Table 3. Path co-efficient, direct effects and indirect effects of the yield components

characters	Days to 50% flowering	Days to maturity	Harvest index	Straw yield (kg/plot)	Genotypic correlation with grain yield
Days to 50% flowering	2.74	-2.79	0.077	-0.061	-0.033
Days to maturity	2.74	-2.78	0.072	-0.064	-0.036
Harvest index	0.287	-0.271	0.739	0.202	0.957**
Straw yield (kg/plot)	-0.403	0.425	0.358	0.418	0.797**

Residual effect = 0.226

negative indirect effect throught days to maturity. Due to this, days to 50 per cent flowering could not exert positive significant association with seed yield. Due to the positive indirect and direct effects of harvest index, it could exert positive significant genotypic correlation with grain yield. The indirect effects of straw yield through days to maturity, harvest index along with direct positive effect could associate with grain yield positively and significantly. Due importance might be given in the selection programme for harvest index and straw yield as these two characters recorded positive and significant association with grain yield and they exerted high indirect effects on grain yield.

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INTERRELATIONSHIP BETWEEN EARLINESS AND YIELD COMPONENTS IN RICE

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ABSTRACT

Relationship between earliness and other yield components were analyzed in 20 crosses involving four early and five very early lines in indica rice. Earliness (days to flowering) had significant and positive correlation with most of the characters studied. Positive significant association was observed among the yield components. Correlation studies revealed that selection for very early types obviously resulted in reductin in panicle length, number of grains and 100 grain weight which in turn reduced the yield.

KEY WORDS :   Correlation, Days to flowering, Yield, Yield components

To meet the ever increasing demand for food grains , the breeders are now engaged in the task of evolving short duration (around 90 days and below) varieties with association of economically important characters. However, in the biological system, only very few economic traits are associated with earliness. In rice, plant height, number of tillers, panicle length, number of grains per panicle, 100 grain weight, and grain yield have been reported to have association with earliness (days to flowering). The present experiment was taken up to study the nature and magnitude of association between the various economic traits in rice with the objective of developing varieties with early duration.

MATERIALS AND METHODS

The study was conducted with four early lines viz., IR 50, Co 37, ASD 16, ADT 36 and five very early testers viz., ASD 8, ASD 17, CO 39, Heera and Kalyani II and their 20 F_1 hybrids. The progenies were grown during 1991 Rabi season at the Paddy Breeding Station, Tamil Nadu Agricultural University, Coimbatore in randomized block design with three replications. In each treatment, a population of 80 hills was maintained uniformly with a spacing of 20 x 10 cm. Data were collected on seven quantitative traits viz., days to flowering, plant height, number of productive tillers, panicle length, number of grains per primary ear, 100 grain weight and grain yield. Genotypic, phenotypic and environmental correlation coefficients were estimated using the procedure given by Johnson et al. (1955).

RESULTS AND DISCUSSION

The genotypic, phenotypic and environmental correlation co-efficients among the

Table 1. Genotypic, phenotypic and environmental correlation for days to flowering and yield components

Characters	Plant height	Number of productive tillers	Panicle length	Grains per primary ear	100 grain weight	Grain yield	Days to flowering
Plant height	1.000	0.3492	0.5501**	0.4023*	0.2146	0.3965*	0.1204
	1.000	0.3644**	0.7072**	0.4529**	0.3104**	0.4499**	0.1279
	1.000	0.3025	0.2665	0.1769	-0.2109	0.1688	0.0693
Number of productive		1.000	0.2965	0.2431	-0.0291	0.7205**	0.0825
Tillers		1.000	0.3867**	0.2719**	0.0166	0.7212**	0.1039
		1.000	0.1293	0.1486	-0.1887	0.7505**	-0.0692
Panicle length			1.000	0.5881**	-0.1497	0.3107	0.1858
			1.000	0.6890**	-0.1086	0.4177**	0.2897**
			1.000	0.4394	-0.2681	0.1219	-0.2182
Grains per Primary Ear				1.000	-0.0891	0.3794*	0.1699
				1.000	-0.0689	0.4079**	0.2136
				1.000	-0.1761	0.2736	-0.2295
100 Grain Weight					1.000	0.1359	0.0828
					1.000	0.1908	0.0954
					1.000	0.0611	0.0554
Grain yield						1.000	0.3841*
						1.000	0.4575**
						1.000	0.1865
Days to flowering							1.000
							1.000
							1.000

seven traits are presented in Table 1. Genotypic correlations were higher than phenotypic correlations in all characters except grain yield. Days to flowering showed positive genotypic correlation with panicle length, grains per primary ear and grain yield. Similar results were also reported by Ramna Reddi and Reddi (1981). Number of productive tillers significantly and positively associated with grain yield in all the three correlations. Reddy and Ramachandraiah (1990) and Pradyumna Rao *et al.*, (1996) observed that number of tillers and other yield components were positively correlated with grain yield. Panicle length and grains per primary ear exhibited positive and significant association with all the levels of correlations. Similar results at genotypic level was reported by Singh (1980) and Jangale *et al.* (1987). Grain yield was influenced by plant height, number of tillers and panicle length. This was in accordance with the findings of Sarial and Uma Ahuja (1991) and Saravanan *et al.*, (1996). Plant height was positively correlated with number of tillers, panicle length, grains per primary ear, 100 grain weight and grain yield. The inter-association estimates obtained between the seven characters under study revealed the importance of plant height through panicle length and grains per primary ear both at genotypic and phenotypic level. Three characters viz., grain yield, grains per primary ear and panicle length registered significant and positive association with days to flowering genotypically. Notably the grain yield was positively correlated with the days to flowering both at phenotypic and genotypic level. In case of number of productive tillers, the association was with panicle length and grains per primary ear only at the genotypic level. The association between number of productive tillers and grain yield and the panicle length with grains per primary ear exerted positive and significant influence of the environment suggesting that the heritable fraction for these two characters are low.

From the present study, it was observed that genotypic correlation was positive and significant

with most of the traits. Hence, a correlation on the basis of heritable part of the values (genotypic values) provides an efficient basis for selection. Yield components like panicle length, grains per primary ear and grain yield were positively correlated with days to flowering. Thus, selection for very early types would obviously result in reduced panicle length, number of grains per primary ear which in turn reduce the yield. However, the positive correlation existing between days to flowering and grain yield and other components warrants a suitable compromise level for simultaneous selection of these traits for achieving improvement in grain yield with early duration rice cultures.

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