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SEASONAL INCIDENCE OF MAJOR INSECT PESTS ON CLUSTER BEAN *CYAMOPSIS TETRAGONALOBA (L.) TAUB*

AJAY KUMAR, N.L. DANGI, M.K. MAHLA, LEKHA AND G. CHHANGANI

Department of Entomology, Rajasthan College of Agriculture (MPUAT) Udaipur
*Corresponding author E-mail: ajaydukhiya143@gmail.com

ABSTRACT

Field experiments were conducted during *Kharif* season of 2018. The pest population was recorded in cluster bean field, population of aphid (*Aphis medicaginis* Koch), whitefly (*Bemisia tabaci* Gennadius), jassid (*Empoasca kerri* Pruthi) and thrips (*Megaleurothrips distalis* karny) were recorded on cluster bean crop throughout the growing season. The incidence of aphid, jassid and whitefly were commenced in the second week of July. While the incidence of thrips commenced in third week of July. The population of aphid, jassid and thrips attained its peak during second week of August. While the population of white fly attained its peak during first week of August. Aphid, thrips and whitefly showed negative non significant correlation while jassid showed positive non significant correlation with temperature. Aphid, jassid and thrips showed negative non significant correlation and whitefly showed significant correlation with relative humidity. Aphid, jassid, thrips and whitefly showed negative significant correlation with rainfall.

Keywords: Relative humidity, pest, population, cluster bean

INTRODUCTION

Cluster bean (*Cyamopsis tetragonoloba* L.Taub.) known as Guar, belongs to family Leguminosae is a crop of arid and semi-arid areas cultivated in north and northwest parts of India and east and south-eastern parts of Pakistan. India is the largest producer of Guar and contributes 80 per cent of total Guar production in the world. In India it is cultivated in 36 lakh hectare with production of 18 metric tones with productivity of 485 kg ha^{-1}. In India, cluster bean is mostly grown in Rajasthan, Haryana, Punjab, Uttar Pradesh and Madhya Pradesh. Rajasthan is the major guar producing state in India followed by Haryana and Gujarat and small contributions from the states of Uttar Pradesh, Punjab and Madhya Pradesh. In Rajasthan it is cultivated in 46.30 lakh hectare with production and productivity of 27.47 million tones and 593 kg ha^{-1} respectively, and 77.44 per cent production (Anonymous 2016-2017). There are many factors responsible for low productivity, of which infestation by insect pests is major one. The crop is attacked by mostly sucking insect pests as jassid (*Empoasca kerri* Pruthi), whitefly (*Bemisia tabaci* Gennadius), thrips (*Megaleurothrips distalis* karny) and aphid (*Aphis medicaginis* Koch) (Butani ,1979).

MATERIALS AND METHODS

Experimental details:

The experiment was carried out in a completely randomized design (CRD) with five replications in plot size 3.6x 3 m^2 with row to row and plant to plant spacing of 40x10 cm^2. Sowing was done in first week of July 2018. Observations were recorded at interval of 7 days.

Observations:

The observations of sucking pests was recorded by visual counting method in the early morning hours when the insects are less active. The populations of jassids, aphids, thrips and whiteflies was recorded on the 3 trifoliate of upper, middle and lower portion of five randomly selected plants in each plot. Thrips population will be counted by finger tip method. A magnifying 10x hand lens with LED illumination will be used to count the insects in the field.

Statistical analysis:

To study the prompt effect of weather parameters on population of major sucking insect pests of cluster bean, the data of abiotic factors *viz.*, mean temperature, relative humidity and rainfall were correlated. The

Table 1. Seasonal incidence of major insect pests on cluster bean during *Kharif* 2018.

S.M.W	Date and month	Abiotic factors			Mean population per five plant			
		Mean Atmospheric Temp (°C)	Mean RH %	Total rain fall (mm)	Aphids	Jassids	Whitflies	Thrips
28	**9 July- 15 July**	27.67	80.79	130.20	3.5	7.6	4.4	-
29	**16 July - 22July**	26.56	85.93	130.20	3.2	10.6	6.8	4.2
30	**23 July- 29 July**	25.56	78.36	2.40	18	24.6	13.2	10.2
31	**30 July -5Aug**	26.59	67.07	0.00	20.6	21.4	20.8	18
32	**6 Aug-12 Aug**	26.59	78.04	27.20	23.6	31.6	17.4	20.4
33	**13 Aug-19 Aug**	26.86	77.43	67.60	20.8	20.6	11.2	15.4
34	**20 Aug-26 Aug**	26.64	77.93	33.60	24.2	15.4	12.6	14.6
35	**27 Aug-2 Sept**	25.55	78.93	17.40	26	12.8	12.2	12.4
36	**3 Sept -9 Sept**	24.66	75.43	11.00	14	8	8.4	8.2
Coefficient of correlation (r1) between Mean Atmosphere Temperature and pest population					-0.280	0.082	-0.083	-0.090
Coefficient of correlation (r2)between Mean Relative Humidity and pest population					-0.506	-0.322	-0.734*	-0.591
Coefficient of correlation (r3) between Total Rainfall and pest population					-0.792*	-0.477	-0.736*	-0.686*

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

experimental data recorded during the course of investigation were subjected to appropriate statistical analysis with using method suggested by Karl Pearson for simple correlation coefficient

Where,

r_{xy} = Simple correlation coefficient.

X = Insect population

Y = aboitic factor

n = Number of observations.

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

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

RESULTS AND DISCUSSION

The aphid infestation was first reported in second week of July (28th SMW) with a mean population of 3.5 aphids/5 plants. The population of aphid gradually increased and reached to its peak (23.6 aphids/5 plants) in the 2nd week of August (32nd SMW) and showed non significant correlation with temperature and humidity and significant correlation with rainfall. Similar results were also obtained by Patel (2000), Prasad *et al.* (2008). The jassid infestation was first recorded in second week of July (28th SMW) with a mean population of 7.6 jassids/5 plants. The population gradually increased and reached to its peak (31.6 jassids/5 plants) in the 2nd week of August (32nd SMW) and showed non significant correlation with temperature, humidity and rainfall. The present finding was partially corroborated by Nitharwal and Kumawat (2013). The whitefly infestation was first recorded in second week of July (28th SMW) with a mean population of 4.4 white flies/5 plants and continued till nine weeks. The population gradually increased up to 1st week of August (31st SMW) and reached to its peak (20.8 whiteflies/5plants) in the 2nd week of august (32nd SMW) when the mean atmospheric temperature was 26.59°C, relative humidity 67.07 per cent and no rainfall and showed non significant correlation with temperature and significant correlation with humidity and rainfall. These findings are in general agreement with those of Kumar and Singh (2016) and Sharma *et al.* (2017). Thrips infestation was first recorded in 3rd week of July (29th SMW) with a mean population of 4.2 thrips/5 plants. The population gradually increased up to 1st week of August (31st SMW) and reached to its peak (20.4 thrips/5plants) in the 2nd week of August (32th SMW) and showed non significant correlation with temperature and humidity and significant correlation with rainfall. These findings are in general agreement with those of Kumar and Singh (2016); Nitharwal and Kumawat (2013).

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