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RESEARCH ARTICLE

Combining ability analysis for yield components and physiological traits in rice

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SUMMARY

Combining ability analysis for 7 varieties for yield components physiological traits and yield in a diallel fashion revealed that the progenies differed significantly for all characters indicating the involvement of both additive and non-additive type of gene action in expression of the characters. The relative magnitude of estimates of SCA variance was higher than that of GCA variance for all the characters indicating the predominance of non-additive gene action. The parent Indra was the best combiner among all the seven parents studied as it recorded positive gca effects for 6 characters *viz.*, panicle length, ear bearing tillers, number of seeds/panicle, biological yield, flag leaf nitrogen content and grain yield per plant. The crosses Samba mahsuri/Polasa prabha and Samba mahsuri/ Nellore mahsuri recorded high specific combining ability effects for exploitation. From an overall analysis that all characters *viz.*, days to 50 per cent flowering, ear bearing tillers/plant, harvest index, biological yield and flag leaf nitrogen content which are influencing grain yield are predominantly governed by non-additive gene action.

Key Words : Combining ability, Grain yield, Rice

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The information on combining ability and gene action for different yield contributing characters and physiological traits is important to achieve superior genotypes from the segregating population or in exploiting the heterosis in rice. Combining ability studies for these traits are frequently used by the plant breeder to evaluate parental lines for their usefulness in crosses and to assess the nature of gene action involved in the inheritance. Rice researchers are of the opinion that in order to increase the present yield potentiality in rice, it is necessary to identify the physiologically efficient genotypes and involve them in yield oriented projects. At this juncture, the genetic analysis of physiological characters will be of immense value to breeders, as very few attempts were made till now to generate information in these areas. The combining ability analysis (Grifing, 1956) gives an idea about the relative magnitude of additive and non additive types of gene action in expression of the traits. Diallel analysis in rice has been reported by many workers (Sarathe *et al.*, 1986). For rapid success in only conventional hybridization programme the choice of parents which can produce superior offsprings is very much essential. The choice of breeding methodology is a function of genetic architecture of the traders in the crop. The present study was made with a view to study the combining ability of indigenous rice cultivars for yield, its component traits and physiological traits.

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MATERIALS AND METHODS

Seven rice varieties *viz.*, Samba mahsuri, Polasa Prabha, Jagtial Samba, Nellore Mahsuri, Indra, Vijetha and Prabhat were crossed in diallel mating design (without reciprocals) during *Rabi* 2006 and *Kharif* 2007 seasons. These parents were selected based on their attributes for grain quality, cooking quality, reaction to pests and diseases and high