

Heterosis studies in sunflower (*Helianthus annus* L.)

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SUMMARY

In the present study 4 CMS lines and 9 testers were crossed in LXT design to produce 36 hybrids. Out of 36 hybrids 12 hybrids were identified as high heterotic compared to the best standard check hybrids. It is noticed that the involvement of female parents like CMS-207 A (DS) and CMS-234 A and male parents like LTR HD-1-856-b, LTRR-1-822 and LTR DMLT-1-Y (22) in displaying high heterotic effects for seed yield per plant and its components.

Key words : Sunflower, *Helianthus annus*, Heterosis, CMS lines.

The sunflower (*Helianthus annus* L.) in the present days has become major oilseed crop of economic importance in India and worldwide. The crop is highly amenable commercially to investigation and the heterosis has been largely exploited because of its highly cross pollinated nature, development of cytoplasmic male sterility and identification of restorer genes. The present study was therefore undertaken to study the extent heterosis in sunflower for seed yield and its components.

MATERIALS AND METHODS

The experiment was conducted at Oilseed Research Station, Latur during *rabi* 2004. The experimental material composed of 4 CMS lines, 9 tester and 3 check hybrids. The experiment included 36 hybrids, 13 parents and 3 check hybrids. The F_{15} , parents and check hybrids were planted in randomized block design with 3 replications in a single row plot of 4.5 m length with spacing of 60 cms and 30 cms between and within rows respectively. The observations were recorded on five randomly selected plants for six qualitative characters. The individual plant data for days to 50 per cent flowering, days to maturity, plant height, test weight, oil content and seed yield per plant was subjected to statistical analysis. The heterotic effects in terms of per cent increase or decrease over standard check were measured for all characters.

RESULTS AND DISCUSSION

The percentage of standard heterosis for seed yield and its components are presented in Table 1. The results revealed that 12 hybrids were identified as high heterotic compared to the best standard check hybrids for seed yield per plant, test weight, volume weight, plant height

and oil content. Fourteen hybrids showed significant positive heterosis for seed yield per plant over all the 3 check hybrids viz. CMS-234 A x LTR-DMLT-1 (Y) 22 (51.28**, 78.79** and 80.61**), CMS-388A x LTRR-1-822 (58.12**, 86.87** and 88.77**), CMS-338A x LTRB-1-856b (23.93*, 46.46* and 47.96**), CMS-338 A x LTR-DMLT-1(Y)22 (51.28**, 78.79** and 80.61**), CMS-388A x LTR-HD-17B (44.44**, 70.71* and 72.45**), CMS-207A (DS) x LTRR NDR-60 (22.22**, 44.45** and 45.92**) and CMS-207A (DS) x LTR-DMLT-1 (Y) 22 (58.12**, 86.87** and 88.78**).

The negative significant standard heterosis for days to maturity was displayed by CMS-207 A (DS) x LTR-DMLT-1(Y) 22 (-5.14**, -5.46** and -1.77). The dwarf hybrid showing maximum negative standard heterosis was CMS-207 A (DS) x LTRR NDR-60 (-0.75, -17.17** and -25.05*). The cross combination CMS-234 A x LTR-DMLT 1(Y) 22 (3.03, 16.44** and 33.86**) showed high standard heterosis for volume weight. With regards to oil content only one hybrid i.e. CMS-207 (DS) x LTRR-NDR (2.52, 31.18** and 7.02**) showed significant positive standard heterosis over the checks.

Manifestation of standard heterosis by particular cross combination CMS-234 A x LTR-DMLT-1 (Y) 22 (51.28, 78.79** and 80.61**) was also realized for days to maturity, volume weight and seed yield per plant. The highly cross pollinated nature of this crop offers tremendous scope for commercial exploitation of heterosis using cytoestorer system (Madrap and Makne, 1993 and Sudhakar, 1979).

The present study revealed manifestation and considerable amount heterosis for seed yield per plant in sunflower. It indicates larger scope for commercial exploitation of heterosis in the lines.

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