SHORT COMMUNICATION

Selection of Parents for Heterosis Breeding through Line x Tester Analysis in Upland Cotton *(Gossypium hirsutum)*

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In the modern era of synthetic fibres, cotton continues to occupy top position as king of fibres and accounts for more than 60 per cent consumption in the World's textile industry. A study on heterosis will therefore have a direct bearing on the breeding methodology to be employed for varietal improvement. Hybridization is an important tool to exploit the genetic variability and breaking linkages as well as to create new genetic variability. Looking to the importance of the hybrid in increasing productivity as well as quality of cotton, present investigation was undertaken to measure heterosis for yield and its component traits.

Two experiments were conducted on 16 hybrids in each set. First experiment consisted of the crosses of two females (K 34007 and F 891 lines) and eight males (LRA 5166, F 505, LRK 516, H 777, F 1184, HS-6, LH 900 and F 1183 as testers). The second experiment consisted of eight females (testers and males of first experiment) and two males (lines and females of first experiment). These hybrids were grown along with ten parents in randomized block design with three replications during *kharif* 1995-96 and 1996-97. Hybrids and parents were grown at spacing of 67.5x60 cm and 67.5x30 cm, respectively. Data were recorded for seed cotton yield/plant (g) and its four component traits namely, boll weight (g), mean fibre length (mm), G.O.T. (%) and seed Index (g) and lint index on five randomly selected plants in each genotype from each replication. Heterosis was measured over better parent and the best parent.

The mean squares due to genotypes were significant in both the sets of experiment for all the traits indicating that there was enough genetic variability present in the experimental material selected for the study.

Seed Cotton Yield per Plant

In the first experimental set, three hybrids, K 34007xLRA 5166, F 891xLRK 516 and F 891x LH 900 showed more than 20 per cent positive heterosis (over better parent). The maximum heterosis observed over better parent was 52.71 per cent for the hybrid K 34007 x LRA 5166. Over the best parent, hybrid F 891 x LH 900 gave 29.69 per cent heterosis and 36.39 per cent over better parent.

In the 2nd experimental set the hybrids F 1184 x K 34007, HS-6 x K 34007 and HS 6 x F 891 gave the heterosis of 24.14 and 31.03 per cent over better parent, respectively. None of the hybrids could give more than 20 per cent heterosis over the best parent in this experimental set. Results indicated that crosses involving K 34007 and F 891 as male and female parents could give positive heterosis with other parents for seed cotton yield.

Boll Weight (g)

Six crosses for boll weight showed more than 20 per cent heterosis (22.77 to 42.04 per cent) over better parent in the first experimental set. The cross F 891 x HS-6 had maximum positive heterosis followed by F 891 x K 34007 and F 891 x F 505. None of the cross could show more than 20 per cent positive heterosis over best parent. Three crosses, H 777 x F 891, HS-6 x F 891 and LH 900 x F 891 had positive heterosis of 63.29, 48.23 and 22.35 per cent, respectively over better parent in the second experiment. Like for the first experiment, none of the cross in the 2nd experiment had more than 20 per cent heterosis over the best parent for boll weight. Results suggested that in crosses using F891 and HS-6 either as male or female with other parents give positive heterosis for boll weight.

Mean Fibre Length (mm)

In the first experimental set, hybrids F 891 x HS-6 (28.01%) and F891 x F 1183 (22.69 %), gave positive heterosis for mean fibre length over better parent. Over the best parent none of the hybrids gave positive heterosis. In the second experiment none of the cross combinations

had more than 20 per cent positive heterosis over either better or the best parents.

Ginning Out Turn (%)

The highest positive heterosis was observed for the crosses K 34007xH 777 (10.00) followed by K 34007 x LH 900 (8.33) and K 34007 x F1183 (7.39) over better parent in the first experiment. All the crosses gave negative heterosis over best parent. For crosses LH 900 x K 34007, F1184 x K 34007 and H 777 x K 34007 heterosis over better parent were 14.44, 8.03 and 7.78 per cent, respectively in the second experiment. The cross HS-6 x K 34007 showing heterosis over better parent was the only hybrid which also showed positive heterosis of 5.4 per cent over the best parents. For ginning out turn K 34007 could be used either as male or female for desirable heterosis.

Seed Index (g)

Only two crosses K 34007 x LH 900 (8.33) and K 34007 x F1183 (7.39) showed positive heterosis over better parent in the first experiment. Hybrids F1184xF891 and HS-6 x F891 gave positive heterosis of 8.64 and 6.17 per cent, respectively over better parent in the second experiment.

These results are in agreement with the findings of many workers who recorded significant heterosis for boll weight (Patil *et al.*, 1991; Tuteja *et al.*, 1993 and Ahuja and Tuteja, 2000) and for yield of seed cotton (Kalsy and Garg, 1989; Bhale and Bhat, 1990; Koodalingam *et al.*, 1991; Singh *et al.*, 1995; Tuteja *et al.*, 1993 and Ahuja and Tuteja, 2000) and quality traits like mean fibre length (Gupta and Singh, 1987; Wang and Pan, 1991) ginning out turn by (Rao *et al.*, 1977; Tuteja *et al.*, 1993 and Tiwari *et al.*, 1987), seed index (Mirza, 1986; Gupta and Singh, 1987; Rathinavelu and Premsankar, 1990). Results discussed clearly indicate that positive heterosis values were higher for experimental set involving two females and eight males (2x8) in comparison with eight female and two males (8x2).

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