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Combining ability analysis for seed yield and its attributes in Indian Mustard [*Brassica juncea* (L.) Czern and Coss]

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The hybrids were developed by adopting diallel mating design excluding reciprocals involving ten Indian mustard genotypes during *Rabi* 2005-06. The resultant 45 hybrids along with their parents were evaluated in a Randomized Block Design with three replications under four environments *viz.,* timely sown at Sardarkrushinagar (E_1) and Ladol (E_2), and late sown at Sardarkrushinagar (E_3) and Ladol (E_4), during *Rabi* 2006-07. Combining ability analysis on pooled basis, revealed importance of both additive and non-additive genetic variances for the control of various traits. However, the ratio σ^2gca/σ^2sca indicated preponderance of non-additive gene action for days to 50 per cent flowering, days to maturity, seed yield per plant, biological yield per plant and harvest index, while additive gene action was preponderant for rest of the traits. The parents RK 9501, GM 1 and GM 2 were good general combiners, whereas, the crosses 'RK 9501 x GM 2', 'GM 1 x GM 3' and 'GM 3 x SKM 139' were found to be the best specific combinations for seed yield per plant and some of the important yield contributing traits. However, on the basis of *per se* performance, exploitable heterosis and significant sca effects for seed yield per plant and some of its important components, the above hybrids were considered to be the most promising for exploitation of heterosis.

Key words : *Brassica juncea,* Diallel, Combining ability, gca, sca

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INTRODUCTION

Mustard is one of the most important edible *Rabi* oil seed crops. The genus *Brassica* belongs to Brassicaceae family and includes many crop species. Exploitation of heterosis in mustard has been recognized as a practical tool in providing breeders a means of improving yield and other important traits. The phenomenon of heterosis of F_1 hybrids can also reflect special combining ability (sca) and general combining ability gca of parental lines. Combining ability concepts are the basic tools for improved production of crops in the form of F1 hybrids. Identifying parental combinations with strong heterosis for yield and obtain genetic parameters are the most important steps in the development of new cultivars. Among different mating designs, diallel analysis is a systematic approach which has been widely used in crop plants for testing the performance of genotypes in hybrid combinations and also for characterizing the magnitude and nature of gene action involved in controlling quantitative characters (Grifing, 1956). The present Investigation was, undertaken with a view to estimate general and specific combining ability variances and effects in Indian mustard.

RESEARCH METHODOLOGY

The experimental material consisted of 10 parents and their 45 F_1s produced utilizing diallel mating design suggested by Griffing (1956) method I and method II, were developed at the Seed Technology Department, S.D. Agricultural University, Sardarkrushinagar during *Rabi* 2005-06 and the field experiments were conducted in a Randomized Block Design with three replications at the Seed Technology Department, S.D. Agricultural University, Sardarkrushinagar and the Agricultural Research Station, S.D. Agricultural University, Ladol during *Rabi* 2006-07 over four environments created by two staggered dates of sowing *viz.,* timely sown (16th October) at Sardarkrushinagar (E_1) and Ladol (E_2) and late sown (3rd November) at Sardarkrushinagar (E_3) and Ladol (E_4). All agronomic practices were adopted in order to a healthy