57-60.