

## Exploitation of heterosis in rice (*Oryza sativa* L.)

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### SUMMARY

A study was conducted to estimate heterosis in CMS based hybrids of rice (*Oryza sativa* L.) with respect to grain yield and its components using thirty hybrids. In the present study 3 CMS lines and 10 testers were crossed in L x T design to produce 30 hybrids. Among the hybrids, PMS 8A x NDRK 5028 recorded maximum grain yield with 105.80 and 40.56 per cent heterosis over the better parent and standard variety, respectively. This cross was found to be superior in terms of number of panicle bearing tillers per plant, test weight and harvest index.

**Key words :** Rice, Heterosis, Heterobeltiosis, Line x tester analysis.

In India, about 40% of the plant nutrients are consumed by rice crop. Rice (*Oryza sativa* L.) plays a very important role in providing nutrition to human race. The traits like yield and its components are governed by polygens with complex gene action and hence, understanding the nature and magnitude of gene action help the breeder in selection of an appropriate breeding method. For impartment in such an important crop, the most important prerequisite is the selection of suitable parents, which could combine well and produce describable hybrids and segregants. In the presents study, an attempt has been made to estimate the heterosis in F<sub>1</sub> hybrids, using line x tester mating designs.

### MATERIALS AND METHODS

Thirteen genotypes of rice were studied in this experiment, which consisted of three CMS lines namely, PMS 8A, PMS 10A and IR 58025 A and ten tester namely, Jaya, Vikas, Indrasan, IR 30, NDRK 5028, Ratna, NDRK 5026, Sarjoo 52, Ananda and NDR 359 along with Sarjoo 52 as standard check variety. These presents were crossed in a line x tester mating design and resultant thirty hybrids along with their parents were raised at Student Instructional Farm, N.D. University of Agriculture and Technology, Kumarganj, Faizabad, in RBD with three replications during *kharif* 2001. Heterosis was assisted over the better parent (heterobeltiosis) and standard variety (standard heterosis). Estimation of these three type

of heterosis were done for following 10 characters *viz.*, days to 50% flowering, plant height, number of total tillers per plant, number of panicle bearing tillers per plant, number of fertile spikelets per panicle, panicle weight, test weight, grain yield, biological yield and harvest index.

### RESULTS AND DISCUSSION

Heterosis was estimated for thirty rice hybrids for ten different characters and was expressed as increase or decrease over better parent (heterobeltiosis) and over standard check (standard heterosis) (Table 1).

For days to 50 per cent flowering, heterosis in negative direction is considered desirable since earliness is preferred over late maturity, the hybrid PMS 8A x Vikas recorded highest significant negative heterosis (-7.89) over better parent and heterosis (-9.59) over standard variety. Sharama and Mani (1990), Young and Virmani (1990) and Yolanda and Vijendradas (1996) have reported negative heterosis for days to 50% flowering in hybrids.

Semi-dwarf plants (80-100 cm) are describable in rice varieties because tall plants are usefully susceptible to lodging and exhibit low harvest index. The overall range for heterobeltiosis and standard heterosis for plant height was observed -6.55 to 43.92% and 2.5 to 36.36, respectively. Peng and Virmani (1991) and Lokaprakash *et al.* (1992) also observed the same results.

For number of fertile spikelets per panicle, most of the crosses have shown significant positive heterobeltiosis and standard heterosis. The cross combinations which recorded higher heterosis per cent over better parent were PMS 8A x Jaya PMS 8A x Indrasan, PMS 8A x NDRK 5028, PMS 8A x Ratna, PMS 8A x NDR 359, PMS 10A x Jaya, PMS 10A x Indrasan, PMS 10A x NDRK 5028, PMS 10A x NDRK 5026, PMS 10A x Ananda, PMS 10A x NDR 359, IR 58025 A x NDRK 5028, IR 58025A x Ratna and IR 58025A x NDRK 5026. For test weight, 4 hybrids have shown significant positive heterobeltiosis

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