

Evaluation of Some Aromatic Rice Germplasm in New Alluvial Soil of West Bengal

S. ROY, A. BANERJEE¹ AND B. K. SENAPATI

*Department of Plant Breeding, ¹Department of Plant Pathology, Faculty of Agriculture, Bidhan Chandra Krishi Viswavidyalaya, Mohanpur 741252, India
E-mail : sroypbr@gmail.com*

Abstract

Field experiment was conducted in 2006 with 28 quality rice genotypes. Observations on nine quality parameters were analyzed to assess the genetic variability and character association. Phenotypic and genotypic coefficients of variation for nine grain quality parameters revealed the existence of large amount of variability in 1,000-seed weight, alkali spreading value, brown kernel L/B ratio and moderate variability in brown and cooked kernel length, amylase content and kernel elongation index. High heritability and genetic advance were noted for 1,000-seed weight, amylase content, alkali spreading value and brown kernel L/B, implying the potential of these parameters to be used in breeding programme. Kernel elongation index was positively associated with brown kernel length and brown kernel L/B. Alkali spreading value was positively associated with cooked kernel length and breadth, while, amylase content did not exhibit any significant association with any of the traits studied. Cooked kernel length and cooked kernel breadth showed high positive direct effect, while brown kernel length and L/B ratio recorded high negative direct effect on kernel elongation index.

Key words : Quality rice, KEI, Variability, Character association.

Quality is based on a combination of subjective and objective factors. Rice, unlike most of the cereals, is consumed mainly as a whole grain. Therefore, physico-chemical properties such as size, shape are of utmost importance. The other major criteria of quality are sweet flavour, taste, stickiness and palatability. Genetic variability has been the main driving force used by man to meet not only its food needs but also to produce high quality cultivars. Knowledge about variability and character association among different quality parameters helps the breeder in tailoring the hybridization program. The present investigation was carried out to study the different quality traits and their association among themselves in some quality rice genotypes grown under new alluvial zone of West Bengal.

Methods

The materials consisted of 28 quality rice genotypes collected from diverse sources. They were grown at Regional Research Station, Chakdah, Nadia, West Bengal in *khari* season of 2006. Four week-old seedlings were transplanted in a randomized block

design with two replications. Each entry consisted of five rows of 6.0 m length with a plant spacing of 20 cm in either direction. Normal agronomic practices were followed during the crop growth period. Observations on different physico-chemical characters like grain length (mm), grain breadth (mm), L/B ratio of grain and kernel elongation index were recorded (Shouichi et al. 1976), and amylase content (Sadasivan and Manikkam 1992), and alkali digestion value (Little et al. 1958) were estimated. The data were analyzed to calculate variability components, correlation coefficients and path coefficients using Gen-Res (version 7.01) statistical package.

Results and Discussion

Analysis of variance showed highly significant differences suggesting substantial to moderate genetic variability in all the parameters studied. Similar but lower genotypic (GCV) and phenotypic coefficient of variation (PCV) were observed (Table 1) for most of the traits except for 1,000-seed weight, alkali digestion value brown kernel L/B ratio, which were quite higher and consistent with the previous reports

Table 3. Direct and indirect effect of different quality traits on kernel elongation index. **Significant at 1% level of significance. Residual = 0.165.

Characters	Direct effect on kernel elongation index	Correlation coefficient with kernel elongation index	Brown kernel length	Brown kernel breadth	Brown kernel L/B	Cooked kernel length	Cooked kernel breadth	Alkali digestion value	Amylose content	1000-seed weight
Brown kernel length	-1.079	-0.572**	-	0.015	-0.473	0.468	0.153	0.015	0.002	0.024
Brown kernel breadth	-0.097	0.165	0.164	-	0.258	-0.075	0.052	0.004	0.001	0.004
Brown kernel L/B	-0.512	-0.533**	-0.996	0.049	-	0.445	0.105	0.014	0.002	0.020
Cooked kernel length	0.609	0.069	-0.830	0.012	-0.374	-	0.157	0.019	0.005	0.022
Cooked kernel breadth	0.239	-0.149	-0.689	-0.021	-0.224	0.401	-	0.019	0.003	0.018
Alkali digestion value	0.049	0.033	-0.325	-0.007	-0.138	0.229	0.093	-	-0.001	0.007
Amylose content	0.208	0.173	-0.104	-0.004	-0.041	0.151	0.029	-0.002	-	0.008
1000-seed weight	0.028	-0.317	-0.932	-0.014	-0.360	0.480	0.159	0.013	0.006	

Direct and indirect effects of different quality traits on kernel elongation index (Table 3) revealed that direct positive effect imparted on kernel on elongation index was highest by cooked kernel length (0.609) followed by cooked kernel breadth (0.239) and amylose content (0.208). Brown kernel length recorded highest negative direct effect (-1.079) followed by brown kernel L/B ratio (-0.512). Cooked kernel length imparted highest positive direct effect on kernel elongation index but it was nullified by high amount of negative indirect effect via brown kernel length, which ultimately brought about non-significant positive correlation with kernel elongation index. Therefore to utilize this high direct positive effect of cooked kernel length in quality improvement program, a restricted selection model should be followed in this regard and obviously restriction are to be imposed mainly against brown kernel breadth. Though alkali digestion value and 1,000-seed weight had low positive direct effect on kernel elongation index, but their indirect effects via cooked kernel length were high.

The results from correlation and path coefficient analysis indicated that cooked kernel length, cooked kernel breadth, 1,000-seed weight were the major quality parameters, as these traits had shown positive direct effects on kernel elongation index and also had positive significant association. So, these traits should be considered with special priorities during quality improvement program in rice.

References

- Hussain A. A., D. M. Muarya and C. P. Waish. 1987. Studies on quality status of indigenous upland rice (*Oryza sativa*). *Indian J. Genet.* 47 : 145—152.
- Little R. R., G. B. Hilder and H. H. Dawson. 1958. Differential effect of dilute alkali on 25 varieties of mild white rice. *Cereal Chem.* 35 : 111—126.
- Sadasivam S. and A. Manikkam. 1992. Determination of amylase. Pages 12—13. in *Biochemical methods for agricultural sciences*. Wiley Eastern Ltd., New Delhi, India.
- Shouchi Y., F. Douglas, H. C. James and A. G. Kwanchai. 1976. pp. 69—77. In *Laboratory manual for physiological studies of rice*. IRRI, Philippines.