



Heterosis studies for drought tolerant and grain yield traits in maize (*Zea mays* L.)

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Abstract : The present study was conducted to assess heterosis for drought tolerant and grain yield traits in maize. Seventy F₂s generated by crossing ten drought tolerant lines with seven drought susceptible testers were evaluated. The ratio of sca / gca variance revealed that there was preponderance of non additive gene action in the expression of all the traits under study. Among the hybrids, significant standard heterosis over NAH-2049 and NAH-1137 in the desirable direction was exhibited by many crosses for all the characters. Four hybrids SKV-70 × SKV-58, SKV-375 × SKV-57, SKV-156 × SKV-5 and SKV-69 × CML-322 showed positive standard heterosis for all the drought tolerant traits viz., SPAD chlorophyll meter reading (SCMR), specific leaf area (SLA), anthesis silking interval (ASI), carbon isotope discrimination ($\Delta^{13}\text{C}$) and yield. These crosses are from parents with high × low, low × low overall GCA effects. Top ranking hybrids were found to have high (H) heterosis status for several characters studied. Nearly 50 per cent (36 out of 70) hybrids had high overall heterosis.

Key Words : SPAD chlorophyll meter reading (SCMR), Specific leaf area (SLA), Anthesis silking interval (ASI), Carbon isotope discrimination ($\Delta^{13}\text{C}$)

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INTRODUCTION

Maize (*Zea mays* L.) is the third most important crop among the cereal crops grown in India. Maize grain is gaining popularity in our country due to huge demand, particularly for poultry feed industry. Besides, maize has diversified uses as food and industrial raw materials. Maize acreage and production have an increasing tendency with the introduction of hybrids due to its high yield potential.

A good number of inbreds developed recently is available at the All India Coordinated Research Project on Maize, Zonal Agricultural Research Station, Mandya whose combining ability has not yet been studied for utilization in hybrid development programme. Most efficient use of such materials would be possible only when adequate information on the amount and type of genetic variation and combining ability effects in the materials is available. A wide array of biometrical tools is available to breeders for characterizing genetic control of economically

important traits as a guide to decide upon an appropriate breeding methodology to involve in hybrid breeding. The present investigation was carried out to determine breeding value of genotypes, nature and magnitude of gene action and heterosis for various yield and other important traits in maize (*Zea mays* L.). Line x tester mating design developed by Kempthorne (1957), which provides reliable information on the general and specific combining ability effects of parents and their hybrid combinations was used to generate the information. The design has been widely used in maize by several workers and continues to be applied in quantitative genetic studies in maize (Joshi *et al.*, 2002; Sharma *et al.*, 2004).

Thus, the objective of the present investigation was to estimate heterosis for drought tolerant traits and grain yield traits.

MATERIALS AND METHODS

Ten drought tolerant lines and seven drought

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