RESEARCH ARTICLE

International Journal of Plant Sciences, (January to June, 2010) Vol. 5 Issue 1: 60-66

Genetics of yield components and oil content in Indian mustard

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Accepted : September, 2009

SUMMARY

Indian mustard [*Brassica juncea* (L.) Czern and Coss.] is an important *Rabi* oilseed crop. India is the second largest rapeseedmustard growing country in the world and ranks third next to Canada and China in production. Ten genetically diverse genotypes of Indian mustard were crossed following diallel mating design to generate basic material to know the general combining ability (gca) of the parents and suggested the crosses with specific combining ability (sca). The 10 genotypes along with 45 F_1 s and their F_2 s were evaluated in completely randomized block design (CRBD) at CSAUA and T., Kanpur (India) during 2003-04 for yield and other agronomic traits. The parent Rohini was found good general combiner for maximum characters, *viz.*, length of main raceme, number of siliquae on main raceme, number of seeds per siliquae, seed yield per plant and oil content followed by parent Varuna for four characters days to maturity, 1000-seed weight, seed yield per plant and oil content. RK 01-3 was found as a good general combiner for four characters, *viz.*, days to 50 per cent flower, plant height, number of secondary branches per plant and days to maturity. Considering sca effects of crosses over the generations, the crosses Rohini x RK 02-5, Rohini x RK 02-3 and Varuna x RK 02-4 for seed yield per plant and RK 02-4 X SEJ-2 for oil content were found as good specific combiners.

Key words : Indian mustard, Diallel, Combining ability analysis

mong major oilseeds crops of the world, the oleiferous *Brassicae*, comprising rapeseed-mustard, occupies third position in production after soybean and cottonseed. In India, rapeseed-mustard ranks second after groundnut and is grown in an area of 5.1mha.. Indian mustard is a naturally evolved from secondary balanced polyploid of two monogenomics [Brassica campestris (L.) 2n=AA=20 and Brassica nigra (L.) Koch, 2n=BB=16] due to autosyndetic pairing. Being often cross-pollinated crop, the knowledge of combining ability is useful to assess nicking ability of parents and to elucidate the nature and magnitude of gene action involved. The concept of combining ability has assumed greater importance in plant breeding as it permits the prediction of the efficiency of parents based on early generation performance besides enabling to study the comparative performance of genotypes/lines in hybrid combination. The gca effect is primarily a function of additive gene effects and additive x additive interaction. The additive effects are mainly due to polygenes, which act in additive manner, expressing fixable effects, while sca effects represent non-additive type of gene action (Griffing, 1956). Non-additive gene action results from the effect of dominance, epistasis and various other interactions, which are non-fixable. The

P. SINGH AND RANJEET, Department of Genetics and Plant Breeding, C.S.A. University of Agriculture and Technology, KANPUR (U.P.) INDIA present investigation was carried out to know the gene action for certain quantitative characters and to identify certain parents/crosses for their utilization in further breeding programme.

MATERIALS AND METHODS

The present study comprised of ten diverse genotypes of Indian mustard, viz., Varuna, Rohini, RK 02-3, RK 02-4, RK 02-5, RK 02-6, RK 03-1, RK 03-2, RK 01-3 and SEJ-2 and their F_1s and F_2s (excluding reciprocals). These genotypes were crossed in all possible combinations in winter 2003-04 and advanced to F₂ in off-season nursery during summer season of 2004. Fortyfive F₁s and F₂s along with ten parents were grown in a randomized block design with three replications during winter 2004-05 at Oilseed Research Farm, Kalayanpur, C.S.Azad University of Agriculture and Technology, Kanpur. Each progeny was represented by a single row of parents and F₁s and two rows of F₂s having five meter length with inter and intra row spacing of 45 cm and 20 cm, respectively. The standard agronomic practices were followed to raise the crop.

RESULTS AND DISCUSSION

Analysis of variance for combining ability revealed that variances due to gca and sca were highly significant for all the characters in both the generations (Table 1). This indicated existence of genetic variability among parents included in the present study and role of both additive and non-additive gene effects in the inheritance

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