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Impact of Weather Parameters on Population of *Bimisia Tabaci Genn. (Whitefly) and Oxycarenus Laetus Kirby (Dusky Cotton Bug)* at Bharwari, Distt. Kaushambi, U.P.

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Abstract

The small whitefly was found to be dusted with white waxy powder. Its nymphs and adults in the beginning sucked cell sap from leaf, resulting in curling and yellowing of leafs. The extent of damage was found to vary from 17.8 to 31.63 percent latter on this migrated to spread flower head, sucked cell sap from developing seeds, result in chaffy seeds to the extent of 13-27 percent. The flies were more abundant during in zaid crop. Population of whitefly during zaid 2001 and 2002 was not found to be correlated to any of the weather parameter but it was found correlated to maximum temperature directly (r= +0.827 and indirectly to minimum relative humidity (r= -0.829) during 2003.

Keywords: Whitefly, Sunflower crop, Dusky Cotton Bug.

Introduction

The climate of Kaushambi is monsoonic with extremes of temperature. It has three distinct season i.e., summer, rain and winter seasons, corresponding to zaid, kharif and rabi crop seasons respectively. Summer is very hot and dry characterized by high temperature ranging between the average minimum of 25.5°C and maximum of 36.5°C and sometimes it goes upto 46-48°C. Relative humidity during this period remains 40-45 percent or less, but it falls down considerably during noon and afternoon. During the day-time, westerly hot wind blow. Due to the extreme dryness, hot winds and high temperature, the ground vegetation is reduced to naught except in the cultivated field where the irrigation facilities are available. The rainy season is hot and humid diurnal fluctuation between maximum and minimum temperature; these are less in comparison the summer months. Unlike the westerly winds of the summer, in this season, the wind direction is from the east and most of the rainfall is received from monsoon winds. About 80 percent of the annual rainfall is generally received during this period. The first two months, July and August, are the rainiest. This is the season of maximum biological activities of insects due to high temperature, which favours good growth Annual average precipitation is about 1000 mm in this

area. The winter season is cold coupled with short bright days. The mean temperature varies from 15°C to 18°C, sometimes, after snowfalls in North West Himalayas, cold winds below and the temperature falls even below 4°C. The days are usually sunny. The relative humidity remains about 70 percent.

Material & Method

Experimental field at research farm of Tulsi Agroenviron Research Institute (Bharwari) was ploughed 20-25 cm deep by mould board plough after flooding with water in summer but in other seasons, pre-sowing water supply to the field depended upon moisture content soil. The field was prepared for sowing by two or three ploughings followed by planking. Seeds of cultivars modern, soaked in water over night, were sown on 19th February, 7th July and 31st October during zaid, kharif and rabi crop seasons every year throughout the tenure of the investigation. Plant to plant was 30 cm, whereas row to row distance was 45 cm. All the recommended agronomical practices with regard to fertilizer doses, irrigation and other intercultural operations were followed, Nitrogen, Phosphorus and Potassium as synthetic fertilizers were applied to the soil @ 60 kg, 40kg and 20 kg/ha. Half dose of nitrogen and full dose of P and K were applied to the soil at time of the first ploughing. The remaining quantity of N was applied when plants were 30 days old. The above mentioned activities were executed in two plots, each measuring 20x5 cm. Other cultivars were also sown as described above. Sunflower is a plant of temperate zone but varieties adopted to a wide range of environments have been developed. It is considered to be drought resistant and requires medium texture soil. Soil with sand content is considered better than more clayey. Sunflower grows well on neutral to moderately alkaline soils with a pH range of 6.5-8.0 but acidic soils are not suitable. Being photo- and thermo-insensitive, sunflower can grow throughout a year. In the soutner parts of India, the funflower is grown during all the three cropping seasons but in northern parts, it is mostly in Zaid season alone.

Result & Discussion

During 2001 and 2002, activity of whitefly in sunflower crop mostly started 35DAS and continued till harvest But during 2003 the activity of the pest started 49DAS in all crop season and continued up to harvest in all season. The small whitefly was found to be dusted with white waxy powder. Its nymphs and adults in the beginning sucked cell sap from leaf, resulting in curling and yellowing of leafs. The extent of damage was found to vary from 17.8 to 31.63 percent latter on this migrated to spread flower head, sucked cell sap from developing seeds, result in chaffy seeds to the extent of 13-27 percent. The flies were more abundant during in zaid crop. Population of whitefly during zaid 2001 and 2002 was not found to be correlated to any of the weather parameter but it was found correlated to maximum temperature directly (r= +0.827 and indirectly to minimum relative humidity (r= -0.829) during 2003. During kharif crop seasons of three consecutive years the population of the fly increased with fall is the maximum temperature. And it also increased with the increasing rains. Usually, the maximum and

minimum temperature were not found to effect the population of whitefly but minimum temperature was correlated to the population of whitefly in rabi season. Likewise minimum relative humidity was also found to be correlated. The incidence of dusky cotton bug was found only during zaid crop season each year and it was never in kharif and rabi crop season. Its initial incidence coincided with spreading of flower and was restricted to the capitutum. Its populayel level varied from 15-177/capitulum 1-163/ capitulum and 7-251 during 2001, 2002 and 2003 respectively and it was found to increase with increasing age of the sunflower plants. The population growth curve of the dusky cotton bug was found to be J-shaped. The population increased slowly and thereafter at fast rate. The post was reckoned to be major pest. Coefficients of correlation between incidence of dusky cotton bug and maximum temperature was found to be +0.921 and between the former and the minimum temperature calculated to be +0.845. Flower, the former was correlated to both the maximum relative humidity (r= -0.925) and minimum (r=-0.750) relative humidity. Table 1. Similar result also found by Bhatnagar, A. (1998). Monitoring of *Helicoverpa armigera* through light and pheromone traps and seasonal activity of their natural enemies at Bastar Plateau Zone, Broadley, R.H. (1984). Seasonal incidence and Parasitism of *Heliothis* Sp. (Lepidoptera : Pyralidae) larvae in South Queensland Sunflower, Diraviam, J. *et. al.* (1993), Lal, S.S. (1981), Mahto, Y. (1990), Mishra, B.A., *et. al.* (1992), M.M. H. Khan (2019). Effect of temperature and relative humidity on the population dynamics of brinjal and tomato infesting whitefly, Bemisia tabaci, Patel, C.C., and Koshiya, D.J. (1997), Pimpale, T.D. and Summanwar, A.S. (1983), Sekhon, B.S. and Singh, S. (1985). Effect of temperature, relative humidity and rainfall on the population build up of cotton jassid, Sethi, G.R., *et. al.* (1979), Singh, K.M. and Singh, R.N. (1977), Yumamura K, *et. al.* (2006) and Zhang S, *et. al.* (2014).

Table 1.Correlation Matrix: Association between Weather Factors and Population of Whitefly and Dusky Cotton Bug at Bharwari, Kaushambi, 2003

Insect	Crop Season	Weather parameters				Rainfall mm.
		Av. Temp. (^{o}C)		Av. Relative humidity (%)		
		Max.	Min	Max.	Min.	
Whitefly	Zaid Kharif Rabi	+0.827* =0.934* -0.431	+0.234 +0.862* -0.673	-0.829* +0.456 +0.743*	+0.621 +0.752* -0.312	- +0.753* -
Dusky cotton bug	Zaid Kharif Rabi	+0.923* - -	+0.882* - -	+0.125 - -	+0.832* - -	- - -

Fig. In Parentheses and Transformed value.

- Based on 5 observations

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