

Heterotic response of seed yield and its components in Indian mustard [*Brassica juncea* (L.) Czern and Coss]

RICHA NIGAM AND ALKA

Accepted : September, 2008

SUMMARY

A study using 45F₁'s developed through 10 parental diallel excluding reciprocals was conducted at C.S.A.U. of Agril. and Technology, Kanpur. Based on the results, it was observed that heterotic response was of high order for seed yield per plant in the crosses CSR-1017x T-6342, RK-8601 x RK-8608, A-11 x B-85, T-6342 x B-85 and CSR-1017 x RK-8608, A-11 x B-85, T-6342 x B-85 and CSR-1017 x RK-8901. These crosses have also exhibited significant heterosis for days to flowering, number of primary and secondary branches and dry matter per plant. Thus, these crosses may be of utility for developing hybrids in Indian mustard [*Brassica juncea* (L.) Czern and Coss].

Key words : *Brassica juncea*, Mustard, Yield and yield components, Hybrids, Genotype.

Indian mustard [*Brassica juncea* (L.) Czern and Coss] is an important oilseed crop and plays an important role in the country's oilseed economy but its productivity is low in comparison to other mustard growing countries of the world. In order to increase the productivity of this crop, effective and systematic breeding programmes are necessary. The magnitude of heterotic response or heterosis provides a basis for genetic diversity and guides for the choice of desirable parents for developing superior F₁ hybrids to exploit hybrid vigour and/or building gene pools to be employed in breeding programmes. In this communication results of heterotic response from 45 crosses developed through diallel (excluding reciprocals) involving ten diverse genotype of Indian mustard are presented.

MATERIALS AND METHODS

Ten diverse genotype *viz.*, CSR-1017, RL-18, LAHA-101, T-6342, RK-8901, RK-8601, RK-8608, RK-8701, A-11 and B-85. which were maintained by selfing and crossed in a diallel fashion excluding reciprocals. Ninety crosses (45F₁'s and 45F₂'s) alongwith ten parents were evaluated in a Randomized Complete Block Design (RCBD) with three replications during *rabi*, at research farm of C.S.A. University of Agriculture and Technology, Kanpur. All the treatments were grown in 5 meter long three row plots. Row to row and plant to plant distance was maintained at 45 cm and 20 cm, respectively. Recommended agronomic practices were used to raise

the crop. Data for 12 characters were recorded on 20 randomly selected plants from each plot. Heterotic response was calculated (in %) as increase or decrease in relation to better parent (BP) for each character.

RESULTS AND DISCUSSION

The results obtained (Table 1) indicated that significant amount of heterosis over better parent was exhibited for almost all the characters studied except relative water content in leaf and length of main fruiting branch. In the present study, maximum amount of significant heterotic response for seed yield per plant was observed in the cross CSR-1017 x T-6342 (214.58%) followed by RK-8601 x RK-8608, A-11 x B-85, T-6342 x B-85 and CSR-1017 x RK-8901.

Best heterotic crosses for other characters were CSR -1017 x T-6342 (196.54%) for dry matter per plant, A-11 x B-85 (71.04 per cent) for number of secondary branches, T-6342 x A-11 (45.28%) for number of primary branches, CSR-1017 x RK -8901 (-34.54%) for erucic acid content in oil, LAHA-101 x B-85 (-16.40%) for days to flowering, RK-8608 x A-11 (16.39%) for length of main fruiting branch, T-6342 x B-85 (13.50%) for test weight, CSR-1017xRK-8601 (11.78%) for harvest index, RK-8601 x B-85, (4.27%) for relative water content, LAHA -101 x T-6342 (3.41%) for protein content in seed and RL-18 x A-11 (2.17%) for oil content (Table 1)

The above results indicated that out of 45 crosses two, CSR-1017 x T-6342 and A-11 x B-85 were the best crosses for not only seed yield but also most of the other characters. In view of this, it is suggested that these crosses may directly be utilized for developing hybrids in case of Indian mustard or otherwise the segregants of these crosses may be selected for developing high yielding varieties. Dixit and Tripathi (1973), Singh (1973), Hirve

Correspondence to:

RICHA NIGAM, Department of Botany, D.G. College, KANPUR (U.P.) INDIA

Authors' affiliations:

ALKA, Department of Botany, D.G. College, KANPUR (U.P.) INDIA