

RESEARCH NOTE

Influence of different weather parameteres on aphid, *Melanaphis sacchari* infesting *Kharif* sorghum

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ABSTRACT

Studies on population dynamics of *Melanaphis sacchari* infesting sorghum was made during 2007-08 and 2008-09 in *Kharif* season at Agricultural Research Station, N.A.U., Tanchha, district Bharuch. The incidence of pest began from fourth week of August and continued upto first week of November with a peak activity in first week of November. The abiotic factors, minimum and average temperature, morning, evening and average relative humidity, rainy days and wind velocity had significant negative association, while sunshine hours had significant positive association with *Melanaphis sacchari* on *Kharif* sorghum.

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INTRODUCTION

Sorghum aphids, *Melanaphis sacchari* is distributed in Asia, Africa and the America. It is an occasional pest worldwide. It prefers to feed on the undersurface of older leaves. The damage proceeds from the lower to upper leaves. The nymphs and adults suck sap from the lower surface of leaves, and this leads to stunted plant growth. The aphids secrete honeydew which falls on the leaves and on the ground on which sooty molds grow. The aphids infestation spoils the crops fodder quality. Hence, the present investigation was carried out which also helps in forecasting the pest incidence and to incorporate the same in integrated pest management programme gainfully.

MATERIAL AND METHODS

The study on population fluctuation of aphids and correlation with weather parameters was carried out for two consecutive years (*Kharif* 2007-08 and 2008-09) on sorghum variety, GJ 38. In order to determine the effect of weather parameters on population fluctuations of aphids, the sorghum crop (variety GJ 38) was grown in 400 m² areas during *Kharif*

seasons at Agricultural Research Station, N.A.U., Tanchha, Distt-Bharuch. The crop area was divided into 20 quadrates and 5 plants were randomly selected from each quadrates. All the recommended agronomic practices were followed for raising the crop. Experimental area was kept free from insecticidal spray throughout the season. Observations on aphids, *Melanaphis sacchari* were recorded at weekly interval. For this purpose, three leaves each from top, middle and bottom canopy of randomly selected five plants in each quadrate were observed for recording the populations of aphids. Mean population of aphids per leaf was worked out and data were statistically analyzed. In order to study the effect of weather parameters *viz.*, maximum temperature, minimum temperature, average temperature, morning relative humidity, evening relative humidity, average relative humidity, sunshine hours, rainy days and rainfall on population of various insect pests, correlation coefficient and multiple/simple regression were worked out.

RESULTS AND DISCUSSION

During 2007-08, population of aphids (Table 1) on

sorghum commenced with 0.18 aphids/leaf from 42nd standard week (third week of October). The number of aphids per leaf increased gradually and reached to a peak level 9.55 aphids/leaf on 45th standard week (first week of November) *i.e.* at the time of harvesting. During 2008-09, the incidence of aphids (0.23 aphids/leaf) was commenced from the 35th standard week (last week of August). The aphids population increased gradually and reached to a peak (12.62 aphids/leaf) during 45th standard week (first week of November) *i.e.* at the time of harvesting. Population of aphids appeared earlier in 2008-09 and also higher.

The pooled data of two years revealed that the aphids population was initiated from the fourth week of August (Table 1 and Fig. 1). The average number of aphids ranged from 0.12 to 11.09 aphids per leaf during the fourth week of August to first week of November *i.e.*, harvesting of crop. Two peaks of population level during 36th standard week (first week of September, 0.16 aphids/leaf) and 40th standard week (first week of October, 1.29 aphids/leaf) were observed. Thereafter, the pest population declined and again gradually increased till harvesting of crop (12.62 aphids/leaf). The activity of the pest was low during early stage of crop.

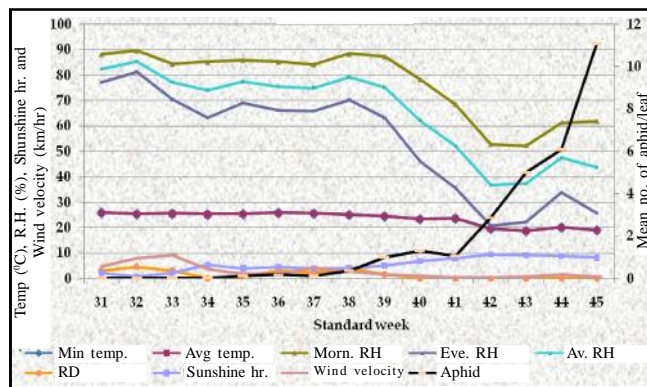


Fig 1 : Correlation of aphids on sorghum in relation to weather parameters during *Kharif* season

The correlation studies (Table 2 and Fig. 1) revealed that the aphids population had significant negative correlation with minimum temperature, average temperature, morning relative humidity, evening relative humidity, average relative humidity, rainy days and wind velocity indicating increasing this factor adversely effect on aphids population. While

Table 1: Population of aphids, <i>Melanaphis sacchari</i> on sorghum variety GJ 38 in <i>Kharif</i> Season						
Sr. No.	Met. week	Date	WAS	Mean aphids population per leaf		
				2007-08	2008-09	Pooled
1.	31	30-5 July	2	0.00	0.00	0.00
2.	32	6-12 Aug	3	0.00	0.00	0.00
3.	33	13-19	4	0.00	0.00	0.00
4.	34	20-26	5	0.00	0.00	0.00
5.	35	27-2	6	0.00	0.23	0.12
6.	36	3-9 Sep	7	0.00	0.32	0.16
7.	37	10-16	8	0.00	0.20	0.10
8.	38	17-23	9	0.00	0.69	0.35
9.	39	24-30	10	0.00	1.93	0.97
10.	40	1-7 Oct	11	0.00	2.57	1.29
11.	41	8-14	12	0.00	2.09	1.05
12.	42	15-21	13	0.18	5.52	2.85
13.	43	22-28	14	0.05	9.98	5.02
14.	44	29-4	15	0.22	11.97	6.10
15.	45	5-11 Nov	16	9.55	12.62	11.09

MW = Standard meteorological week

WAS = Week after sowing

Table 2 : Correlation coefficient between <i>Melanaphis sacchari</i> and weather parameter during <i>Kharif</i> season											
Year	Weather parameter										
	Temperature ^o C			Humidity %			Rainfall	Rainy days	Sunshine hours	Wind velocity	Evaporation
	Max.	Min.	Mean	Morn.	Even.	Mean					
2007 - 08	0.315	-0.340	-0.178	-0.207	-0.326	-0.283	-0.231	-0.246	0.174	-0.208	-0.205
2008 - 09	0.210	-0.988*	-0.618*	-0.897*	-0.851*	-0.875*	-0.455	-0.570*	0.783*	-0.599*	0.814
Pooled	0.193	-0.729*	-0.556*	-0.589*	-0.621*	-0.615*	-0.354	-0.418*	0.514*	-0.407*	0.309

* Indicate significance of value at P=0.05

sunshine hours had significant positive correlation. Maximum temperature, rainfall and evaporation had non-significant correlation with aphids population.

The multiple regression study was carried out and the following equation was fitted :

$$Y = 34.82 - 1.4529 \text{ Min TEMP.} - 0.3384 \text{ Avg TEMP} + 0.4901 \text{ MRH} + 0.0001 \text{ ERH} - 0.3641 \text{ ARH} - 0.2015 \text{ RD} - 0.5440 \text{ SSH} + 0.0565 \text{ WV} \quad (R^2=0.6323)$$

The multiple regression co-efficient (R^2) was 0.6323 which explains that there was 63.23 % variation in the dependent variable due to various independent variables. Prabhakar *et al.* (1986) reported that aphid population were negatively correlated with morning relative humidity. Waghmare *et al.* (1995) observed that aphid, population was negatively correlated with cumulative value of depression of temperature. The present finding revealed that aphid population negatively correlated with minimum temperature, average temperature, morning, evening and average relative humidity in *Kharif*. Thus present finding is in closed agreement with earlier reports made by Prabhakar *et al.* (1986) and

Waghmare *et al.* (1995).

Conclusion :

The activity of aphid was recorded from last week of August and continued up to first week of November with a peak activity in first week of November. The abiotic factors like minimum temperature, average temperature, morning relative humidity, evening relative humidity, average relative humidity, rainy days and wind velocity had significant negative correlation with aphids population while, sunshine hours had significant positive correlation.

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