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Heterosis and combining ability for yield, economic and morphological traits in deshi cotton (*Gossypium arborium* L.)

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SUMMARY

Eighteen deshi cotton (*Gossypium arborium* L.) hybrids were evaluated for heterosis and combining ability at Akola location. The results revealed that, the cross GAM-87 x AKA-9124 recorded highest heterosis and heterobe-ltiosis for seed cotton yield. Female GAM-87 and Male AKA-9124 proved to be the good general combiners for economic traits and as regards specific combining ability effects, same cross combination exhibited highest values for most of the traits.

Key words : Heterosis, Combining ability, Deshi cotton.

Cotton occupies a unique position among the commercial crops of India. In cotton, yield and fibre quality are equally important in developing superior varieties. In recent years, biometrical techniques are being increasingly used to study the combining ability of parents to infer the underlying gene action for different traits and to plan a successful breeding programme. Accordingly, line x tester analysis is adopted for identification of superior cross combinations and parents to be used for crossing programme.

MATERIALS AND METHODS

Eighteen hybrids were developed by crossing six lines *viz.*, GAM-87, PA-255, AKA-8616, GAM-54, CINA-323B and PA-182 and three testers *viz.*, AKA-9431, AKA-9124 and AKA-5 in the year 2002 and were evaluated along with parents in *kharif* 2003 at Cotton Research Unit, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola. The experimental layout plan was as per the Randomized Block Design replicated thrice. Hybrids and parents were grown in separate blocks with randomization within hybrids and within parents themselves. Each plot was of two rows of 6 m row length spaced at 60 cm apart; 60 cm distance was adopted within two plants to raise the healthy crop. Observations were recorded on randomly selected five competitive plants in each treatment per replication. For morphological traits *viz.*, number of sympodia, number of bolls, seed cotton yield, boll weight, seed index, ginning percentage and lint index. Line x tester analysis (Kempthorne, 1957) was performed for estimation of combining utility and standard procedure for the estimation of heterosis over mid parent and better parent.

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RESULTS AND DISCUSSION

Variance for treatment were significant for boll weight, seed cotton yield, seed index, lint index, ginning percentage and were nonsignificant for number of sympodia and number of bolls. Variance due to parents were significant for economic traits, seed cotton yield, seed index, ginning percentage and were non-significant for morphological traits. Variance due to hybrids were significant for boll weight, seed cotton yield, lint index, ginning percentage and non-significant for number of sympodia, number of bolls and seed index (Table 1).

Highest per cent heterosis and hetero-beltiosis has been recorded by hybrid AKA-8616 x AKA-9431 (30.06 and 25.48 %, respectively) for number of sympodia per plant and for number of bolls per plant, highly significant and positive heterosis and hetero-beltiosis was recorded by the hybrid PA-182 x AKA-5 (76.01 and 67.83 per cent, respectively). Kajjidoni *et al.* (1984) also reported 80.87 and 85.87 % heterosis and hetero-beltiosis for number of bolls per plant. While for the character of boll weight per plant hybrid GAM-87 x AKA-5 exhibited maximum values for heterosis and hetero-beltiosis (22.83 and 20.85 % respectively). Similar results were reported by Kapoor *et al.* (2002) in boll weight.

As regards economic traits, seed cotton yield ten hybrids exhibited significant and positive heterosis over mid parent and eight hybrids exhibited significant and positive hetero-beltiosis. Hybrids GAM-87 x AKA-9124 recorded maximum values for heterosis and hetero-beltiosis (177.85 and 137.65 %, respectively). Hola *et al.* (1984), Tuteja and Singh (2001) and Choudhari and Borale