International Journal of Plant Sciences (2006) **1** (1) : 88-91

Combining ability and heterosis for fruit yield characters in Okra (*Abelmoschus esculentus* (L.) *Moench)*

N. SENTHIL KUMAR AND A. ANANDAN*
Genetics and Plant Breeding, Department of Agricultural Botany, Faculty of Agriculture, Annamalai University, Annamalai Nagar - 608 002 Tamil Nadu.

(Accepted : October, 2005)

SUMMARY

A six-parent diallel including reciprocals were made. The analysis of variance for combining ability revealed the importance of both additive and non-additive gene action in the inheritance of all the 10 traits studied. Reciprocal differences in the estimates of combining ability variances were recorded for all the 10 traits investigated. The parents were identified as good general combiners for most of the characters of interest. The hybrid namely, Parbhani kranti x Punjab Padmini portrayed high per se performance coupled with high SCA effects for majority of the traits, also evinced high standard heterosis for fruit yield per plant. In the presence of both additive and non-additive gene action coupled with reciprocal differences, reciprocal recurrent selection may be resorted for population improvement.

Key words**:** Combining ability, heterosis, Okra, gene effect.

Okra is an ancient vegetable crop. The reproductive biology of the crop offers good scope for exploitation of heterosis. Therefore, proper choice of parents for hybridization is essential in generating heterotic hybrids. Further, relevant information about the inheritance of different fruit yield characters has an important role in deciding proper selection strategies, besides creation of variability. In the present study, six genotypes of Okra were utilized in and diallel crossing programme (including reciprocals) to obtain information on the combining ability, inheritance of fruit yield and their component characters and heterotic potential.

MATERIALS AND METHODS

An experiment involving six parents of Okra viz., Arka Anamika (AA), Parbhani Kranti (PK), Punjab Padmini (PP), Pusa Sawani (PS), MDU 1 and Mohanur Local (ML) and their 30 crosses, obtained by crossing them in diallel fashion (including reciprocals), were laid out in Randomized Block Design with three replications during July-Oct, 2001. Each entry was grown in a 3 m long single row plot with a spacing of 45 x 30 cm. Observations were recorded on five randomly selected plants in each plot on 10 fruit yield traits and its analysis of combining ability based on mean values was done as per Model 2, method 1 of Griffing (1956). Relative heterosis, heterobeltiosis and standard heterosis were worked out as per the standard methods.

RESULTS AND DISCUSSION

Statistical analyses for parents, direct as well as their reciprocal hybrids revealed highly significant differences among parents and hybrids (Table 1). This indicated the presence of high genotypic variability in the reference population. A detailed analysis of combining ability and gene actions were therefore, appropriate.

The analysis of variance for combining ability revealed significant GCA and SCA variances for all the 10 characters studied (Table 2). The RCA variances were also significant for all the traits except days to first flowering, number of nodes and branches per plant. This indicated the importance of both additive and non-additive gene action in the inheritance of the traits studied. However, the estimates of GCA variances were higher than their corresponding SCA and RCA variances for all the 10 traits studied. The ratio of GCA mean squares to SCA mean squares and GCA mean squares to RCA mean squares were more than unity. Similar findings were earlier reported by Pathak *et al*., (1997). This indicated that there is opulence of additive genetic variance for these characters. Hence, these characters could be well exploited by resorting to simple pure line selection. It was quite interesting to conceive for all the ten characters studied exhibited reciprocal differences. This may be due to maternal effect or cytoplasmic influence or the confounded effect. In the presence of both additive and non-additive gene action coupled with reciprocal differences, reciprocal recurrent selection may be resorted for population improvement. The contribution of individual lines to hybrid performance was accomplished by comparing the general combining ability effects. The parents, which recorded high fruit yield per plant *viz*., AA and PP were good general combiners for five and eight out of ten characters studied, respectively. The parent namely, AA exhibited significant positive *GCA* effects for number of nodes, number of fruits, fruit yield, total green matter production and harvest index. It also exhibited negative *GCA* effects for days to first flowering. The parent namely, PP portrayed significant positive *GCA* effects for all the traits except days to first flowering and

*Author for correspondence