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EFFECT OF WEATHER FACTORS ON POPULATION OF HELICOVERPA ARMIGERA (*GRAM POD BORER)* AND *SPILOSOMA OBLIQUA WALKER (BIHAR HAIRY CATERPILLAR)* AT BHARWARI, KAUSHAMBI, U.P.

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ABSTRACT

During rabi season of 2001, 2002 and 2003 the population levels were almost alike. However, the population levels of this pest was comparatively low during kharif and zaid crop season of each year. The capitulum borers (incidence exhibited showed increased trend during all cropping season of each year. A significant direct relationship was found between incidence and temperature (maximum or minimum during rabi season of all the years. The similar relationship was also found during zaid season of all the year. But kharif season of all the year the incidence was found to depend on the minimum temperature. However, a significant positive relationship between incidence and relative humidity was found in kharif season of 2001 alone (r = +0.872).

KEYWORDS: Population, Rabi, Capitulum, Gram Pod Borer, Bihari hairy caterpillar.

INTRODUCTION

Sunflower is though to have originated in the south-west America since it grows naturally throughout this region. The sunflower is one of the most important oilseed crops not only in India but at global level also. 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 sunflower is grown during all the three cropping seasons but in northern parts, it is mostly in Zaid season alone.

MATERIAL AND METHOD

Experimental field at research farm of Tulsi Agroenviron Research Institute (Kaushambi) 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.

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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.

RESULTS & DISCUSSIONS

The beginning of the capitulum borer activity coincided with the initiation of inflorescence in sunflower crop. It appears first on leaves but after spread it moved to capitulum at seed, filling stage. It bored capitulum and consumed the developing seed thus it directly reduced the yield.

During each year from 2001-2003 it was found to be more active in rabi season during which its population varied from 0.6-3.8 from 0.6-4.4 and from 0.5-4.2 larvae/capitulum (plant) in 2001, 2002 and 2003 respectively. During rabi season of 2001, 2002 and 2003 the population levels were almost alike. However, the population levels of this pest was comparatively low during kharif and zaid crop season of each year. The capitulum borers (incidence exhibited showed increased trend during all cropping season of each year. A significant direct relationship was found between incidence and temperature (maximum or minimum during rabi season of all the years. The similar relationship was also found during zaid season of all the year. But kharif season of all the year the incidence was found to depend on the minimum temperature. However, a significant positive relationship between incidence and relative humidity was found in kharif season of 2001 alone (r = +0.872). During each of 2001, 2002 and 2003 Bihar hairy caterpillar was more active in zaid crop season as compared to kharif and rabi crop season. The beginning of activity and population trend were almost identical in kharif and rabi crop each year. The population showed fluctuation; in the beginning, it increased for a short while and thereafter, went on decline. The population of Bihar hairy caterpillar during three crop season from 2001-2003 varied from 2.4-4 caterpillar/ plant. During 2001 the population build up of above mentioned insect was found to be correlated to maximum and minimum temperature (r=-0.949 and r= -0.856 respectively) indirectly and directly to relative maximum and minimum humidity (r= +0.812 and r= +0.93) respectively). The Bihar hairy caterpillar was observed to be vorecious defoliator. Its infestation varied from 5.8-11.2 percent. Table 1. Similar result also found by Bhatnagar, A. (1998), 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). Population build up of *Diacrisia oblique* Walker on sunflower at New Delhi, Singh, K.M. and Singh, R.N. (1977), Yumamura K, *et. al.* (2006) and Zhang S, *et. al.* (2014), Exposing eggs to high temperatures affects the development, survival and reproduction of *Harmonia axyridis.*

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Table 1.Correlation Matrix: Association between Weather Factors and Population of Gram Pod Borer and Bihar Hairy Caterpillar at Bharwari, Kaushambi, 2003.

Insect	Crop Season	Weather parameters				Rainfall mm.
		Av. Temp. (°C)		Av. Relative humidity (%)		
		Max.	Min	Max.	Min.	
Gram pod borer	Zaid Kharif Rabi	+0.872* -0.325 -0.378	+0.857* -0.732* +0.853*	-0.953* +0.542 +0.57	-0.482 +0.325 +0.387	- -0.214 -
Bihar hairy cater pillar	Zaid Kharif Rabi	-0.350 -0.208 +0.152	-0.279 -0.668 +0.417	+0.475 -0.393 -0.921*	+0.291 -0.080 -0.314	- +0.913* -

Fig. In Parentheses and Transformed value.

- Based on 5 observations

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