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## Study of Weather Factors and Population of *Bimisia Tabaci* Genn. and *Oxycarenus Laetus* Kirby at Bharwari, Distt. Kaushambi, Uttar Pradesh

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### Abstract

The population growth curve of the *Oxycarenus Laetus* Kirby was found to be J-shaped. The population increased slowly and thereafter at fast rate. The pest 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. *Bimisia Tabaci* Genn., the small white fly was found to be dusted white waxy powder.

**Keywords:** Population, Dusky Cotton Bug, Humidity, White fly.

### Introduction

Sunflower (*Helianthus annuus*, Linn.), one of the World's important oilseed plants, is grown in India since ancient times. Commercial cultivation of this crop in India was started in few hectares land in Southern States. Owing to its certain qualities, it has made in roads in Northern States also. Today, sunflower is grown in above 2 million hectare area.

Among the vegetable oils, sunflower oil is considered to be the most suitable for human consumption because of high level of linoleic acid and total absence of linoleic acid. Oleic and linoleic unsaturated fatty acids constitute about 90% of the total fatty acids in its oil. This characteristic has made sunflower nutritionally better than groundnut or mustard oil. Almost the entire volume of sunflower seeds produced in India is oil bearing type. The United States, however, produces more lucrative type sunflower seeds which are confectionery grade, containing less than 35% oil. The kernel of sunflower seed are also consumed in view of their high nutritional value and flavour. The sunflower is one of the most important oilseed crops not only in India but at Global level also.

## 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 19<sup>th</sup> February, 7<sup>th</sup> July and 31<sup>st</sup> 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 southern parts of India, the sunflower is grown during all the three cropping seasons but in northern parts, it is mostly in Zaid season alone.

## Result & Discussion

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 capitulum. Its population 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 pest 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. 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 whitewaxy powder. Its nymphs and adults in the beginning sucked cell sap from leaf, resulting in curling and yellowing of leaves. The extent of damage was found to vary from 17.8 to 31.63 percent later 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. 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, 2002**

Insect	Crop Season	Weather parameters				Rainfall mm.
		Av. Temp. (°C)		Av. Relative humidity (%)		
		Max.	Min	Max.	Min.	
Whitefly	Zaid	+0.242	+0.064	-0.617	-0.508	-
	Kharif	-0.937*	-0.746*	-0.456	+0.072	0.886*
	Rabi	-0.616	-0.533	+0.402	-0.416	-
Dusky cotton bug	Zaid	+0.836*	+0.605	-0.784*	-0.793*	-
	Kharif	-	-	-	-	-
	Rabi	-	-	-	-	-

Fig. In Parentheses and Transformed value.

➤ Based on 5 observations

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