

Genetic study in Indian mustard [*Brassica juncea* (L.) Czern and Coss]

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SUMMARY

The present investigation was undertaken to study the combining ability and values of gene action in Indian mustard (*Brassica juncea* (L.) Czern and Coss]. The crosses were attempted by adopting line x tester mating design among 10 lines and 4 testers during *rabi* 1999-2000. The ratio of estimates of variance due to *gca* and *sca* indicated that the non additive gene action was predominantly involved in the expression of days to 50 per cent flowering, number of secondary branches per plant, number of seeds per siliqua, oil content, 1000-seed weight, number of siliqua per plant and seed yield per plant. While additive gene action was predominantly involved in the expression of plant height, length of main branch and number of primary branches per plant. The promising hybrids having high *per se* performance and significant desirable *sca* effects for various character involved either good x good, good x average, average x good and poor x poor combining parents. Thus, crosses exhibiting high *sca* effects did not always involve parents with high *gca* effects. The best three hybrids on the basis of *per se* performance were RSK-87 x GM-2, SKM-95-85 x GM-2 and RSK-87 x Varuna had also significant *sca* effects in desirable direction for seed yield per plant.

Key words : Combining ability, Gene action, Sca variance, Hybrids, Line x tester.

Indian mustard is second most important oilseed crop in the country. The mustard oil is utilized for human consumption for cooking as well as frying purpose. The oil serves as a rich source of energy in the predominantly vegetarian diet consumed in the country. The mustard oil has great industrial utility for the manufacture of soap, lubricant and tanning purposes. Gujarat is ideally suited for mustard cultivation. The phenomenon of combining ability and gene action has been proved to be most important genetic tool in enhancing yield of self as well as cross pollinated crops. For developing high yielding varieties through hybridization, the choice of right type of parents is 'important as high yielding genotype may not necessarily transmit its superiority in its cross combination. The combining ability of parents to combine depends on complex interaction among genes which can not be judged by their yield performance of the parents. Therefore, proper understanding of combining ability of parents and nature of gene effects for yield and its component characters.

MATERIALS AND METHODS

In the present investigation ten lines were crossed with four testers in line x tester mating design. The present

experiment was conducted with set of 54 genotypes composed of 14 parents and 40 F₁ hybrids during 1999-2000 in randomized block design with three replications. Each genotype was sown in single row of 3 m length with inter and intra row spacing of 45 x 15 cm, respectively. The recommended cultural practices including plant protection measures were followed. The morphological observations on ten quantitative traits were recorded by selecting five competitive plants randomly. The individual plant data for days to 50 per cent flowering, plant height, length of main branch, number of primary branches per plant, number of secondary branches per plant, number of seeds per siliqua, oil content, 1000-seed weight, number of siliqua per plant and seed yield per plant was subjected to statistical analysis. The combining ability analysis was carried out according to the method given by Kempthorne (1957).

RESULTS AND DISCUSSION

The estimates of general combining ability effects for various characters are presented in Table 1. The estimates of *gca* effects revealed that it is difficult to select good general combiner for all the characters. However, the parents GM2 and RSK-87 were found to be good general combiners for seed yield and number of siliqua per plant. Parents BIO-902 and GM-2 were good general combiner for bolder seed. The parent PM67 was good general combiner for number of primary branches, seeds per siliqua and oil content. The parent Vaibhav was good general combiner for length of main branch, number of secondary branches and siliqua per plant. The parents Vardan and SKM-95-85 were good general combiners

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