

## Heterosis and combining analysis in Safflower (*Carthamus tinctorius* Linn.)

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(Accepted : November, 2007)

Top cross analysis consisted of crosses between GMS line AKSMS 1 as a tester (female) and twenty one male lines. Significant heterosis was observed for all the ten quantitative traits except number of capitula per plant and oil content. The magnitude of heterosis and useful heterosis was low and differed for different characters. The highest magnitude of useful heterosis was observed in respect of number of seeds per capitulum (53.78 %), seed yield per plant (27.23 %), 100 seed weight (2.58 %) and days to maturity (-2.87 %). Only one cross, AKSMS 1 X JLSF 228, recorded significant useful heterosis over check variety, Bhima for seed yield per plant (27.23 %). AKSMS 1 X JLSF 228 showed significant highest useful heterosis for number of seeds per capitulum (53.78 %). The estimates of general combining ability indicated that JLSF 288 recorded highest significant general combining ability effect for seed yield per plant (26.27\*\*), plant height (10.41 \*\*) and number of seeds per capitulum (9.87\*\*). A 1 showed significant general combining ability effect for seed yield per plant (15.91\*\*). Bhima was good general combiner for seed yield per plant (13.39\*\*), plant height (6.16\*\*), number of primary branches per plant (1.74\*\*) and 100 seed weight (0.96\*\*).

Key words : Hererosis, Combining analysis, Safflower

### INTRODUCTION

Safflower is one of the most important oilseed crop. Safflower has been gaining increasing popularity in recent years in several parts of the county because of its adaptability under drought conditions. The increase in productivity through breeding efforts has not been adequate because of traditional selection methods following hybridization. Heterosis breeding could be a potential alternative for achieving quantum jumps in production and productivity. The significant break through in yield advances could be made through exploitation of heterosis at commercial level (Knowles, 1989). The comprehensive review of heterosis in safflower indicate that there is a significant amount of heterosis over commercial cultivars indicating the possibility of exploiting heterosis at commercial level in safflower. In absence of cytoplasmic male sterility, genetic male sterility offers a vast scope in safflower hybrid development programme (Heaton and Knowles, 1980, Chitanvis *et al.* 1999). In 1997, DSH 129, a safflower hybrid was released for commercial cultivation by DOR, Hyderabad with 20 to 22 % yield increase over national check, A<sub>1</sub>. This indicates that GMS can be successfully used in development of

safflower hybrid varieties. The present study was undertaken to assess the heterosis, combining ability and identify the experimental potential hybrids.

### MATERIALS AND METHODS

The present study was conducted in 2000, at the Farm of Department of Agricultural Botany, College of Agriculture, Nagpur, (India). The experimental material comprised of eleven lines selected for high yield, earliness and wider adaptability *viz.*, JLSF 228, N 7, CTV 209, JLSF 88, Sharda, BLY 652, AKS 65, AKS 68, HUS 305, A<sub>1</sub> Bhima and ten exotic lines *viz.*, S 541, W6-872, PI 401470, PI307029A, PI307029B, PI537601A, PI537601B, PI401473, PI401479A, PI401479B. Each line was crossed with a common tester i.e. AKSMS 1, a genetic male sterile line, to obtain 21 crosses during winter 1999.

Thus, complete set of material; under study consisting of one tester, 21 lines and 21 crosses, among them were raised in randomized complete block design with two replications during winter 2000. The plants were spaced 45 cm between rows and 30 cm between plants. Fifteen plants per genotype per row were grown. Border plants were grown on all sides of the block to avoid border effect.