# A STUDY ON THE GENETIC EFFECTS OF $F_1$, $F_2$ , $F_3$ AND $BC_1$ BRINJAL PLANTS IN THEIR MORPHO AGRONOMIC CHARACTERS

( *Solanum melongena L.*)

BY

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## ABSTRACT

This study was undertaken primarily to estimate the heterotic effect of selected important agronomic characters in hybrid generations and back crossed progeny of two varieties namely local variety Palugamum purple and exotic variety SM-6-6 and also to establish correlation among selected agronomic characters with yield.

The experiment for this study was carried out at the Eastern University, Vantharumoolai, which is located in the eastern region of Srilanka, during the period of July to December,2000. All the treatments were arranged in the Randomized Complete Block Design (RCBD) with five replicates. Data collection commenced with the initiation of the seedling and terminated with the last harvest.

Parents Palugamum purple (from Batticaloa district) SM-6-6 (from AVRDC,Taiwan) were used in this study. Palugamum purple is the locally adopted and SM-6-6 is Italian origin. The hybrid F1 and the subsequent generations F2 and F3 were derived from the crosses of Palugamum purple X SM-6-6 and BC1 which is the first generation of the cross between and F1 hybrid and recurrent parent Palugamum purple.

The agronomic characters viz., height at first and final harvest, days to first flowering, number of fruits per plant, fruit weight, fruit length, fruit girth, total yield, colour and shape of fruits were considered in this experiment. The collected data were subjected to statistical analysis of variance (ANOVA). Mean comparison was done among treatments by using Duncon Multiplied Ranged Test ( DMRT) and

correlation analysis for yield with different parameters that were considered, were also performed.

In this experiment different hybrid generations and BC1 exploited different gene actions. F1 hybrid exploited over and incomplete dominances and additive gene actions. F2 showed over dominance, incomplete dominance and additive gene actions. F3 showed only additive gene action. BC1 showed over and incomplete dominances and additive gene actions for the selected agronomic characters.

F1 hybrid showed significantly better yield than their parents and other advanced progenies in which strong heterotic effect was realized for yield ($p<0.05$). The results indicated the possibility to uplift the yield by cultivating the F1 hybrid rather than other progenies and parents. BC1 showed significantly higher yield than other progenies and parents and had certain heterotic action , however, it was lower than F1 hybrid.

F2 also had significant yield increment than its parents and had certain heterotic effect; however, there was a reduction in yield compared to F1 hybrid, and it was followed by F3 that showed a reduction in yield than F1 and F2.

F1 hybrid was early to reach first flowering and harvest where as, BC1 had more days than F1 hybrid and there were no significant differences among the generations. Plant height at first and last harvesting was influenced by additive gene action in BC1, F1 hybrid, and subsequent generations, since the values were lower and closer to the mid parent value.

Fruit weight and fruit length were found to be influenced by the incomplete dominance action in F1 and BC1 leading to heterotic condition, which is important to increase the total yield in brinjal. Since all the progenies showed values lower than mid parent but closer to it for number of fruits per plant, which can be attributed to the additive gene action and exploitation of hybrid vigour may not be possible to this character. Fruit girth was influenced by incomplete dominance gene action in F1, F2 and BC1.

Positive correlation showed the direct relationship between yield and yield components such are, number of fruits per plant, fruit weight, fruit length and girth. It was apparent that the selection that based on higher value of these parameters uplifts the yield. Among the morphological characters, fruit colour of F1 and F2 were whitish purple . F3 showed light purple while BC1 showed both light purple and whitish green fruits. Fruit shape in F2 and BC1 were alike, (cylindrical intermediate) but BC1 was thicker than all other progenies. F1 produced intermediate cylindrical, while F3 showed small, cylindrical.

The results of this experiment revealed that heterosis would be exploited for many of the important agronomic characters including yield in F1 and BC1 and gradually lost in the parental path way F1 and F3 and hence the development of F1 hybrid from varieties of diverse origin would be considered a successful attempt to elevate yield and other attributes in brinjal, provided suitable parent are selected with a great accuracy.

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