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CORRELATION OF YIELD COMPONENTS WITH YIELD IN RICE (Oryza sativa L.).*

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ABSTRACT

Correlation studies in rice varieties indicated positive and significant association of panicle length, grains per panicle and 100 grain weight with yield, while there was no such correlation in the hybrids. In hybrids, the grain yield had significant and positive association with number of primary and secondary branches per panicle, days to panicle emergence and number of non-ear bearing tillers. Correlation and regression studies of F1 performance with better and mid : parental values might be attributed to the potentiality of both the parents and not to a single better parent alone.

KEY WORDS: Correlation, Regression, Grain yield, Rice.

A knowledge of association between yield and the yield components is useful to make simultaneous selection for more characters. There are few reports on the correlation studies in rice hybrids. Virmani et al. (1982) in their studies on correlation between hybrids and their parents reported that higher correlation exists between hybrids and mid parental value than between the hybrids and their better parent for different characters. Ananda Kumar and SreeRangasamy (1986) reported that the correlation between different characters in rice revealed that the contribution of number of productive tillers was high for the yield expression. The findings on the correlation studies in rice hybrids are reported in this paper.

MATERIALS AND METHODS

A set of fourteen intervarietal rice hybrids viz., Vaigai/IET 3273, Vaigai/IET 6148, Vaigai/IET 6712, Vaigai/IET 4786, Vaigai/AS 688, Vaigai/TNAU 8999-4, Co 33/IET 4786, Co 33/IET 6148, Co 33/TNAU 8999-4, IET 6639/IET 7614, IET 7259/IET 6639, IET 7564/IET 7259,

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TNAU 18328-1/IET 7564 and TNAU 18328-1/IET 7614 were raised in rabi season (September-October to December-January) of 1983 at the Agricultural College and Research Institute, Madurai. The hybrids were raised in a randomised block design with three replications along with their parents. A spacing of 60 cm between rows and 15 cm between plants was adopted. Observations were recorded on fourteen yield components.

The relationship between the hybrids, their corresponding mid-parent and better parent was worked out by correlation co-efficient and linear regression co-efficient in respect of all the characters. The correlation co-efficients of yield components were worked out for the mean of the parents and hybrids as per the method suggested by Goulden (1952)

RESULTS AND DISCUSSION

The correlation co-efficients between yield and its component traits for parents are presented in Table 1. The grain yield was positively correlated with panicle length, grains per panicle and 100 grain weight. Therefore choice of parents with high mean values for these traits will ultimately result in high grain yield (Singh et al., 1980). Yadav and Singh (1979) reported positive association of grain yield with number of grains per panicle. Panicle length was positively associated with number of primary and secondary branches per panicle in the parents. Number of primary branches per panicle was positively and significantly correlated with number of secondary branches per panicle and number of grains per panicle.

The nature of association between yield and its component traits was completely different in the hybrids as compared to the parents (Table 2). There was positive and significant correlation between grain yield and days to panicle emergence and number of primary branches per panicle. This indicated that when the plants are selected for longer duration, the grain yield is likely to be higher. But generally, varieties with short duration and high yield are preferred. Hence, a compromise at optimum duration coupled with more number of primary branches per panicle will result in high yielding genotypes. Positive and significant correlation was noticed between productive tillers and number of grains per panicle as well as between panicle length

Table 1. Correlation co-efficients of yield components in parents

Characters	X1	X2	X3	X4	X5	X6	X7	X8	X9	X10	X11	X12	X13	X14
X 1		0.407	0.129	0.178	-0.123	-0.029	-0.920	0.234	0.361	0.221	-0.359	0.517	0.399	0.264
X 2			0.527	0.396	0.017	0.215	-0.086	0.050	-0.704**	0.102	0.087	-0.018	0.100	0.491
X 3				-0.032	0.225	0.254	-0.404	-0.456	0.430	0.105	-0.169	0.247	0.171	0.197
X 4					-0.217	0.567*	-0.248	-0.283	-0.162	-0.164	-0.197	-0.442	-0.539	-0.315
X 5						0.671*	-0.414	-0.419	-0.375	-0.257	0.328	0.090	0.363	-0.415
X 6							04	-0.466	0.699*	-0.421	0.060	0.003	-0.313	0.118
X 7								0.756**	0.608*	-0.037	-0.096	0.073	0.577*	0.496
X 8									0.741**	0.862**	-0.018	-0.280	0.196	-0.290
X 9										0.845**	-0.158	0.233	-0.082	0.519
X10											0.241	0.360	0.553*	0.589*
X11												0.441	0.088	0.481
X12													0.584*	0.269
X13														0.159

X 1 Plant height
X 2 Days to panicle emergence
X 3 Boot leaf length
X 4 Boot leaf breadth
X 5 Number of ear bearing tillers
X 6 Number of non-ear bearing tillers
X 7 Panicle length
X 8 Number of primary branches per panicle
X 9 Number of secondary branches per panicle
X10 Number of grains per panicle
X11 Days to maturity
X12 100 grain weight
X13 Grain yield
X14 Straw yield

Table 2. Correlation co-efficients of yield components in F1 hybrids.

Characters	X1	X2	X3	X4	X5	X6	X7	X8	X9	X10	X11	X12	X13	X14
X 1		0.001	0.615*	-0.124	0.220	0.176	0.746**	0.585*	0.171	0.294	-0.129	0.274	0.095	0.805**
X 2			0.044	0.372	-0.119	-0.299	0.612*	-0.151	0.638*	-0.057	0.829**	0.252	0.660*	0.574*
X 3				0.372	-0.706**	0.403	-0.604*	-0.048	0.197	0.482	0.592*	0.307	0.052	0.750**
X 4					-0.559*	-0.246	0.641*	0.274	-0.648*	0.539*	0.431	-0.435	-0.065	0.257
X 5						0.029	0.160	-0.181	-0.536*	0.609*	-0.129	0.027	0.027	-0.012
X 6							-0.408	0.421	0.142	0.085	-0.211	0.368	0.568*	-0.148
X 7								0.178	0.196	0.035	0.177	0.584*	0.310	0.502
X 8									0.349	-0.044	0.586*	0.293	0.641*	0.452
X 9										0.755**	-0.306	-0.090	-0.612*	-0.098
X10											0.820**	0.210	0.006	-0.268
X11												0.090	-0.389	0.307
X12													0.005	0.320
X13														0.237

Table 3. Correlation (r) and regression coefficients (b) between F1 hybrids and their mid and better parental values

S. No.	Characters	Mid parent		Better parent	
		(r)	(b)	(r)	(b)
1.	Plant height	0.628*	0.081	0.550*	0.069
2.	Days to panicle emergence	0.493	0.573	-0.526	-0.181
3.	Boot leaf length	0.113	0.034	0.076	0.029
4.	Boot leaf breadth	0.516	0.306	0.262	0.172
5.	Number of ear bearing tillers	0.039	0.027	0.134	0.117
6.	Number of non-ear bearing tillers	-0.293	-0.105	-0.302	-0.119
7.	Panicle length	0.720**	0.395	0.540*	0.284
8.	No. of primary branches/panicle	-0.068	-0.036	-0.295	-0.063
9.	No. of secondary -do-	0.193	0.219	0.121	0.012
10.	Number of grains per panicle	0.168	0.094	-0.685**	-0.228
11.	Days to maturity	0.634*	0.743	0.337	-0.082
12.	100 grain weight	0.194	0.076	-0.359	0.113
13.	Grain yield	0.318	0.160	0.268	0.149
14.	Straw yield	0.226	0.053	0.096	0.054

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

and grain weight.

The F1 mean performance was correlated with the better and mid parental values and the results on correlation and regression co-efficients are presented in Table 3. The F1 performances were positively and significantly correlated with their mid parents, for plant height, panicle

length and days to maturity. This high correlation for the above traits can generally be expected when the hybrid is predominantly contributed by additive and additive x additive gene effects as reported by Virmani et al. (1982). It is to be pointed out that a high degree of heterosis was obtained for these traits in the present study (Sampath, 1984). The relatively lower degree of correlation between F1 hybrids and their better parental values was obtained for most of the traits. This indicates that the higher performance of F1 hybrids may not be due to the better parent alone. This was confirmed by the regression values which showed that hybrid values more closely regressed on the mid parental values than the better parental values.

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