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RESEARCH PAPER

# Genetic analysis of heterosis for seed yield and its components in sunflower (*Helianthus annuus* L.)

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A study was undertaken to assess the magnitude of heterosis involving seventeen inbred lines of sunflower. The inbred comprised of five new male sterile lines and twelve diverse restorer lines (six branching and six non-branching) which were crossed in all possible combinations. The resulting 60 F<sub>1</sub> hybrids along with their parents were studied for the extent of heterosis during summer 2006 for nine characters by adopting line x tester analysis, considerable average heterosis was observed for all characters studied. Highest magnitude of average heterosis was observed for seed yield per plot (150.34) followed by seed yield per plant (118.86), head diameter (26.79), plant height (15.32), thousand seed weight (7.49) and oil content (2.13) for the characters days to 50 per cent flowering, the hybrids recorded negative average heterosis. Percentage contribution of component characters, viz., thousand seed weight, plant height and head diameter towards expression of heterotic effect for seed yield was to the extent of 15.06, 30.82 and 53.86 per cent, respectively.

**Key words** : Heterosis, Sunflower, Inbred lines, Line x tester analysis

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## INTRODUCTION

Sunflower (*Helianthus annuus* L.) is one of the important oilseed crops of major economic importance. The introduction of this crop to India in 1969 has helped a great deal increasing oilseed production and the area under cultivation due to its day neutrality, wide adaptability, short duration, high yielding potential, remunerative market price and good quality oil. Due to its cross pollinated it offers considerable scope for commercial exploitation of heterosis utilizing cyto-restorer system (Madrap and Makane, 1993; Sugoora *et al.*, 1996; Gangappa *et al.*, 1997). The discovery of cytoplasmic male sterility (Leclereq, 1969) and subsequent identification of restorers (Ennis *et al.*, 1970) had significantly contributed in genetic improvement of the crop as well as in exploitation, of heterosis, leading to development and release of several hybrids for commercial cultivation. However, favourable characters of the hybrids like production stability, suitability to high input agriculture, high self fertility and uniform growth

and maturity shifted the focus towards heterosis breeding leading to the release of the first ever sunflower hybrid in India, BSH-1 by Seetharam (1981). The crop is gaining rapid popularity in India, but the productivity levels of sunflower still continue to be as low as 0.68 tonnes per ha against the world productivity of 1.22 tonnes per ha (Anonymous, 2005). To develop sunflower hybrids with improved yield potential, the choice of parents through careful and critical evaluation is of indicative of the crosses, which are likely to throw productive transgressive segregants. Hence, there is an urgent need to collect basic information about these traits in order to conceptualize breeding strategies suited to specific conditions. The present attempt has been taken to study heterosis for seed yield, oil content and the yield components in sunflower using 5 CMS line and 12 restorer lines among which 6 were branching types and 6 were non-branching types.

## RESEARCH METHODOLOGY

Present experimental material consisted of five