

# Correlation between morphological characters of sorghum genotypes with aphid and shoot bug incidence



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## SUMMARY

For resistance against aphid (*Melanaphis sacchari* Zehntner) and shoot bug (*Peregrinus maidis* Ashmead), one hundred and thirty one genotypes of *Rabi* sorghum were studied at the Regional Agricultural Research Station, Bijapur, Karnataka, India during *Rabi* 2006-07. Morphological characters viz., plant height, distance between two leaves and leaf angle were correlated non-significantly and positively with aphid density. Number of leaves was negatively and significantly associated with aphid incidence, whereas, leaf area correlated significantly and positively. A significant and positive correlation for plant height and leaf area, a significant and negative correlation for number of leaves per plant and non-significant positive correlation for distance between two leaves and leaf angle with shoot bug damage was observed.

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Plant  
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Aphid (*Melanaphis sacchari* Zehntner) and shoot bug (*Peregrinus maidis* Ashmead) are serious pests of *Rabi* sorghum in Northern Karnataka, India. Most of the released hybrids and high yielding varieties are highly susceptible to these pests. Sorghum aphid is becoming economically important in recent years in many sorghum growing areas leading to losses in grain and fodder yield. The shoot bug is a major hurdle in *Rabi* sorghum production by causing dual problem of direct loss by sucking the sap and indirect damage by transmitting sorghum stripe disease. Hence, it comes in the way of harvesting potential yield of grain and fodder. The characteristics of the plants that make them "resistant" for given phytophagous insects are not always clear. It may incorporate many attributes of the plants from the microscopic to the macroscopic, e.g., its community, its phonological characteristics, its physiological state and its physical and chemical properties. All these properties of the plants are known to have influence upon the phytophages (Ananthkrishnan, 1992). Morphological and

biochemical factors for insect resistance in plants usually overlap each other. The morphological factors have been studied in one hundred and thirty one genotypes of *Rabi* sorghum to identify the cause of resistance against the aphid and shoot bug.

## MATERIALS AND METHODS

The study was carried out during *Rabi* 2006-07 at the Regional Agricultural Research Station, Bijapur, Karnataka, India. The experiments were conducted in a randomized block design with three replications in a plot size of 1.2 x 4.0 m (2 lines of 4 m length) during *Rabi* season. From each entry, in each replication, five plants were selected randomly and observations on plant height (cm), distance between two leaves (cm), number of leaves per plant and leaf angle (degrees) and leaf area (length x breadth x 0.7) were recorded at milky stage of the crop. These morphological characters were correlated with aphid density and percentage of plant damage due to shoot bug. The aphid population density was recorded on all the five randomly selected

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**Table 1: Correlation coefficients between morphological characters of sorghum genotypes and aphid incidence**

Parameter	AD 80 DAE	PH 45 DAE	DBL	NLP	LAG	LAR
AD 80 DAE	1.00					
PH 45 DAE	0.15	1.00				
DBL	0.14	0.33**	1.00			
NLP	- 0.33**	- 0.27**	- 0.24**	1.00		
LAG	0.03	- 0.01	0.06	0.00	1.00	
LAR	0.24**	0.41**	0.37**	- 0.17*	0.12	1.00

**Table 2 : Correlation coefficients between morphological characters of sorghum genotypes and shoot bug incidence**

Parameter	SBD 45 DAE	SBD 60 DAE	PH 45 DAE	DBL	NLP	LAG	LAR
SBD 45 DAE	1.00						
SBD 60 DAE	0.86**	1.00					
PH 45 DAE	0.28**	0.38**	1.00				
DBL	-0.01	0.09	0.49**	1.00			
NLP	- 0.17*	-0.30**	-0.16	-0.24**	1.00		
LAG	0.05	0.08	0.04	0.06	0.00	1.00	
LAR	0.08	0.26**	0.25**	0.37**	- 0.17*	0.12	1.00

\* and \*\* indicate significance of values at P=0.05 and 0.01, respectively

SBD= Shoot bug damage, AD= Aphid density, PH= Plant height,

DBL= Distance between two leaves, NLP= Number of leaves per plant,

LAG= Leaf angle, LAR= Leaf area, DAE= Days after emergence

plants in each treatment at peak incidence during third week of January. Six leaves in each plant from apex to downward excluding flag leaf as well as dried leaves at the bottom were observed for aphid colonies and rated using 0-9 scale as explained by Kadam and Mote (1983). Total number of plants in each entry was recorded and number of plants showing yellowing, girdling and stunted growth were recorded at 70 days after emergence and percentage of plant damage due to sorghum stripe disease was worked out.

## RESULTS AND DISCUSSION

Results from correlation study revealed non-significant and positive correlation between aphid density and plant height (0.15), distance between two leaves (0.14) and leaf angle (0.03). Whereas significant and negative correlation between aphid density and number of leaves per plant (-0.33), positive and significant correlation with leaf area (0.24) was evident (Table 1).

Significant and positive correlation between the shoot bug plant damage and that of plant height (0.38) and leaf area (0.26) existed. While, non-significant and positive correlation between shoot bug damage and distance between two leaves (0.09) and leaf angle (0.08) and significant and negatively with number of leaves per plant (-0.30) was observed (Table 2).

A non-significant positive correlation was observed

for plant height, distance between two leaves and leaf angle with aphid density. Whereas, with increase in number of leaves, there was reduction in aphid population and relations were significant. Leaf area indicated a direct significant positive relationship with aphid density (Table 1). These findings are in conformity with Balikai and Lingappa (2002) who reported that, the increase in the plant height and number of leaves, there was a reduction in aphid population. There was a positive correlation between leaf angle and distance between two leaves and aphid incidence (Table 1).

A significant positive correlation of plant height and leaf area, non-significant positive correlation for distance between two leaves and leaf angle and significant negative correlation between numbers of leaves per plant was observed with shoot bug damage (Table 2). These findings are in close agreement with Mote and Shahane (1994) who reported that no significant correlations were noticed between plant morphology, sugary exudates and infestation of *M. sacchari* and *P. maidis*.

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