

Correlation and path analysis in parents and hybrids for resistance to sorghum shoot fly [*Atherigona soccata* (Rondani)]

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SUMMARY

Correlation, and path analysis were carried out in 20 parents and 87 hybrids of sorghum for 13 characters to assess the factors responsible for resistance to sorghum shoot fly both during rainy and post rainy seasons. Correlation trends and values were similar among parents and hybrids as well as during rainy and post rainy seasons. Egg count, per cent oviposition and deadheart percentage were strongly associated with each other. On the other hand, the defensive characters influenced each other and were positively interrelated. All the defensive characters were inversely related with susceptibility parameters like deadheart percentage, oviposition percentage and egg count. These defensive traits largely contribute to deadheart formation indirectly through per cent oviposition. Much contribution to deadheart percentage was through oviposition percentage and least from egg count. Hence, it is suggested to use per cent oviposition for indicating antixenosis type of resistance rather than egg count. An ideal ideotype must have high seedling vigour, narrow, erect, pale green leaves, high glossy character of leaves, dry central leaf whorl (leaf surface wetness), higher seedling and plant height, more number of trichomes on upper and lower leaves.

Key words : Correlation, Path analysis, Shoot fly, Resistance, Sorghum

The shoot fly, [*Atherigona soccata* Rondani (Diptera: Muscidae)] is one of the key pests of sorghum in sorghum growing areas of Asia, Europe and Africa. Up to 75.6 and 68.6 per cent losses by shoot fly in sorghum grain and fodder yield, respectively have been reported (Pawar *et al.*, 1984). The resistance to sorghum shoot fly appears to be a complex character and depends upon the interplay of a number of component characters, which finally sum up on the expression of shoot fly resistance. In obtaining a clear picture of the contribution of each of such component character in building up the resistance, it would be necessary to discriminate them through their correlation and causation study involving these traits. Such a study would provide a realistic basis for allocation of weightage to each of the governing traits in deciding suitable selection criteria for genetic improvement of resistance. With this in view, an investigation was taken up, the results of which are presented in this paper.

MATERIALS AND METHODS

Fourteen shoot fly resistant parents *viz.*, ICSV 708, ICSV 714, IS 923, IS 2122, IS 2291, IS 2312, IS 2314, IS

5480, IS 5613, IS 5636, IS 22144, SPSFR 94012 A, SPSFR 94022 A and SPSFR 94031A and six susceptible parents but good for agronomic traits *viz.*, RS 29, C 43, SB 7001, SB 401A, 2077A, and 27A were selected for the study, based on initial screening for resistance to shoot fly. Further, 84 hybrids obtained from crossing these parents in 14x6, L x T fashion were also included. Among these hybrids, 33 were cross between resistant x resistant, nine were between susceptible x susceptible, and 42 were between resistant x susceptible parents.

The 104 test entries including parents and hybrids were laid out in a randomised block design at Sorghum Research Scheme, University of Agricultural Sciences, Dharwad during both rainy and post rainy seasons. During each season, the seeds of entries were sown in a plot size of 1.8 x 4.5 m with inter and intra row spacing of 45 and 15 cm, respectively. Interlard Fishmeal Technique (Taneja and Leuschner, 1985) was adopted to ensure high and uniform pressure of shoot fly infestation on test entries. In this technique, susceptible entry CSH-1 was sown 14 days earlier to test material as interlards at every 24 rows. Fishmeal was kept in the field as to attract shoot fly, multiply them in susceptible entry, and then infest the test material uniformly. Observations were recorded on 8 components of resistance to shoot fly *viz.*, seedling vigour, glossiness, leaf colour, leaf width, leaf erectness, seedling height, trichome density, leaf surface wetness; and three shoot fly damage indicating traits *viz.*, egg load, per cent oviposition and deadheart percentage besides on plant height and yield. Observations on all the component traits

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