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HAYMAN'S DIALLEL ANALYSIS IN BITTER GOURD (*Momordica charantia* L.) UNDER SALT STRESS

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ABSTRACT

Diallel analysis using genetical and graphical approach in a full diallel mating design, involving eight inbreds identified as parents through genetic divergence indicated the existence of both additive and dominant gene action influencing the expression of majority of the traits. The characters *viz*., yield of fruits per vine and leaf sodium: potassium content were found to be controlled by dominant gene action. The analysis of components of variation showed the presence of over dominance for node of first male flower appearance, number of male flowers per vine, vine length, yield of fruits per vine and leaf sodium: potassium ratio whereas, all the other traits were under the control of partial dominance. However, the regression line of the Wr - Vr graph was found to cut the ordinate above the point of origin only for node of first male flower appearance. The frequency of distribution of dominant and recessive alleles in different parental arrays for the characters under study were also elucidated through the variance - covariance graphs. The preponderance of dominant gene action for node of first male flower appearance, vine length, yield of fruits per vine and leaf sodium: potassium ratio revealed the importance of heterosis breeding for simultaneous improvement of yield as well as saline tolerance in bitter gourd.

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Increasing salinity of soil has become a serious global concern. Development of crop varieties capable of tolerating high level of salinities and producing economic yields would be a cost effective method as against developing technologies to grow sensitive crops under such situations. Breeding for salinity requires an understanding of the genetics of salt tolerance. A precise knowledge on gene action responsible for the inheritance of yield and yield components is a prerequisite to identify a suitable breeding methodology. Bitter gourd or balsam pear (*Momordica charantia* L.) is one of the commercially important, nutritive cucurbitaceous vegetable crops reported to have moderate degree of salt tolerance. As the work on developing saline tolerant genotypes on this important crop is meager, the present investigation was taken up to elucidate the gene action for yield and component characters under salinity.

MATERIALS AND METHODS

An investigation was taken up at the Pandit Jawaharlal Nehru College of Agriculture and Research Institute during Kharif 2005. Eight genetically diverse inbreds of bitter gourd *viz*., MDU 1, CO 1, IC 85643, Bikaneer 1, Bikaneer 3, BGS 1, Vadipatti Local and Paravai Local , identified through genetic divergence analysis were used for the study. The parents were subjected to crossing in a full diallel fashion. The parents along with the resultant 56 F1 hybrids were raised in a Randomised Block Design with three replications. The soil of the experimental design was saline sodic in nature with the saturation extract having a pH of 8.9, EC 4.78 dsm^{-1} and ESP 20.21 %. Observations on fifteen characters *viz*., days to first male flower appearance, days to first female flower appearance, node of first male 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), vine length (m), number of primary branches per vine, number of fruits per vine, yield of fruits per vine (g) and leaf sodium: potassium content were recorded from five randomly selected plants in each replication. The estimation of sodium and potassium contents in the leaf samples were determined by using flame photometer (Stanford and English, 1949) from the neutralised triacid extract as suggested by Jackson (1973). Gene action was elucidated by adopting genetical and graphical analysis as suggested by Hayman (1954 a,b).