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Combining ability studies of yield and component characters in American cotton

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The present investigation was carried out to study the combining ability for yield and yield related traits. Among the parents KH-111 found best general combiner for seed cotton yield per plant and component characters. Two hybrids, KH-111 x RAH-101 and NA-1325 x G. Cot-16 identified as best cross combinations based on sca effects for seed cotton yield per plant , yield contributing components and fibre quality parameters.

Key words: General combining ability and Specific combining ability

Introduction

Improvement in yield and quality is the major objective in plant breeding programme. Selection of parents is crucial in hybridization programme. Combining ability analysis has been widely used for identifying potential parents and superior crosses. The analysis also aids in characterizing genetic nature of the population and adoption of suitable breeding method to achieve the desired goal. The present paper relates to studies on combining ability involving a diallel set of 10 lines of diverse origin.

Materials and Methods

The present investigation was carried out at Experimental Farm, Department of Agricultural Botany, Parbhani during *kharif*, 2003. Ten diversified lines were crossed (without reciprocals) to generate 45 F_1 combinations and these 45 F_1s along with 10 parents were evaluated for their combining ability in RBD with two replications. Observations were recorded on 10 characters including seed cotton yield per plant, yield contributing characters and quality characters on five randomly selected plants in each replication for each of the treatment. The characters studied were number of bolls per plant, boll weight, ginning percentage, seed index, 2.5 % span length, micronaire value , fibre strength, fibre elongation and uniformity ratio. The data was used for statistical analysis following method II and model I given by Griffing (1956).

Results and Discussion

The results in Table 1 revealed that the mean sum of squares for general combining ability and specific combining ability were highly significant for all the characters except for sca variances for fibre strength and uniformity ratio indicating the importance of both additive as well as non additive gene action in inheritance of these characters. The importance of both additive and non additive gene action has been reported by Bhatade *et al*. (1992), Sambamurthy and Ranganadhacharyulu (1998) and Khorgade *et al*. (2000).

The ratio of 6^2gca/6^2sca variance components indicated predominance of non additive gene action for all the characters except for ginning percentage and uniformity ratio. The ratio of 6^2gca/6^2sca was greater than unity for ginning percentage and uniformity ratio indicated involvement of additive genes in control of these traits. Similar findings were also reported by Modi *et al*. (1999) and Banumathy *et al*. (2000).

The estimates of gca effects in Table 2 showed that the parent KH-111 found as best general combiner for seed cotton yield per plant and all other character except ginning percentage and uniformity ratio. This parent was involved in top four out of five crosses for seed cotton yield per plant.

The parent RAH-2211 though found good general combiner for seed cotton yield per plant, number of bolls per plant and ginning percentage but was poor general combiners for other traits. The parent JK-276-10-5 was found good general combiner for number of bolls per plant

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