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Combining ability studies in sesame (*Sesamum indicum* L.)

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SUMMARY

Combining ability analysis in a set of ten parents, 45 F_1's (excluding reciprocal) and their 45 F_2's in a diallel crossing programme for yield and yield contributing traits revealed significant estimates of mean squares due to gca and sca for all the characters in both the generations. The estimates of gca/sca variance ratios suggested that variances due to sca were greater than variances due to gca for most of the traits in F_1 and F_2 except for plant height and days to maturity in F_1 indicating the preponderance of non-additive effects. Equal importance of additive and non-additive gene actions were observed for 1000 seed weight in F_1. A comprehensive examination of results revealed ABT-22, ABT-23 and AT-34 as good general combiners and crosses AT-90 x AT-104, ABT-22 x G.Til-1, ABT-23 x AT-34 and AT-104 x G.Til-2 as good specific combiners for yield and yield contributing characters.

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Key words : Combining ability, gca, sca, Gene action and sesame

Sesame (*Sesamum indicum* L.) is one of the most ancient oilseed crops of India. The crop is cultivated almost throughout India for its high quality oil and it has tremendous potential for export. It ranks third in term of total oilseeds area and fourth in terms of total oilseeds production in the country. The selection of parents on the basis of *per se* performance does not necessarily lead to desirable results. The knowledge of combining ability is prerequisite in any plant breeding programme for varietal improvement and for evolving a hybrid. Hence, attempts have been made to study the general combining ability and specific combining ability effects for yield and its component traits in sesame.

MATERIALS AND METHODS

Ten genetically diverse genotypes *viz*., AT-90, AT-92, AT-104, AT-114, BAVJ-1, ABT-22, ABT-23, AT-34, G.Til-1 and G.Til-2 were crossed during *Kharif* 2002 following 10 x 10 diallel mating design excluding reciprocals. Five seeds were grown during *Kharif* 2003 for advancing the generation and F_2 seeds were collected from the F_1 plants. Thus, the experimental materials comprised of 10 parents, 45 F_1's and 45 F_2's and these were planted at Main Oilseeds Research Station, Junagadh Agricultural University, Junagadh during *Kharif* 2004 in a Randomized Block Design with three replications at a spacing of 45 x 15 cm. Each entry consisted of a single row of 4 meter length for each of parents and F_1's whereas, two rows each of F_2 progenies. All the recommended agronomical package of practices and plant protection measures were followed timely to raise a healthy crop. The observations were recorded on five randomly selected competitive plants of parents and F_1's while, 20 plants of F_2's from each replication for twelve characters *viz*., days to 50 % flowering, plant height (cm), number of effective branches per plant, number of capsules per plant, number of seeds per capsule, length of capsules (cm), days to 80 % maturity, yield per plant (g), 1000 seed weight (g), oil content (%), harvest index (%) and leaf area index. Data were statistically analyzed following Panse and Sukhatme (1978). The combining ability analysis was carried out according to Model-I, Method-2 of Griffing (1956_a). The gca and sca variances were estimated as per the technique suggested by Griffing (1956_b) and Gardner (1963).

RESULTS AND DISCUSSION

Analysis of variance revealed significant differences among parents, F_1's, F_2's, parents *vs* crosses and F_1's *vs* F_2's, for all the traits except, for number of capsules per plant in F_2's and parents *vs* crosses for days to 50 % flowering, plant height, number of capsules per plant,

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