Biological Forum – An International Journal **16(6): 50-52(2024)**

ISSN No. (Print): 0975-1130
ISSN No. (Online): 2249-3239

Seasonal Incidence of Eriophyid mite (*Aceria cajani* Channabasavanna) on Pigeonpea

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(Received: 20 March 2024; Revised: 12 April 2024; Accepted: 13 May 2024; Published: 15 June 2024)
(Published by Research Trend)

ABSTRACT: The current study, "Seasonal Incidence of Eriophyid mite (*Aceria cajani* Channabasavanna) on Pigeonpea," was conducted in Kharif 2022 at the Mahatma Phule Krishi Vidyapeeth, Rahuri, at the Research Farm of Pulses Improvement Project. The goal of the current study was to determine the seasonality of the eriophyid mite (*A. cajani*) infestation on pigeonpea. According to research on seasonal incidence, mite incidence was observed from the 29th standard meteorological week (1.63 mites/trifoliate leaves) until the crop was harvested on the 49th standard meteorological week (1.60 mites/trifoliate leaves). The 42nd standard meteorological week had the highest mite population (4.92 mites/trifoliate leaf). The incidence of mites and maximum temperature showed a highly non-significant negative correlation (r = -0.313), while the minimum temperature showed a positive correlation (r = 0.036**).**

On the other hand, a highly non-significant positive correlation (r = 0.066) was found with evening relative humidity and a highly non-significant negative correlation (r = -0.017**) with morning relative humidity. On the other hand, a non-significant negative correlation (r = -0.289*) was found between the mite population and rainfall.**

Keywords: Pigeonpea, Eriophyidmite (*A. cajani*), Seasonal incidence, Sterility mosaic, Weather parameter.

INTRODUCTION

Pigeonpea (*Cajanus cajan* L. Millsp.), also known as Tur or Red gram or Arhar. Its centre of origin India. Pigeonpea seeds provide essential amino acids like lysine, tyrosine, and arginine, whereas cystine and methionine contents are low. Nevertheless, a number of biotic (such as diseases like Fusarium wilt and Sterility mosaic) and abiotic (such as pests like pod borers, mites, and blister beetles) factors can affect the production of pigeonpeas, including drought, salinity, and waterlogging. One of the main illnesses in pigeonpeas is sterility mosaic disease.

Sterility mosaic disease (SMD), considered as the "Green Plague of pigeonpea" caused by *Pigeonpea Sterility Mosaic Virus* (PPSMV) (Jones *et al*., 2004) and the virus is transmitted by the vector Eriophyid mite, *Aceria cajani* Channabasavanna (Kannaiyan *et al*., 1984). Sterility mosaic disease causes heavy losses in production and thereby in the yield of crops. Given the aforementioned information and the paucity of available data regarding the eriophyid mite (*A. cajani*) and its effects on pigeonpea, an investigation was carried out to determine the seasonal distribution of this mite in order to develop preventative and remedial strategies to prevent yield losses in pigeonpea caused by Aceria cajani infestation.

MATERIALS AND METHODS

Seasonal incidence of eriophyid mite (*A. cajani*) on pigeonpea was carried at Farm of Pulses Improvement Project, Mahatma Phule Krishi Vidyapeeth, Rahuri during *Kharif* 2022. Pigeonpea variety Phule Rajeshwari was sown in 100 m^2 m plot with the spacing of 90 cm ×60 cm.

For recording observations, field was divided into three equal replications and five plants were selected randomly from each plot. Three leaves (upper, middle and lower) of each randomly selected plant were collected in polythene bags and brought to laboratory. Mite population was observed under stereo binocular microscope on the lower surface of each younger trifoliate leaf. Weekly observations were made starting with the pest's first appearance and continuing until the crop was harvested. Using a standard procedure, the data on the population of mites was correlated with various meteorological parameters, including temperature (maximum and minimum), relative humidity (morning and evening), and rainfall.

RESULTS AND DISCUSSION

From the data, it was revealed that, mite incidence noticed from 29th standard meteorological week (1.63 mites/trifoliate leaves) and lasted upto harvesting of the crop *i.e.,* 49th standard meteorological week (1.60 mites/trifoliate leaves). Mite population ranged from 1.18 - 4.92 mites/trifoliate leaves.

Due to the high temperatures, the maximum population of mites was observed from the 40th to the 44th standard meteorological week, or the first week of October to the fourth week of October. It peaked during the 42nd SMW, or the third week of October, with 4.92 mites/trifoliate leaves. After that, a gradual drop in temperature caused the mite population to gradually decline until the 49th standard meteorological week, or the first week of December (1.60 mites/trifoliate leaves).

Results of the present research are nearly similar with Lakshmikantha and Prabhuswamy (2002) who reported that the population of *A. cajani* was highest in September and October and declined in November in all cultivars. Similarly the results of present research on seasonal incidence of mites are close with the investigation of Paul *et al.* (2018) who reported that peak incidence of sterility mosaic and thereby mite during third week of October to November. The current study's findings also align with those of Vasudha *et al*. (2022), who discovered that the mite population peaked in the summer and then again in October, the post-monsoon season, with the lowest mite population recorded in January.

Correlation of mite population with weather parameters. Table 2 presents the data regarding the correlation between mite incidence and weather parameters. The population of mites exhibited a highly non-significant negative correlation (r = -0.313**) with the maximum temperature and a positive correlation (r = 0.036**) with the minimum temperature. On the other hand, a highly non-significant positive correlation (r = 0.066**) was discovered with evening relative humidity and a highly non-significant negative correlation (r = -0.017**) with morning relative humidity. On the other hand, a negative correlation (r = -0.289*) was found between the mite population and rainfall.

The results of this study are almost entirely consistent with those of earlier studies. Reddy and Raju (1993) found that the mite population was significant and had a positive correlation with both maximum and minimum temperature, but a negative correlation with relative humidity and rainfall. The same correlation was noted by Singh and Rathi (1997) as well: a non-significant negative correlation with rainfall and a negative correlation with both the maximum and minimum relative humidity, but a significant positive correlation with both the maximum and minimum temperature. Vasudha *et al*. (2022) also verified the outcome.

Table 1: Seasonal incidence of eriophyid mite (*Aceria cajani*) on pigeonpea under field condition.

S.M.W.	Date of observation	No. of mites/ trifoliate/leaves	Temperature (°C)		R.H. (%)		Rainfall (mm)
			Maximum	Minimum	Morning	Evening	
29	16/07/2022	1.63	29.3	24.0	86.1	63.0	7.4
30	23/07/2022	3.32	29.1	23.5	86.7	65.3	68.4
31	30/07/2022	1.35	30.7	23.5	88.9	62.4	120.0
32	06/08/2022	3.60	28.3	24.1	84.4	71.1	56.2
33	13/08/2022	3.14	28.3	24.1	81.3	70.0	2.6
34	20/08/2022	4.15	29.8	24.1	81.3	64.1	1.6
35	27/08/2022	3.90	31.6	23.2	86.9	55.3	23.8
36	03/09/2022	1.18	30.8	23.5	91.0	65.0	150.0
37	10/09/2022	2.95	29.0	23.6	91.4	74.4	75.8
38	17/09/2022	3.42	27.5	22.2	90.1	70.4	98.0
39	24/09/2022	3.72	29.6	22.7	90.1	62.7	32.6
40	01/10/2022	4.25	31.4	23.0	87.6	58.0	30.8
41	08/10/2022	4.48	28.5	22.7	92.9	68.7	65.8
42	15/10/2022	4.92	27.6	21.6	92.3	70.9	59.0
43	22/10/2022	4.66	28.2	18.7	84.9	42.6	3.6
44	29/10/2022	3.90	29.6	17.3	83.0	36.3	0.0
45	05/11/2022	3.65	31.0	17.2	76.9	27.3	0.0
46	12/11/2022	3.28	30.1	15.6	84.6	33.7	0.0
47	19/11/2022	3.08	27.9	14.7	77.9	31.9	0.0
48	26/11/2022	2.10	30.1	16.2	81.4	36.3	0.0
49	2/12/2022	1.60	30.1	16.3	87.9	38.9	0.0

Table 2: Correlation between field incidence of Eriophyid mite (*A. cajani*) and weather parameters.

Sr. No.	Weather parameter	Correlation coefficient
1.	Maximum temperature (°C)	-0.313**
2.	Minimum temperature (°C)	0.036**
3.	Morning relative humidity (%)	-0.017**
4.	Evening relative humidity (%)	0.066**
5.	Rainfall (mm)	-0.289*

*Significant at 5% d.f. (r= 0.433) ** Significant at 1% d.f. (r= 0.549)

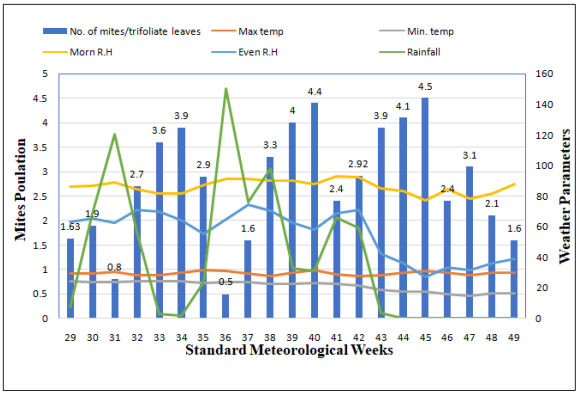

Fig. 1. Seasonal incidence of Eriophyid mite (*A. cajani*) on Pigeonpea.

CONCLUSIONS

From this study it is concluded that mite population has both positive and negative correlation with temperature as well as humidity. Population decreases with increase in rainfall. It reached to its peak (4.92 mites/trifoliate leaves) during 42nd SMW *i.e* 3rd week of October. Afterwards, mites population decreased upto 49th standard meteorological week *i.e.*1st week of December (1.60 mites/trifoliate leaves) due gradual decrease in temperature.

FUTURE SCOPE

As whole world is facing climate change issues, in such conditions there is scope for determining effect of climate change on population dynamics and seasonal occurrence of pest.

Acknowledgement. I want to express my gratitude to my research guide, Dr. C.B. Wayal and other committee members for their unwavering support and guidance during my research work.

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How to cite this article: N.I. Patil, C.B.Wayal, S.T. Aghav and V.A. Chavan (2024). Seasonal Incidence of Eriophyid mite (*Aceria cajani* Channabasavanna) on Pigeonpea. *Biological Forum – An International Journal, 16*(6): 50-52.