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EFFECT OF ABIOTIC FACTORS ON THE INCIDENCE OF MAIZE APHIDS

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ABSTRACT

The present investigation on effect of abiotic factors on incidence of maize aphids was carried out at Agronomy Farm and Department of Entomology, Rajasthan College of Agriculture, MPUAT, Udaipur. Maize crop was sown in the first fortnight of July, 2017. The population of maize aphids initiated in the first week of August and remained active throughout the growing stage and reached to its peak in the second week of September. The mean aphid population had a significant positive correlation with mean atmospheric temperature (r=0.76); whereas, mean aphid population had non significant negative correlation (r=-0.107) with relative humidity. Mean aphid population had positive but non significant correlation (r=0.065) with rainfall.

Key words: Maize, aphid, occurrence, seasonal incidence, abiotic factors.

INTRODUCTION

Maize (*Zea mays* L.) belongs to family Poaceae and is one of the most versatile crop having high yield potential and wide adaptability. It is used as human food, animal feed, in starch industry, corn oil production and as baby corn. Maize was introduced into India from Latin America in the beginning of 17th century. It is an important crop next to rice, wheat and jowar, grown over a wide range of geographical and environmental conditions in India as compared to other cereal crops. As many as 141 insect pests cause varying degrees of damage to maize crop right from sowing till harvest (Reddy and Trivedi, 2008). The serious insect pests are, maize stalk borer *(Chilo partellus* Swinhoe*)*, pink borer *(Sesamia inferens* Walker*)*, shoot fly (*Atherigona soccata* Rondani), shoot bug *(Peregrinus maidis* Ashmead*)*, corn leaf aphid *(Rophalosiphum maidis* Fitch*)*, sugarcane pyrilla (*Pyrilla perpusilla* Walker) and sugarcane leaf folder (*Marasmia trapezalis* Guen.). The corn leaf aphid *Rhopalosiphum maidis* (Fitch) is a key pest of maize during *kharif,* both nymphs and adults suck cell sap and secrete honey dew which not only attracts black ants, but also favours growth of sooty mould giving the plant sticky appearance. There are four species of aphids found to attack maize plants, *Rhopalosiphum maidis* (Fitch) being the dominant species.

The knowledge of incidence pattern of these pests plays a great role in management of these pests. Farmers of the tribal belt of southern Rajasthan have very poor economy and small holdings and do not use costly insecticides for the control of the pests..

MATERIALS AND METHODS

The present investigation was carried out at the Agronomy Instructional farm and Department of Entomology, Rajasthan College of Agriculture, Udaipur, during *kharif* 2017. Udaipur located at 23.4^0 N longitude and 75^0 E latitude at an elevation of 579.5 MSL (mean sea level) in the state of Rajasthan.

During *kharif* 2017, the experiment to record the seasonal incidence of aphids and their associated natural enemies was conducted in plots of size 3.0 m x 5.0 m replicated four times with row to row and plant to plant spacing of 60 cm and 20 cm, respectively. The insect pest complex infesting the maize crop was recorded from 21 days after germination till harvest of crop at weekly interval. Five randomly selected plants were tagged and observations were recorded from 15 cm tassel and three leaves (top, middle and lower) of each selected plant by visual count during morning hours (7.30 - 9.00 AM) depending upon their occurrence in field during crop season. The associated natural enemies were also recorded by visual count technique from the same 5 randomly selected plants per replication during early hours of the day in the maize based planting patterns of sole maize, maize + greengram, maize + blackgram, maize + cowpea and maize + soybean. The abiotic

factors *viz.*, temperature, relative humidity and rainfall were recorded throughout the crop season and simple correlation with the population of aphids and their associated natural enemies was worked out using the standard method.

$$r_{xy} = \frac{\sum XY - \frac{\sum X \sum Y}{n}}{\sqrt{\left[\sum X^2 - \frac{(\sum X)^2}{n}\right]\left[\sum Y^2 - \frac{(\sum Y)^2}{n}\right]}}$$

Where,

r_{xy} = Simple correlation coefficient.

X = Variable i.e. abiotic component. (Average temperature, relative humidity and total rainfall)

Y = Variable i.e. mean number of aphid and their associated natural enemies per plant.

n = Number of observations.

RESULTS AND DISCUSSION

The seasonal incidence of the aphids infesting maize has been presented in Table (1). During the crop season, aphid infestation began from the first week of August, 2017 that gradually increased and reached to a peak in the second week of September, 2017 with a mean of 40.00 aphids per plant in maize sole. The mean aphid population had a significant positive correlation with mean atmospheric temperature (r = 0.76)**.** The aphids showed a negative correlation with mean relative humidity (r = -0.107) and while a positive correlation with total rainfall (r = 0.65).

The present findings are in accordance with that of Carena and Glogoza (2004) and Razmjou and Golizadeh, (2010), who reported that the corn leaf aphid, *Rhopalosiphum maidis* (Fitch) is one of the important pests of maize with worldwide distribution. Sahito *et al*. (2012) reported that the population of aphid was positively (r = 0.4719) and significantly correlated with temperature and insect population increased with increasing temperature; whereas, insect population was significantly (r = -0.5104) correlated with relative humidity in negative direction and the aphid population decreased with increasing relative humidity.

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Table 1. Seasonal incidence of aphids on maize during kharif, 2017

Dates of observation	Mean Atm. Temp. (°C)	Mean RH. (%)	Total Rainfall (mm)	Mean (No. of aphids/ plant on maize)
07 – Aug	25.70	87.80	0.00	5.40
14 – Aug	26.40	85.40	2.80	19.00
21 – Aug	27.00	69.80	4.20	32.00
28 – Aug	27.40	82.10	107.20	38.00
04– Sept	25.40	85.70	71.80	10.00
11 – Sept	26.10	73.90	0.00	40.00
18 – Sept	26.20	83.90	38.60	10.00
25– Sept	26.60	62.60	0.00	35.60
02 – Oct	27.00	54.30	0.00	30.00
09– Oct	26.60	43.80	0.00	22.00
16-Oct	25.00	45.00	0.00	5.00
Seasonal Mean	26.31	70.39	20.42	22.45
Coefficient of correlation (r) b/w aphids and mean Atm. Temp.				0.765*
Coefficient of correlation (r) b/w aphids and mean RH				-0.107
Coefficient of correlation (r) b/w aphids and Total Rainfall				0.065

* Significant at 5% level of significance

REFERENCES

Carena, M.J. and Glogoza, P. 2004. Resistance of corn to the corn leaf aphid: a review. *Maydica,* **49**: 241-254.

Razmjou, J. and Golizadeh, A. 2010. Performance of corn leaf Aphid, *Rhopalosiphum maidis* (Fitch) (Homoptera: Aphididae) on selected maize hybrids under laboratory conditions. *Applied Entomology and Zoology*, **45**: 267-274.

Reddy, Y.V. R and Trivedi, S. 2008. Maize Production Technology. Academic Press. pp. 0-192.

Sahito, H.A., Abro, G.H., Talpur, M.A., Mal, B. and Dhiloo, K.H., 2012. Population fluctuation of insect pests and predators in maize, *Zea may* L. *Wudpecker Journal of Agricultural Research,* **1**: 66-473.

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