

## Prediction and postdiction of heterosis in Safflower (*Carthamus tinctorius* L.)

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(Accepted : November, 2007)

Selected lines of safflower (*Carthamus tinctorius* L) were used to predict the heterosis for yield and yield components and to assess the reliability of prediction methods. The highest magnitude of useful heterosis was observed in respect of number of seeds per capitula (53.78%), seed yield per plant (27.23%), 100 seed weight (2.58%) and days to maturity (-2.87%). Only one cross, AKMS 1 x JLSF 228 recorded significant useful heterosis over the check variety Bhima for seed yield per plant (27.23%). The parents JLSF 228, A<sub>1</sub> and Bhima were good general combiners for seed yield per plant. The predictive model was effective for describing hybrid. There was, however, the positive relationship between mid parent and hybrid yield indicating that mid parent may still be a useful guide for the selection of parents for testing hybrid combinations. The effectiveness of predictive and postdiction model differed for different characters except for number of seeds per capitulum and days to maturity for which both models were equally effective in predicting hybrid yield.

Key Words : *Carthamus tinctorius* L. Postdiction of heterosis, Prediction of heterosis.

### INTRODUCTION

The significant breakthrough in yield advances in safflower (*Carthamus tinctorius* L) could be made through exploitation of heterosis at commercial level. (Knowles, 1989). The comprehensive reviews 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 genetic male sterility, genetic male sterility offers a vast scope in safflower hybrid development programme. (Chitanvis *et al.* 1999)

The retrospective analysis of factors which led to the development of hybrid varieties in different crop plants does not pin point conclusive variable that can serve as a guide in the identification of commercially accepted hybrid. Production and testing of a relatively large number of cross combinations is the only way to trace a desirable hybrid. This indeed is true for all the crop plants as very little direct information is available on hybrid breeding through the application of recent procedures of statistical genetics. There is however; some indirect information which can help us in rationalizing the hybrid breeding. Therefore, at an initial stage of hybrid breeding undertaken to predict the heterosis for yield and yield components

and to assess the reliability of prediction methods and to assess the performance of hybrid.

### MATERIALS AND METHODS

The present study was conducted during winter 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, during winter 1999 to obtain 21 crosses.

Thus, complete set of material; under study consisting of one tester, 21 lines and 21 crosses, among them were raised in randomised complete block design with two replications. 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. Recommended package of practices was followed to raise a good crop. Data were recorded for ten competitive plants of each

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