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SEASONAL INCIDENCE OF MAJOR INSECT PESTS OF GROUNDNUT (*ARACHIS HYPOGAEA* L)

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ABSTRACT

The seasonal incidence of major insect pests of groundnut (*Arachis hypogaea* L.) was recorded during July to October 2014 at the Instructional Farm of College of Technology and Engineering, Maharana Pratap University of Agriculture and Technology, Udaipur. Groundnut crop was infested by aphid (*Aphis craccivora* Koch), jassid (*Empoasca kerri* Pruthi), thrips (*Scirtotharips dorsalis* Hood) and tobacco caterpillar (*Spodoptera litura* Fab.). The study revealed that the incidence of aphid, jassid and thrips started in the 2nd week of August; while, tobacco caterpillar appeared in 2rd week of September. The population of aphid (*A. craccivora*) touched the peak in the 3rd week of September with a mean population of 7.60 aphids/3 leaves; whereas, jassid (*E. kerri*) and thrips (*S. dorsalis*) increased slowly and attained the peak in the second week of September with a mean population of 7.00 jassids/3 leaves and 3.80 thrips/3 leaves. The population of tobacco caterpillar, *S. litura* reached the peak in the 2nd week of October with a mean of 1.40 caterpillars/ plant. The correlation between population of thrips and relative humidity was positive and significant; while the tobacco caterpillar exhibited a negative and significant correlation with relative humidity and total rainfall.

Key words: Groundnut, seasonal incidence, insect

INTRODUCTION

Groundnut (*Arachis hypogaea* L.*)* is an annual legume oilseed crop, also known as peanut, earthnut, monkey-nut and goobers is grown in tropical and subtropical countries. It forms the world' largest source of edible oil and ranks 13th among the food crops and is also 4th most important oilseed crop of the world (Ramanathan, 2001); cultivated groundnut has also been reported from South America (Weiss, 2000). Asia occupies 63.4 per cent area contributing 71.1 per cent production and the major groundnut cultivating countries are India (26%), China (19%) and Nigeria (11%). In India, it is cultivated in an area of 4.72 million hectares with a production of 4.70 metric tons and productivity of 995 kg ha^{-1} (Anonymous, 2013-14); and is mainly grown in the southern and north-western states of Gujarat, Andhra Pradesh, Tamil Nadu, Karnataka, Maharashtra and Madhya Pradesh, together occupying about 90 percent of the groundnut area in the country. The major insect pests of groundnut are the aphid, leaf miner, whitegrub, tobacco caterpillar, jassid, thrips and termites (Atwal and Dhaliwal, 2008); however, aphid was not considered to be a serious pest of groundnut until late 1980 (Nandgopal, 1992). The aphid (*A. craccivora),* besides causing direct damage to the crop by sucking the sap, is also responsible for causing rosette viral diseases (Alebejo *et al.,* 1999; Alebejo, 1999; Subrahmanyam *et al*., 2000; Alegbejo and Abe, 2002). The knowledge of seasonal incidence of insect pests at different growth stages of groundnut crop is useful in evolving proper management schedule; hence, the present study was undertaken.

MATERIAL AND METHOD

The field trial was conducted during *kharif,* 2014 at College of Technology and Engineering, MPUAT, Udaipur. Groundnut variety, Pratap Mungphali-1 was sown under natural conditions without insecticides in plots of size 5m x 4m, maintaining 30cm row to row and 10cm plant to plant spacing. The population of aphids, jassid and thrips were recorded at weekly intervals during morning hours between 7.00 am to 9.00 am on five randomly selected and tagged plants in each plot by following the sampling method suggested by Satpathy (1973) and the population was counted on three leaves. The larval population of *S. litura* was recorded on five randomly selected and tagged plants in each plot and expressed on 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 formula:

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

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

During the course of investigation aphid, *A. craccivora;* jassid, *E. kerri*; thrips, *S. dorsalis* and tobacco caterpillar, *S. litura* were recorded as major insect pests of groundnut and the mean population values have been presented in Table (1).

Aphid [*Aphis craccivora* (Koch)]. The aphid appeared during 32nd standard meteorological week (SMW) *i.e.* 6th-12th August (2nd week) with a mean population of 2.20 aphid/ 3 leaves. The population increased gradually and attained its peak in the third week of September (38th SMW) with a mean population of 7.60 aphid/ 3 leaves, when the mean atmosphere temperature and relative humidity were 26.15°C and 68.05 per cent, respectively; thereafter, the population declined and reached to minimum levels of 1.00 aphid/ 3 leaves during 43rd SMW *i.e.* 22nd-28th October. Earlier, higher incidence of *A. craccivora* was observed in mid September by Nandgopal *et al*. (2002). Singh *et al*. (2005) reported that temperature and relative humidity favours the pest population build up; however it was adversely affected at 45 per cent relative humidity.

Jassid, *Empoasca kerri* (Pruthi). The jassid first appeared during 32nd standard meteorological week (SMW) *i.e.* 6th- 12th August with a mean population of 1.60 jassids/ 3 leaves. The population increased slowly and reached to its peak in the second week of September (10th-16th Sep.) with a mean population of 7.00 jassids/ 3 leaves, when the mean atmosphere temperature, relative humidity and rainfall were 25.05°C, 87.65 per cent and 94.80 mm, respectively; thereafter, the population declined and reached minimum levels of 0.80 jassids/ 3 leaves during 43rd SMW *i.e.* 22nd-28th October (4th week). The pest population showed negative correlation with mean atmosphere temperature while, positive correlation

Table 1. Seasonal incidence of major insect pests infesting groundnut variety "Pratap Mungphali-1" during *kharif*, 2014

SMW	Mean Atmospheric Temperature (°C)	Mean Relative Humidity (%)	Rainfall (mm)	Average numbers of sap sucking insect pests on 3 leaves			Average Numbers of *Spodoptera litura* larvae /plant
				Aphids	Jassids	Thrips	
32	25.85	81.30	47.20	2.20	1.60	0.80	0.00
33	26.55	72.70	0.20	2.80	1.80	1.20	0.00
34	28.15	76.35	40.80	2.00	1.40	1.40	0.00
35	27.40	77.35	31.60	3.40	2.00	2.00	0.00
36	25.95	82.70	165.2	2.20	3.20	1.40	0.00
37	25.05	87.65	94.80	4.80	7.00	3.80	0.20
38	26.15	68.05	0.00	7.60	5.20	1.60	0.80
39	25.60	64.25	0.00	3.60	4.80	2.20	1.00
40	26.95	59.55	0.00	2.00	3.00	1.40	1.20
41	26.25	56.50	0.00	2.00	2.20	1.00	1.40
42	25.05	54.00	0.00	1.80	1.60	0.60	0.60
43	24.90	46.00	0.00	1.00	0.80	0.40	0.40
Coefficient of correlation (r) for population and mean atm. temperature				-0.0293	-0.2814	-0.0147	-0.1503
Coefficient of correlation (r) for population and mean relative humidity				0.3426	0.3995	0.6062*	-0.6472*
Coefficient of correlation (r) for population and total rainfall				-0.0084	0.2774	0.3658	-0.5364*

* Significant at 5% level of significance

with relative humidity and rainfall. Jyothirmai *et al.* (2002) observed higher incidence of jassid during the mid September, which might be due to local weather conditions that prevailed during the study period.

Thrips, *Scirtothrips dorsalis* (Hood). The thrips first appeared during 32nd standard meteorological week (SMW) *i.e.* 6th- 12th August (2nd week) with a mean population of 0.80 thrips/ 3 leaves. The population increased and reached its peak in the second week of September (10th-16th Sep.) with a mean population of 3.80 thrips/ 3 leaves, when the mean atmosphere temperature, relative humidity and rainfall were 25.05°C, 87.65 per cent and 94.80 mm, respectively; later on, the population declined to a minimum level of 0.40/ 3 leaves during 43rd SMW *i.e.* 22nd – 28th October. The pest exhibited significant positive correlation with relative humidity (r = 0.6062). Kenchaiah and Porte (1989) observed high incidence of thrips during September that could be due to prevailing local weather conditions.

Tobacco caterpillar, *Spodoptera litura* (Fabricius). *The tobacco caterpillar, S. litura* appeared during 37th standard meteorological week (SMW) *i.e.* 10th- 16th September (2nd week) with a mean population of 0.20/plant. The population slowly increased and reached to its peak in the second week of October with a mean population of 1.40/plant, when the mean atmospheric 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 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). Ranga Rao and Wightman (1994) observed that higher incidence of *S. litura was* initiated by heavy rainfall after the dry spell.

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REFERENCES

Alegbejo, M. D. 1999. Aphid vectors of groundnut rosette virus in northern Nigeria. *Nigerian Journal of Entomology*, **16**: 92-97

Alegbejo, M. D., Egwurube, E. and Kashina, B. D. 1999. Effect of climatic factors and aphid population on the incidence of groundnut rosette virus in Nigeria. *International Arachis News letter*, **19**: 33-34

Algebejo, M. D. and Abe, M. E. 2002. Etiology, ecology, epidemiology and control of groundnut rosette disease in Africa. *Journal of sustainable Agriculture*, **20**: 17-29

Anonymous, 2013-14. Agricultural Stastistics at a Glance. Directorate of Economics and Stastistics, Department of Agriculture and Cooperation, Govt. of India, pp. 107.

Atwal, A. S. and Dhaliwal, G. S. 2008. *Agricultural Pests of South Asia and their Management*. Publications, Rajender Nagar, Ludhiana, pp. 274-277.

Jyothirmai, T., Krishna, T. M., Ramaiah, M., Padmavathamma, K. and Rao, A. R. 2002. Efficacy of different insecticides against jassids on groundnut. *Journal Entomological Research,* **26**: 291-295.

Kenchaiah, R. P. M. and Porte, B. S. 1989. Some observations on population fluctuation of insect pests of groundnut in Karnataka. *Plant Protection Bulletin*, **41**: 7-10.

Nandgopal, V. 1992. Studies on integrated pest management in groundnut in Saurashtra. Ph. D. thesis submitted to Saurashtra University, Rajkot, *Pesticides*, **8**: 246.

Nandgopal, V., Gedia, M. V. and Makwana, A. D. 2004. Population dynamics of aphids in relation to weather parameters in groundnut. *Journal of Oilseeds Research,* **21**: 98-100.

Ramanathan, T. 2001. Genetic Improvement of groundnut, Associated Publishing Company, New Delhi, pp. 9.

Ranga Rao, G. V. and Wightman, J. A. 1994. First Annual Rabi/ summer Groundnut Reaserch workers. Group Meeting held at Indian Institute of Technology, Kharagpur, West Bengal from 12-15 September.

Satpatty, J. M. 1993. Field tests with granulated insecticides for the control of *Leucinodes orbonalis* Guen. (Lepidoptera: Pyralidae) on Brinjal. *Indian Journal of Agriculture Sciences,* **43**: 1081-1986.

Singh, S., Kumar, A. and Awasthi, B. K. 2005. Study of sucking and leaf feeding insect in relation to weather parameters on the brinjal crop. *Vegetable Science,* **32**: 210-212.

Subrahmanyam, P., Merwe, P. J. A., Vander, Reddy, L. J., Chiyembekeza, A. J., Kimmins, F. M. and Naidu, R. A. 2000. Identification of elite short duration, rosette resistant lines in world germplasm collections. *International Arachis Letter,* **20**: 46-50.

Weiss, E. A. 2000. Oilseed Crops, Blackwell Science Publications, London, pp. 13.