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STUDIES ON HYBRID VIGOUR IN BITTER GOURD (*Momordica charantia* L.) UNDER SALINITY

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ABSTRACT

Evaluation of fifty six hybrids of bitter gourd resulting from full diallel mating of eight genetically diverse genotypes for earliness and yield related traits had revealed the presence of heterotic vigour for all the characters under study. The hybrid Bikaneer 3 x Vadipatti Local was the earliest to flower (28.78 days) and eleven hybrid combinations were found to exhibit heterosis for node at which the first female flower appears. The heterosis for sex ratio was maximum on the desired direction in BGS 1 x Paravai Local and forty five of fifty six hybrids were found to show significant heterobeltiosis for sex ratio. Heterosis for fruit girth was observed in twenty five hybrids, while only two hybrids (Bikaneer 1 x CO 1 and Paravai Local x IC 85643) were found to show heterotic vigour for fruit weight. The highest positive heterosis for number of fruits per vine and yield of fruits per vine were observed in Bikaneer 1 x CO 1. Among the fifty six hybrids, seventeen hybrid combinations were found to exhibit heterosis on desired negative direction for leaf sodium : Potassium content. The study indicated the possibility of isolating superior hybrid combinations of bitter gourd for yield under salinity.

Key words : Bitter gourd, *Momordica charantia* L., Diallel, Salinity, Relative heterosis, Heterobeltiosis, Heterosis breeding.

Hybrids in vegetables have become very popular among growers owing to their high yield potential. The potential of these hybrids could be harnessed only under favourable soil and climatic conditions. However, the limited scope for horizontal expansion of agriculture necessitates the use of marginal and problem soils for cultivation and thus breeding crop varieties for abiotic stress assumes significance. Bitter gourd, a nutritive and commercially important cucurbitaceous vegetable exhibit wide genetic diversity. Hence the present investigation was taken up to assess the extent of hybrid vigour for various quantitative traits in bitter gourd under saline soil.

MATERIALS AND METHODS

The present study was taken up at the Pandit Jawaharlal Nehru College of Agriculture and Research Institute, Karaikal of Union Territory of Pondicherry, located along the East Coast at the tail end of the river Cauvery during 2005. Eight genetically diverse parents identified through genetic divergence analysis were subjected to full diallel mating. The parents along with the resultant fifty six hybrids were evaluated in a randomised block design with three replications. The soil of the selected field was sandy loam textured with the saturation extract having a pH of 8.9, EC 4.78 dSm^{-1} and ESP 20.21 percentage and classified as saline sodic. Observations on ten biometric traits [days to first female flower appearance, node of first female flower appearance, number of male flowers per vine, number of female flowers per vine, sex ratio (M/F), fruit length (cm), fruit girth (cm), individual fruit weight (g), number of fruits per vine and yield of fruits per vine (g)] and leaf sodium and potassium content were recorded on five randomly selected plants. Heterosis in F_1 hybrids over mid parent and better parent were estimated for each trait (Gowen, 1952) and the test of significance of heterosis was performed as suggested by Snedecor and Cochran (1967). The sodium and potassium contents in the leaf samples were determined by using the flame photometry (Stanford and English, 1949).

RESULTS AND DISCUSSION

Heterosis for earliness :

The extent of heterosis over mid parent and better parental values were estimated for all the eleven characters in the fifty six hybrids. In cucurbits the flowering time measured as the days to opening of first female flower and nodal position of first female flower are considered indices of earliness. Earliness indicated by negative heterosis is a prime objective of heterosis breeding in bitter gourd. The hybrid Bikaneer 3 x Vadipatti Local was the earliest to flower (28.78 days). Seventeen