RESEARCH PAPER

Asian Journal of Bio Science, Volume **8** | Issue 1 | April, 2013 | 82-85 **Received :** 15.01.2013; **Revised :** 28.02.2013; **Accepted :** 30.03.2013

Studies on heterosis in cotton (*Gossypium hirsutum* L.) for seed cotton yield and its components

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Present study was undertaken to assess the extent of heterosis for seed cotton yield and its attributing traits in 54 inter plant type hybrids of cotton developed by crossing 9 lines with 6 testers in line × tester mating design during *Kharif* 2009 at Main Agricultural Research Station, University of Agricultural Sciences, Dharwad. The mean sum of squares of parent's vs hybrids was significant for all the characters except reproductive points and boll harvest index, indicating presence of heterosis for these traits. None of the crosses were superior for all the traits studied. However, the cross $L_5 \times T_5$ was the best as it had highest mean performance for economically important characters. Majority of the crosses exhibited positive significant mid parent, better parent heterosis for all important yield contributing characters except for inter boll distance and inter branch distance where they showed significant negative heterosis, indicating predominance of non-additive gene action in the genetic control of these traits. Most of the hybrids expressed significant standard heterosis for all the characters over the checks.

Key words : Cotton, Heterosis, Seed cotton yield

How to cite this paper : Ranganatha, H.M., Patil, Shreekanth S., Manjula, S.M. and Patil, B.C. (2013). Studies on heterosis in Cotton (*Gossypium hirsutum* L.) for seed cotton yield and its components. *Asian J. Bio. Sci.*, 8 (1) : 82-55.

INTRODUCTION

Cotton (*Gossypium hirsutum* L.) is a crop of prosperity having a profound influence on men, and matter. It is an industrial commodity of worldwide importance. Cotton is one of the few often cross pollinated crop which is accessible to development of homozygous genotypes as varieties and at the same time amenable for commercial exploitation of heterosis by exploitation of additive as well as non-additive genetic variance. India holds the distinction of being pioneer in the world in developing hybrids by conventional hand emasculation and pollination, and commercial cultivation of hybrids. The development and release of world's first commercial intra-hirsutum hybrid H-4 and first inter specific hybrid, Varalaxmi during the seventies, respectively was an important milestone in the history of cotton improvement not only in India but also in the world.

Heterosis is the superiority of the hybrid over the mid or better parent or over standard check and is the result of allelic or non-allelic interactions of genes under influence of particular environment. To develop potential hybrids in cotton it is necessary to exploit genetic diversity available in the form of visible differences in plant type traits and a cross between robust types and compact types can lead to improvement in higher productivity as a result of superimposition of the desirable features of these contrasting plant types in the F_1 hybrids (Anuradha, 1998). In the present study efforts are made to evaluate the selected diversified parental material for exploiting the hybrid vigour for seed cotton yield and its attributing traits.

Research Methodology

The experimental material used in the present investigation was selected based on the plant type traits to exploit the hybrid vigour. Material consisted of 54 crosses derived by crossing 9 robust lines with 6 compact testers (breeding lines) through line × tester mating design. These 54 hybrids and their 15 parents were grown in Randomized Block Design with two replications during *Kharif* 2009 at Main Agricultural Research Station, University of Agricultural Sciences, Dharwad. Each entry was grown in two rows of 1.8