Genetic control of grain yield and its component characters in rice (*Oryza sativa* L.)

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SUMMARY

Full diallel crosses of 9 ´ 9 rice inbred lines were analyzed, adopting graphical approach. Epistatic gene actions were important for number of productive tillers per plant, 100 grain weight, biomass per plant, and grain yield per plant. Partial dominance was exhibited for number of productive tillers per plant, biomass per plant and grain yield per plant, where as number of filled grains per panicle recorded over dominance. The high yielding genotypes *viz.,* CR 1009, ADT 44 and ADT 38 had most recessive genes for grain yield per plant.

Key words: Rice, Diallel analysis, Graphical approach, Yield attributes.

A knowledge of gene action for various traits is a pre-requisite for launching a successful breeding programme in a crop. The present article reports information on gene actions for various yield attributes in nine genotypes of rice, (differing in maturity period) by employing graphical approach of diallel analysis (Jinks and Hayman, 1953; Hayman, 1954).

MATERIALS AND METHODS

Nine diverse rice genotypes with variable maturity period *viz.,* ADT 37 (P_1), Tulasi (P_2), IR 50 (P_3), ADT 38 (P_4), Sasayasree (P_5), IR 64 (P_6), ADT 44 (P_7), CR 1009 (P_8) and IR 20 (P_9) (P_1-P_3 early; P_4-P_6 medium; P_7-P_9 late) were mated in a 9 ´ 9 diallel fashion, resulting in 72 F_1's. These F_1 hybrids along with their parents were grown in a randomized block design with three replications,

during 2001. Each experiment plot comprised of a single row of 3.0 m length, with a spacing of 20 cm between rows and 15 cm between plants within a row. The crop was maintained under irrigated transplanted conditions under normal fertility levels. The data were recorded on five random plants per entry per replication. Gene actions for various traits were estimated by adopting graphical approach of diallel analysis (Jinks and Hayman, 1953; Hayman, 1954).

RESULTS AND DISCUSSION

Estimates of uniformity test (t^2) (Table 1) were non-significant for all the traits of interest. It indicated that the assumption made by Hayman (1954) for diallel analysis, were valid for all the traits studied. Deviations of regression coefficient from zero were significant for number of productive tillers per plant, number of filled

Table 1 : Regression co-efficients and deviations from zero and unity and t^2 values for grain yield and its component characters in rice

S. No.	Traits	b ± SE	b-O /SE (b)	1-b / SEb	t^2
1.	Number of productive tillers per plant	0.43 ± 0.17	2.53*	3.35*	0.54
2.	Number of filled grains per panicle	0.71 ± 0.22	3.23*	1.32	0.14
3.	100 grain weight	0.17 ± 0.15	1.13	5.93**	2.31
4.	Biomass per plant	0.32 ± 0.12	2.67*	5.67**	1.66
5.	Grain yield per plant	0.40 ± 0.11	3.64**	5.46**	2.34
6.	Harvest index	0.59 ± 0.26	2.27	1.78	0.83

*Significant at 5 per cent level   ** Significant at 1 per cent level

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