

Seasonal Incidence of Tobacco Caterpillar, *Spodoptera litura* Fab. Infesting Groundnut (*Arachis hypogaea* L.)

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ABSTRACT

Seasonal Incidence of tobacco caterpillar infesting groundnut (*A. hypogaea*)” was studied during July to October 2014, at Reasearch farm, College of Technology and Engineering, Udaipur. The study revealed that the incidence of tobacco caterpillar (0.20 caterpillar/plant) appeared in 2nd week of September (37th Standard Meteorological Week). The population of tobacco caterpillar, *S. litura* slowly increased and reached to its peak in the 2nd week of October (41st SMW) with a mean of 1.40 caterpillar/ plant, when the mean atmosphere temperature and relative humidity were 26.25 °C and 56.50 per cent, respectively. Thereafter, the population declined gradually and reached to a minimum level of 0.40/plant during 4th week of October (43rd SMW). The tobacco caterpillar exhibited a negative and significant correlation with relative humidity and total rainfall, while with temperature negatively non-significant.

Key words: Caterpillar, Correlation, Groundnut, Incidence, Peak, Seasonal.

INTRODUCTION

Groundnut (*Arachis hypogaea* L.) is an annual legume crop, also known as peanut earthnut, monkey-nut and goobers. It forms the world's largest source of edible oil and ranks 13th among the food crops and is also 4th most important oilseed crop of the world⁸. It is grown in tropical and subtropical countries. Cultivated groundnut has been reported to from South America¹⁴. Asia posses 1st rank in area (63.4%) and production (71.1%). Major groundnut countries are India (26%), China (19%) and Nigeria (11%). In India, it is cultivated in an area of 4.72 M ha with production of 4.70 MT and productivity is 995 kg ha⁻¹ ³. In india, it is mainly grown in the

southern and north-western states; Gujrat, Andhra Pradesh, Tamil nadu, Karnataka, Maharastra, and Madhya Pradesh, together occupying about 90 percent of the groundnut area in the country. The major insect pest of groundnut are the groundnut aphid (*Aphis craccivora* Koch), leaf minor (*Stomopteryx nertara* meyrick), stem borer (*Sphenoptera perotett* camron), white grub (*Holotrichia consanguinia* Blanchard), bihar hairy caterpillar (*Spilosoma oblique* walker), tobbaoco caterpillar (*Spodoptera litura* Fab.), red hairy caterpillar (*Amsacta albistriga* Butler), jassid (*Empoasca kerri* Pruthi), thrips (*Scritothrips dorsalis*) and termite (*Odontotermes obesus* Rambur)⁴.

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The tobacco caterpillar has been reported as one among the more important pests. *S. litura* larvae are polyphagous defoliators, severe infestation lead to skeletonisation of leaves as well as feeding holes in roots^{1,6,10}. The seasonal incidence of *S. litura* initiated by heavy rainfall after the dry spell lasting for 4-7 days under north Indian conditions⁹.

The knowledge of seasonal incidence of tobacco caterpillar at different growth stages of groundnut crop will be helpful in evolving proper management schedule. Insect pests are a limiting factor in lowering the productivity of groundnut. The indiscriminate and injudicious use of synthetic pesticides have lead to pest build up and cause an imbalance of natural enemies, resulting into problems of pest resurgence and secondary pest out breaks progressively, we are becoming environment conscious and specially disenchanted with the use of pesticides over the past several centuries competition has been in favour of man⁵.

MATERIAL AND METHODS

The experiment was conducted during Kharif, 2014 at College of Technology and Engineering, MPUAT, Udaipur to investigate the “Seasonal Incidence of tobacco caterpillar infesting Groundnut (*A. hypogaea*)”. Groundnut Variety Pratap Mungphali-1 was sown under natural conditions without spraying the insecticides in plot size 5 m x 4 m with 30 cm row to row and 10 cm plant to plant spacing. The larval population of *S. litura* was recorded on five randomly selected and tagged plants in each plot and expressed as a per plant basis. The data were subjected to statistical analysis and correlation coefficient was worked out. Simple correlation was worked out between the population of insect pests and abiotic factors by the Karl Pearson’s coefficient of correlation formula¹²:

$$r_{xy} = \frac{\sum XY - \frac{\sum X \sum Y}{n}}{\sqrt{\left[\sum X^2 - \frac{(\sum X)^2}{n} \right] \left[\sum Y^2 - \frac{(\sum Y)^2}{n} \right]}}$$

Where,

- r_{xy} = Simple correlation coefficient
 X = Variable *i.e.* abiotic component. (Average temperature, relative humidity and total rainfall)
 Y = Variable *i.e.* mean number of insect pests per plant
 n = Number of observations.

The correlation coefficient (r) values were subjected to the test of significance using t-test:

$$t = \frac{r}{\sqrt{1-r^2}} \times \sqrt{n-2} \sim t_{n-2} \text{ d.f.}$$

The calculated t-value obtained was compared with tabulated t-value at 5 % level of significance.

RESULT AND DISCUSSION

The mean population of tobacco caterpillar (*S. litura*) and correlation with weather parameter are presented in Table 1 and Fig. 1.

Tobacco caterpillar, *Spodoptera litura* (Fabricius)

S. litura appeared during 37th standard meteorological week (SMW) *i.e.* 10th- 16th September (2nd week) with a mean population of 0.20 larvae/plant. The population slowly increased and reached to its peak in the second week of October with a mean population of 1.40 larvae/plant, when the mean atmosphere temperature and relative humidity were 26.25 °C and 56.50 per cent, respectively. Thereafter, the population declined gradually and reached to a minimum level of 0.40 larvae/plant during 43rd SMW *i.e.* 22nd-28th October (4th week). The tobacco caterpillar population exhibited a significant negative correlation with relative humidity ($r = -0.6472$) and total rainfall ($r = 0.5364$) while, non significant correlation with mean atmosphere temperature. The minimum temperature, relative humidity and rainfall proving negative relationship with population of *S. litura* infesting groundnut crop in Junagadh area². The higher incidence of *S. litura* initiated by heavy rainfall after the dry spell lasting for 4-7 days under north Indian conditions⁹. The

minimum temperature, evening relative humidity, morning and evening vapour pressure showed negative effect on ovipositional behaviour and larval development of *S. litura*, whereas correlation analysis showed non significant difference between various abiotic factors and leaf damage caused by *S. litura* infesting castor crop in middle Gujarat¹³. The minimum temperature, morning and evening relative humidity and rainfall exhibited non significant and negative relationship with population of

S. litura infesting onion crop in Guntur area¹¹. The *S. litura* population was positively correlated with minimum temperature and rainy days and negatively correlated with forenoon relative humidity and rainfall⁷. The incidence of tobacco caterpillar, *S. litura* was commenced in first week of September and touched its peak in the second week of October (1.07/ 3 leaves) and exhibited a negative and significant correlation between temperature, relative humidity and total rainfall¹⁵.

Table 1: Seasonal incidence of tobacco caterpillar, *S. litura* infesting groundnut variety “Pratap Mungphali-1” during kharif, 2014

SMW No.	Date	Mean Temperature (°C)	Mean Relative Humidity (%)	Rainfall (mm)	Average no. of <i>Spodoptera litura</i> larvae/plant
32	6 Aug-12 Aug	25.85	81.30	47.20	0.00
33	13 Aug-19 Aug	26.55	72.70	0.20	0.00
34	20 Aug-26 Aug	28.15	76.35	40.80	0.00
35	27 Aug-2 Sept	27.40	77.35	31.60	0.00
36	3 Sept-9 Sept	25.95	82.70	165.2	0.00
37	10 Sept-16 Sept	25.05	87.65	94.80	0.20
38	17 Sept-23 Sept	26.15	68.05	0.00	0.80
39	24 Sept-30 Sept	25.60	64.25	0.00	1.00
40	1 Oct-7 Oct	26.95	59.55	0.00	1.20
41	8 Oct-14 Oct	26.25	56.50	0.00	1.40
42	15 Oct-21 Oct	25.05	54.00	0.00	0.60
43	22 Oct-28 Oct	24.90	46.00	0.00	0.40
Coefficient of correlation (r) for population and mean atm. temperature					-0.1503
Coefficient of correlation (r) for population and mean relative humidity					-0.6472*
Coefficient of correlation (r) for population and total rainfall					-0.5364*

* Significant at 5% level of significance
SMW: Standard Meteorological Week

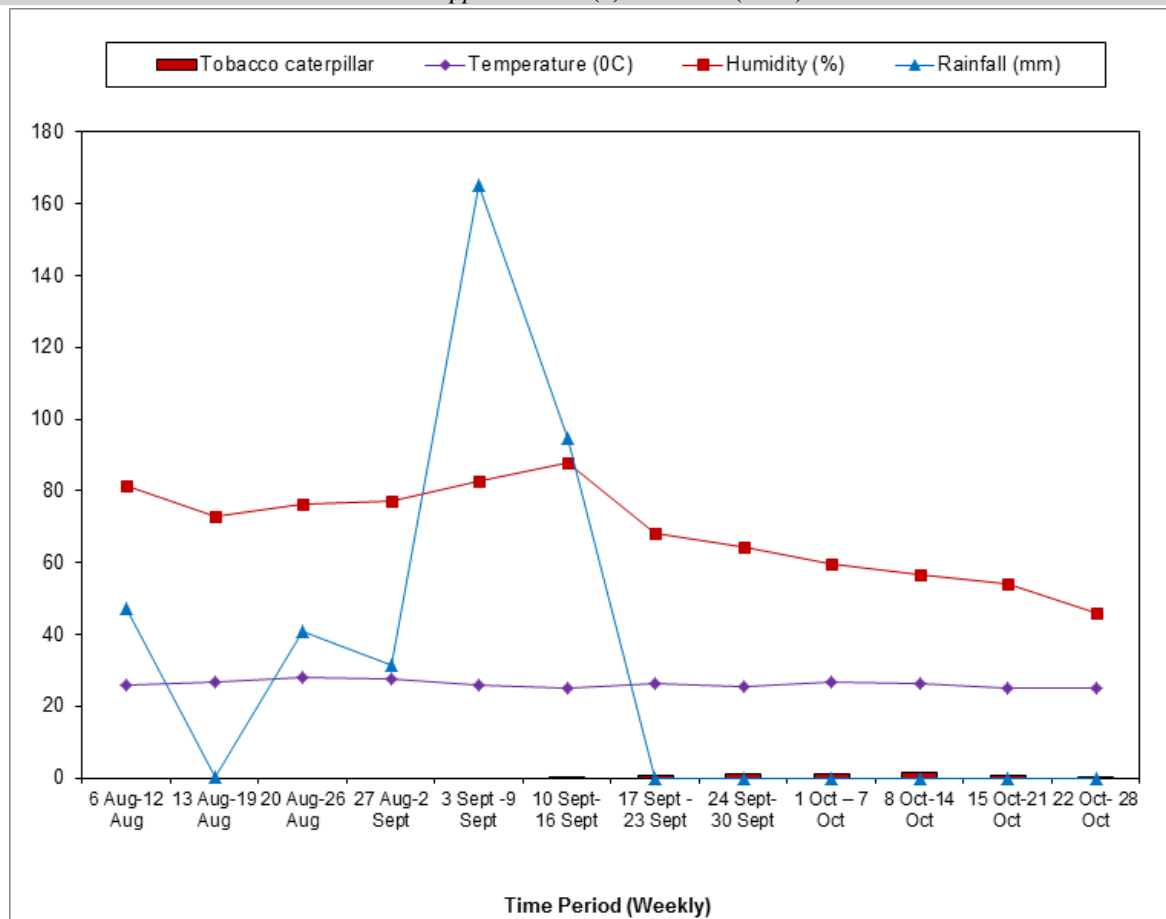


Fig. 1: Seasonal incidence of *Spodoptera litura* Fab. in groundnut variety Pratap Munghphali-1 during Kharif, 2014

CONCLUSION

The present study revealed that tobacco caterpillar; *S. litura* was commenced in second week of September i.e. 0.20 larvae/plant (37th SMW). The tobacco caterpillar touched the peak during the second week of October i.e. 1.40 larvae/plant (41st SMW). This will help us in scheduling management strategies in groundnut crop for tobacco caterpillar.

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