Heterosis and inbreeding depression in relation to other genetic parameters in egg plant

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Heterosis and inbreeding depression with other genetic parameters were studied with the 60 hybrids involving 15 female lines and 4 male testers evaluated for ten characters in a Randomized Block Design with three replications at Kanpur. Maximum positive heterosis (69.23 per cent) was recorded over economic parent (Type 3), whereas inbreeding depression has score 32.39 per cent. None of the crosses exhibited significant heterosis for most of the characters. However, on the basis of fruit yield per plant supported by other significant traits, crosses KS 233 x T 3, KS 263 x AB 1, ACC 2623 x T 3, ACC 820 6 x T 3, ACC 8204 x T 3, KS 247 x T3 and KS 227 x AB 1 for days to flowering, days to marketable maturity, plant height (only for KS 233 x T 3), number of branches per plant, number of fruits per plant, width of fruit (only for KS 263 x AB 1), fruit weight (except KS 247 x T 3 and KS 227 x AB 1) and plant spread exhibited maximum heterotic effects alongwith inbreeding depression. All the 60 crosses exhibited additive gene action except KS 247 x DBR 8 and KS 227 x ABR 8 for plant height, ACC 2623 x KS 224 and ACC 2623 x DBR 8 for width of fruit, ACC 8206 x T 3 for fruit weight and KS 250 x AB 1 for yield per plant which showed non-additive gene effects in relation to heterosis and inbreeding depression. High heritability coupled with high genetic advance was recorded by days to flowering, days to marketable maturity, plant height and fruit weight. Rest of the characters showed high heritability with medium or low genetic advance.

Key words : Egg plant, Heterosis, Inbreeding depression, sca effects, Degree of dominance, Heritability, Genetic advance

INTRODUCTION

The feasibility of utilizing hybrid vigour in egg plant depends on magnitude of per cent superiority of hybrids over economic parent/variety and hybrid seed production at cheaper rate for commercial cultivation. Efforts are underway for commercial exploitation of heterosis in egg plant using natural out-crossing coupled with discovery of stable male sterility system, and the development of technology for hybrid seed production. The heterotic effect is largely dependent on diverse parents with high degree of specific combining ability (sca) as well as good general combining ability (gca). The magnitude of heterosis particularly for yield is of paramount importance and if the heterosis is practically and economically feasible it can help to achieve high yield levels and thereby high productivity in egg plant. Studies on other genetic parameters and *per se* performance in relation to heterosis would also supplement in achieving the desired goal. A knowledge of expression and flexibility of most important characters is, therefore, essential in this respect.

RESEARCH METHODOLOGY

The materials consisted of 15 female lines (KS 219, KS 247, KS 253, KS 262, KS 228, KS 233, KS 250, KS 263, KS 235, KS 227, ACC 5114, ACC 8204, ACC 8206, ACC 8207 and ACC 2623) and 4 mole testers (T 3, AB 1, KS 224 and DBR 8) and their possible 60 F_1 cross combinations. These were grown in Randomized Block Design with three replications at Vegetable Research Station, Kalyanpur, C.S. Azad University of Agriculture and Technology, Kanpur during *Kharif*, 2003-2004. Each entry was grown in 3 m long row at 60cm x 60 cm inter and intra-row spacing. Observations were recorded from five plants from each parents and F_1s and 10 competitive plants in F_2s selected randomly from each replications for days to flowering, days to marketable maturity, plant height (cm) number of branches per plant, number of fruits per plant, length of fruit (cm), width of fruit (cm), fruit weight (g), plant spread (m^2) and yield per plant (kg). Heterosis was calculated over economic parent against check variety (Type 3). The data were also subjected to estimate the genetic advance using