Asian J. of Bio Sci. (April, 2008) Vol. 3 No. 1 : (140 -144)

Combining ability studies for shoot fly resistance and yield parameters in sorghum

S.S. GOMASHE[1]*, M.B. MISAL[1], S.B.DESHMUKH[1] AND S.B. SARODE[2]
[1]Department of Agricultural Botany, Marathawada Agricultural University, Parbhani (M.S.) INDIA
[2]Department of Agricultural Botany, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, AKOLA (M.S.) INDIA

(Accepted : February, 2008)

The parents and crosses differed significantly for most of the characters indicating considerable amount of genetic variability in the materials studied. The lines MS 104B and SPSFR 94010B and the testers SFCR 125 and SFCR 151 were found as best general combiners. Amongst the crosses MS 104A x SFCR 151, SPSFR 94010A x SFCR 125 and PMS 7A x ICSV 700 were identified as best considering sca effects for shoot fly resistance traits and grain yield.

Key words: Combining ability, Shoot fly, Resistance, Sorghum.

INTRODUCTION

Sorghum (*Sorghum bicolor* (L.) Moench) is the fifth most important cereal crop after rice, maize, wheat and barley. Productivity of sorghum is highly variable from county to country. Several constraints affect grain productivity, one of the major factors causing these low sorghum grain yields is insect pest damage. The annual loss of sorghum production due to shoot fly (*Atherigona soccata* Rond.) in India is estimated at nearly US$ 200 million (ICRISAT, 1992). The choice of suitable parents for evolving better varieties or hybrids is important in plant breeding. Parents for hybrid breeding can be selected based on either *per se* performance or general combining ability or both. The combining ability studies were carried out by using 78 hybrids generated by crossing 6 lines with 13 testers.

MATERIALS AND METHODS

The parental lines for present study were obtained through the courtesy of Senior Sorghum Breeder, Sorghum Research Station, Marathawada Agricultural University, Parbhani and International Crop Research Institute for Semi-Arid Tropics (ICRISAT), Hyderabad, India. These genotypes were selected on the basis of genetic variation observed for shoot fly resistance and yield contributing traits. Total 78 crosses were developed by crossing 6 lines with 13 testers in a line x tester mating design were planted along with parents. The material was tested in late *kharif*, 2005 in randomized block design with two replications. Each genotype was planted in a single row plot (4m) with 45 cm x 15 cm crop geometry.

Border rows (6) with susceptible genotype (PVK 801) were sown around experimental plot 20 days before sowing of main experiment. To attain uniform shoot fly pressure under field condition the inter lard fish meal technique was followed for screening. Ten days after seedling emergence polythene bags containing moistened fish meal were kept in test entries at uniform interval covering the entire area to attract the emerging shoot flies from infester rows (PVK 801). The protection measures were avoided until the shoot fly infestation period is over. Observations were recorded on Glossiness score (1-5), 1 for high glossiness and 5 for non-glossy genotypes, per cent oviposition (14 and 21 DAE), per cent dead hearts (21 and 28 DAE), trichome density (nos./ microscopic field (10x) on upper and lower leaf surfaces) and grain yield/plant (g).

The analysis was carried out for line x tester mating design as suggested by Kempthorne (1957).

RESULTS AND DISCUSSION

The results of analysis of variances for line x tester (Table 1) indicated that the differences due to genotypes, crosses, parents, lines, testers and line x testers were significant for most of the characters studied indicating presence of genetic variability for all the characters except for lines for oviposition I (%), oviposition II (%), dead heart I (%) and dead heart II(%) and grain yield per plant (g).

The ratio of 6^2gca/6^2sca less than unity indicated

* Author for Correspondence