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Heterobeltiosis and inbreeding depression in tomato (*Lycopersicon esculentum* Mill.)

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SUMMARY

The studies were conducted on five crosses of tomato *viz*., Feb 4 x KS 17, GT 2 x KS 17, Sel 14 x KS 118, GT 2 x GT 1 and SL 120 x Angur Lata ; involving eight parents, five F_1s and F_2s of tomato. Heterosis over superior parent and inbreeding depression were found to be substantially high in both positive and negative directions depending on the nature of characters. This clearly suggests that due to preponderance of non-additive genetic variances, exploitation of heterosis breeding would be of importance for genetic improvement of tomato crop.

Key words : Heterobeltiosis, Inbreeding depression in tomato, *Lycopersicon esculentum* Mill.

The success of hybridization depends upon the selection of suitable parental genotypes and performance of their cross combinations. Exploitation of heterosis is proving an efficient approach for the improvement of tomato. Due to their high yielding potential, the hybrid varieties of tomato are now gaining popularity among growers. Hence, a study was conducted to determine magnitude of heterosis and to explore the possibilities of utilizing the hybrid vigour at commercial level.

MATERIALS AND METHODS

Eight parents of tomoto *viz*., Feb 4, KS 17, GT 1, GT 2, Sel 14, KS 118, SL 120 and Angur Lata were used and five hybrids *viz*., Feb 4 x KS 17, GT 2 x KS 17, Sel 14 x KS 118, GT 2 x GT 1 and SL 120 x Angur Lata were developed. The seedling of parents, F_1s and F_2s were planted at spacing at 90 x 75 cm in randomized block design with three replications during *Rabi* 2005-06, at MVRS, Anand Agricultural University, Anand. Recommended package of practices were followed to raise a good crop. The observations were recorded on five randomly selected plants of parents and F_1s and 20 plants of F_2s from each plot in each replication. Data on days to flower initiation, days to first picking, primary branches per plant, plant height (cm), fruit length (cm), fruit girth (cm), locules per fruit, pericarp thickness (mm), fruit weight (g), fruits per plant, fruit yield per plant (kg per plant) and total soluble solids (%) were recorded. Heterosis expressed as per cent increase or decrease of F_1 hybrid over its better parent (heterobeltiosis, as termed by Fonseca and Patterson, 1968) as well as inbreeding depression were computed for all the above characters.

RESULTS AND DISCUSSION

Heterosis estimates over superior parent for different character and inbreeding depression as the reduction in F_2 means from F_1 means for characters under study are presented in Table 1. The estimates of heterosis over superior parent ranged from -7.05 to 45.00 per cent for days to flower initiation, -3.21 to 4.93 per cent for days to first picking, -7.37 to 25.49 per cent for primary branches per plant, -25.17 to 11.45 per cent for plant height, -20.42 to 18.96 per cent for fruit length, -19.10 to 16.75 per cent for fruit girth, -35.69 to 42.91 per cent for locules per fruit, -6.66 to 3.10 for pericarp thickness, -24.05 to 19.02 per cent for fruit weight, -12.95 to 6.45 per cent for fruits per plant, -16.92 to 28.43 per cent for fruit yield per plant and -22.56 to 6.17 per cent for total soluble solids. Inbreeding depression varied for various characters such as for days to flower initiation (-17.83 to 23.05 %), days to first picking (-8.07 to 11.77 %), primary branches per plant (5.63 to 15.36 %), plant height (-2.39 to 11.14 %), fruit length (-10.51 to 10.82 %), fruit girth (-10.00 to 10.05 %), locules per fruit (-40.97 to 35.91 %), pericarp thickness (-0.64 to 8.80 %), fruit weight (-3.35 to 26.81 %), fruits per plant (-3.57 to 11.10 %), fruit yield per plant

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