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Genetic Variability Analysis in Rice (*Oryza sativa* L.)

N. Lingaiah, V. Venkanna and C. Cheralu

Regional Agricultural Research Station, Warangal – 506 007, Telangana State

*Corresponding Author E-mail: nlrashi80@gmail.com

ABSTRACT

An experiment was carried out to estimate the variability parameters for quantitative traits in 33 rice cultures. Analysis of variance revealed the existence of significant differences among genotypes for all traits studied. The genotypic and phenotypic coefficients of variations were moderate to high for No. of grains/panicle, Test weight and Yield. High heritability coupled with high genetic advance as percent of mean was observed for No. of grains/panicle, Test weight and Yield indicating the role of additive gene in controlling these characters.

Key words: Genetic variability, Heritability, Rice, Genetic advance.

INTRODUCTION

For any crop improvement it depends on magnitude of genetic variability present in base population. Environmental effects influence the total observable variations of quantitative traits. Therefore, partitioning of overall variance due to genetic and non-genetic causes becomes necessary for effective breeding programme. The genotypic coefficient of variation estimates the heritable variability, whereas phenotypic component measures the role of environment on the genotype. High PCV and low GCV for a character indicated high influence of environment in its expression. The phenomenon of transmission of characters from parents to offspring is usually measured in terms of heritability. Therefore the estimates of heritability and genetic advance would help to formulate a sound breeding programme.

MATERIALS AND METHODS

The experiment was carried out during *khari*, 2012 at Regional Agricultural Research Station, Warangal. The material comprised of 23 elite mid early genotypes sown in a randomized block design with three replications with spacing of 20 X 15 cm. Data were recorded on five randomly selected plants in each entry in each replications for the traits days to 50% flowering, Plant height (cm), Productive tillers/plant, Panicle length (cm), No. of grains/panicle, Test weight (g) except yield which recorded in kg/plot converted into kg/ha. The data subjected to INDOSTAT software to estimate Genetic coefficient of variation (%), phenotypic coefficient of variation (%), Heritability (%) (broad sense), Genetic Advance and Genetic Advance as percent of mean. The estimates for variability treated as per the categorization proposed by Siva Subramanian and Madhavamenon⁴, heritability and genetic advance as percent of mean estimates according to criteria proposed by Johnson *et al.*².

RESULTS AND DISCUSSIONS

In the present study analysis of variance revealed the existence of significant differences among genotypes for all traits studied. The mean, variability estimates *i.e.*, Genetic coefficient of variation (%), phenotypic coefficient of variation (%), Heritability (%) (broad sense), Genetic Advance as percent of mean are presented in table 1. All traits under studied have higher

phenotypic coefficient of variation than genotypic coefficient of variation. The magnitude of phenotypic coefficient of variation and genotypic coefficient of variation was moderate to high for the traits No. of grains/panicle, test weight and yield^{3,5}. The high PCV observed for No. of grains/panicle, test weight and yield⁵. The high GCV obtained for No. of grains/panicle indicating the improvement is possible through selection. Genotypic coefficient of variation measures the extent of genetic variability percent for a trait but does not assess the amount of genetic variation which is heritable. Heritability estimates were high for all the characters except for Number of productive tillers per plant. The heritability estimates along with genetic advance can be useful to predict effect of selection in selection programmes. The traits number of grains per panicle, test weight, yield⁷ and plant height exhibited high magnitude of genetic advance as percent of mean. The traits number of grains per panicle, test weight, plant height and yield have high heritability along with genetic advance as percent of mean indicate that these characters attributable to additive gene effects which are fixable revealing that improvement in these characters would be possible through direct selection.

Table 1: Variability, heritability and genetic advance for quantitative traits in rice

Character	Mean	Genetic coefficient of variation (%)	Phenotypic coefficient of variation (%)	Heritability (%)	Genetic Advance	Genetic Advance as percent of mean
Days to 50% flowering	103.45	3.16	3.69	73.30	7.38	7.14
Plant height	100.50	10.02	10.47	91.60	25.44	25.32
Productive tillers/plant	9.40	5.90	8.00	54.40	1.08	11.49
Panicle length	24.46	6.28	7.10	78.40	3.59	14.70
No. of grains/panicle	196.50	24.73	28.24	76.60	112.12	57.15
Test weight	23.83	16.95	18.61	83.00	9.72	40.78
Yield	4391.65	12.42	14.09	77.70	1270.35	28.92

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