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Studies on reciprocal differences and gene actions through diallel analysis in sesame (*Sesamum indicum* L.)

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A combining ability analysis was carried out in a 7 x 7 diallel mating system for nine quantitative characters in sesame. The results revealed that the variance due to gca, sca and rca were highly significant, denoting the importance of both additive as well as non additive genetic components for yield and yield contributing characters. The magnitude of the gca variance was higher than the sca variance. The magnitude of the latter, when compared to the variance due to the reciprocal effect, was highly significant and higher for the characters, number of capsules per plant, number of seeds per capsule, while the magnitude of the rca variance was highly significant and higher than the sca variance for the characters days to maturity, plant height, number of branches per plant, number of capsules per plant, capsule length, 1000 seed weight and seed yield per plant. This indicated the presence of reciprocal effects for these characters as both additive and non-additive genetic components are involved for yield and yield contributing traits. The additive genetic variances could be improved in the future by a simple selection, whereas no fixable genetic variances can be improved by following biparental mating of the F_2 generation.

Key words : Combining ability, Dialled analysis, GCA, SCA, RCA

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INTRODUCTION

Sesame is the most traditional and important oil yielding crop grown in India. A careful choice of parents in breeding programmes is important particularly if the aim is to improve quantitative characters like yield and its components. The concept of a combining ability analysis gives precise estimates of the nature and magnitude of gene actions involved in the inheritance of quantitative characters, which facilitate the identification of parents with good general combining ability effects and crosses with good specific combining ability effects. It is also useful for selecting the most suitable breeding method. Therefore, the present study was undertaken to study the nature of gene action and maternal effects present in the inheritance of the quantitative characters.

RESEARCH METHODOLOGY

The experimental material comprised seven genotypes *viz.*, JCT-7, DSS-9, CO-1, RT-54, Dhauri Local, Gowry-173, MT-75which were crossed in an 7 x 7 diallel mating design including reciprocals during *Rabi*, 2010. The resulting 42 cross combinations along with parents were grown in a Randomized Block Design with two replications at the Plant Breeding Farm, College of Agriculture, University of Agricultural Sciences, Raichur during the summer of 2011. A spacing of 45 cm between rows and 15 cm between plants was given and 20 plants were maintained in each cross. Observations were recorded on nine biometrical traits *viz.,* days to maturity, plant height, number of branches per plant, number of capsules per plant, capsule length, number of seeds per capsule, 1000 seed weight, seed yield per plant and seed oil content. A fertilizer schedule of 40:25:25 kg of NPK per hectare was followed along with the recommended cultural operations and plant protection measures. The diallel analysis was carried out according to the statistical genetic model described by Griffing (1956) as Method I and Model I and assuming a fixed effects statistical model (Model I). The statistical analysis was carried out with INDOSTAT programme. The combining ability analysis was done based on the method developed by Griffing (1956).