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Research Note

Interrelations among grain quality characters in rice

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Abstract:
An experiment was conducted with five CMS lines and ten restorer lines to estimate the interrelationships among the grain quality parameters. Amylose content, gel consistency, water uptake, alkali value and L/B ratio recorded non significant correlation with grain yield. Significant positive correlation was noticed between amylose content and gel consistency. Selection based on amylose content, water uptake, L/B ratio, gel consistency will be effective.

Key words: Rice, amylose content, gel consistency, correlation

Rice is one of the major food crops of the world and especially in most Asian countries like Bangladesh, China, India, Japan, Korea, Pakistan and Vietnam (FAO, 2000). Cooking quality is an important character that determines consumer preference. The grain quality can be improved genetically through the improvement of grain quality components. Genotypic correlation among grain quality and its components provide the information about their performance and association with one another. Path analysis enables breeders to rank the genetic attributes according to their contribution (Dewey and Lu, 1959). The present study was carried out to find the selection criteria for rice quality., which would help to select the genotypes possessing desirable traits with maximum contribution to grain yield and quality.

The present investigation was carried out at the Department of Plant Breeding and Genetics, Agricultural College and Research Institute, Killikulam for determination of interrelationship of grain quality traits. The material consisted of five Cytoplasmic Male Sterile line *viz*., IR 58025A, IR 62829A, IR 68885A, IR 688885A, IR 688897A and ten testers *viz.*, ACK 03002, ADT 39, ADT 41, ADT 42, ADT 43, ASD 16, ASD 18, CO 43, ASD 19 and White ponni. Seeds of 50 cross combinations along with 15 parents were raised in randomized block design with three replications. Each hybrid was raised in 2m length plot size. All the quality parameters were recorded *viz*., L/B ratio, water uptake, kernel elongation, volume expansion, alkali value, amylose content and gel consistency on five samples from each replication and mean values were used for statistical analysis (Wright, 1921) The genotypic and phenotypic correlation coefficients were estimated and path coefficient analysis was done by Dewey and Lu (1959).

Analysis of variance revealed that all the entries were significantly different for all the characters under this study. The association among the quality characters provided reliable information on nature and direction of their relationship.

The association among grain quality characters was estimated using genotypic correlation coefficients (Table 1). Quality characters *viz.*, L/B ratio, water uptake, kernel elongation, volume expansion, alkali spreading value, amylose content and gel consistency were not significantly correlated with grain yield. This agreed with the report of Vivekanandan (1993) that the kernel traits were independent of yield. Inter relation among the quality components indicated that, L/B ratio exhibited no significant positive association with volume expansion (0.055) and also non significant negative association with water uptake (-0.205), alkali value (-0.162), kernel elongation (-0.108) and gel consistency (-0.103). The water uptake exhibited positive correlation with gel consistency (0.249), kernel elongation(0.237) and alkali value(0.174), kernel elongation exhibited positive significant association with gel consistency (0.294). Similar results were reported earlier by Sarawgi *et al*. (2000). Volume expansion exhibited significant positive association with amylase content (0.281) and also significant negative association with alkali value. Amylose content exhibited positive significant association with gel consistency (0.326). Which are in agreement with the results reported by Perez and Juliano (1979) and Kaw and Cruz

(1990). Hence it may be possible to combine grain yield and quality by specific breeding programme like biparental mating. This will break the linkage between unrelated traits and leads to more recombination.

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Table 1. Genotypic correlation of qualitative characters in rice

Traits	Water uptake	Kernel elongation	Volume expansion	Alkali value	Amylose content	Gel consistency	Grain yield
L/B ratio	-2.05	-0.108	0.055	-0.162	-0.004	-0.103	0.024
Water uptake		0.237**	-0.061	0.174*	0.109	0.249**	0.041
Kernel expansion			-0.136	0.039	0.121	0.294**	-0.005
Volume expansion				-0.248**	0.281**	-0.077	-0.073
Alkali value					-0.002	0.126	0.033
Amylose content						0.326**	0.045
Gel consistency							0.043

*, ** Significant at 1 and 5 % level respectively