RESEARCH PAPER

Heterosis and combining ability in chilli for yield and yield contributing traits (*Capsicum annuum* L.)

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Nine parents and their eighteen hybrids from a line x tester design were evaluated for fruit yield and its components. Line x tester interaction was found significant for all the traits except, plant height considered variance due to treatment were found to be significant for all the characters under study. Whereas, variance due to lines was found to be a significant for all the characters except, days to 50% flowering and fruit length while variance due to testers was found nonsignificant for all the characters. On the basis of gca effects across three characters, RHRC-Cluster-Erect, PBC-535, LCA-235 and LCA-206 were identified as most promising parents for involving in hybridization programme aimed in improving number of fruit per plant as well as other important yield and yield contributing characters. Cross combinations, KA-2 x PantC-1, LCA-235 x Pusa Jwala, PBC-535 x PantC-1, RHRC-Cluster-Erect x Pusa Jwala, RHRC-Cluster-Erect x LCA-206 and RHRC-Cluster-Erect x PantC-1 were recorded specific combiner for fresh yield per plant due to positive significant of sca effect. The manifestation of heterobeltiosis for fruit yield per plant was evidenced by significant superiority of two out of eighteen crosses over better parent ranging from 6.87% in case of RHRC-Cluster-Erect x PantC-1 to 13.48% in case of KA-2 x LCA-206 while rest of the crosses showed significant negative estimates of heterobeltiosis.The most promising crosses with significant positive heterobeltiosis for fresh yield per plant were KA-2 x LCA-206 (15.91%), PBC-535 x PantC-1 (20.10%), RHRC-Cluster-Erect x Pusa Jwala (16.32%), RHRC-Cluster-Erect x LCA-206 (42.60%) and LCA-438 x PantC-1 (16.26%).

Key words : Chilli, Combining ability, Heterosis, Yield and Yield component

INTRODUCTION

Heterosis in chilli has been recognized as a practical tool in providing the breeder a means of increasing yield and other economic traits. Identification of superior cross combinations and study of heterosis values for most of the agronomic as well as yield characters is prior-requisite. Heterosis shows the performance over mid parent whereas heterobeltiosis express the betterment over the better parent. The present study was undertaken to determine the combining ability effects and heterotic response of various economic characters in chilli. The present investigation was undertaken to have an idea of the nature of gene action for fruit yield and other important attributes in chilli. Several biometrical methods are available for studying the combining ability and gene action. The line x tester analysis first developed by Kempthorne (1957) is one such method, which may be used to build up a population with favourable fixable genes for effective yield improvement.

MATERIALS AND METHODS

The experimental material consists of six lines (KA-2, LCA-235, PBC-535, RHRC-Cluster-Erect, LCA-438, and G-4) and three testers (Pusa Jwala, LCA-206 and Pant C-1) and one standard hybrid check Namdhari (NS-874). The investigation presented here in, was carried out during 2008-2009 at the Vegetable Research Farm, Institute of Agricultural Sciences, Banaras Hindu University, Varanasi (U.P.). Crosses were attempted in line x tester fashion involving 6 parents as male and 3 parents as females. Seeds were harvested cross wise to raise subsequent generation. In *kharif* season 2008-09 the seeds of 9 parents and 18 F_{1s} originating from Line x Tester crosses were raised in Randomized Block Design with three replication. The parents and F_{1s} were planted in 3 rows in each replication. of 5 meter with spacing of 60 cm and plants were spaced at the distance of 45 cm in rows. All recommended package and practices were followed to raise the healthy crop. Data were recorded from 10 randomly selected plants on following traits: days to 50% flowering, plant height, number of primary branches, number of secondary branches, weight of fresh fruit, total fresh yield/plant. Heterosis over mid parent, better parent (heterobeltiosis), and commercial check (commercial/standard heterosis) were worked out as per the standard procedures given by Turner (1953) and Fonesca and Patterson (1968). The analysis of variance