Madras agric. J. 68 (7) : 481—484 July, 1981

Study on the Correlation Co-efficient of Plant Characters on the Yield of Paddy Cultivars Bhavani and I R 20

Yield of a crop is the net result of the combined action of the various yield components which are mainly influenced by the agronmical manipulations. Contribution of the growth characters, quality characters and yield components under late sown paddy varieties Bhavani and I R 20 have not so far been well established. A study on the relation between yield and the characters affecting yield would therefore enable us to exploit the potentialities of the cultivar to the extent possible by manipulating agronimical operations. Hence, a study was undertaken at Agricultural College and Research Institute, Madurai during 1975 to 76 in a replicated trial to study the relationship between the characters, number of Productive Tillers, Leaf Area Index, Days to 50 per cent flowering, Plant Height at maturity, Panicle length, Grain number/panicle. Percentage of sterility and 1000 grain weight which contribute the direct and indirect effect on the yield. The rice cultivars I R 20 and Bhavani were sown under six dates at fortnight intervals commencing from July 75 to January '76, with three levels of fertlizer 90:45:45: 120:60:60: and 150:75:75 N:P:K Kg/ha. The results of the pre-sowing soil sample analysis revealed that the soil was of low in available Nitrogen and Potash and medium in available phosphorus with a pH 6.7. The soil was of sandy clay loam.

The experiment was laid out in Split plot design assigning varieties and fertilizer levels in the main plot and dates of sowing in the subplot. The treatments were studied in four replications. The gross plot size was 7×3 m^2. A spacing of 20×10 cm was adopted.

Plant height was taken in five randomly selected plants in each quadrate on 60th day and at harvest. The LAI was computed as suggested by Gomez (1972) in 10 randomly selected hills in two quadrates at heading stage. Number of productive tillers were calculated in all the hills of the two quadrates by encounting in ear-bearing tillers. Length of panicle was recorded in centimeter from 40 primary panicle in each treatment. The same procedure was adopted for recording number of grains/panicle. The no. of filled and unfilled grains were counted in 10 primary panicles and sterility percentage was worked out. It was transformed for calculation as per the methods given by Snedecor and Cocheran (1977). Weight of 1000 grains from each treatment was recorded at 12 samples per treatment.

The result shown i n Table I indicates that all the characters except 1000

grain weight had significant correlation with yield. With regard to Bhavani number of productive tillers, leaf area index, days to 50% flowering plant height at maturity and panicle length had higher correlation co-efficient with the yield. Among the above said characters contribution by leaf area index was higher, since it is semi tall. Negative Correlation was observed in the case of sterility percentage. In the case of IR. 20 eventhough correlation co-efficient was noticed for all the characters except 1000 grain weight, the character panicle length had got good relationship with the yield since it is a dwafr variety. Like that of Bhavani, the cultivar IR 20 also expressed negative correlation for sterility percentage as reported by Smetanin and Velkova (1972).

The correlation co-efficient obtained are given in Table II considering the above correlations with the prevailing environmental condition of this tract, for early sowings in July, Bhavani is the best suited variety at relatively lower level of 93:45.45 Kg N:P:K per ha. If the sowings are to be delayed beyond mid August I R 20 is to be preferred with medium level of fertilization (120:60:60 Kg N:P.K per ha.) The yield with late sowings can be increased applying by hight level of fertilizers.

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TABLE I Total carrelation co-efficients among the different plant characters on yield in Bhavani and IR 20

	X1	X2	X3	X4	X5	X6	X7	X8
Y	0.6234**	0.5187**	0.7313**	—0.6804**	0.6849**	0.6822**	0.5276**	0.0442NS
X1		0.5044*	0.4619**	—0.6944**	0.6078**	0.4785**	0.5878**	—0.0830NS
X2			0.6204**	—0.7876**	0.7750**	0.5834**	0.4662*	—0.1812NS
X3				—0.6753**	0.6727**	0.7633**	0.4754*	—0.2393NS
X4					0.8640**	0.6053**	0.6279**	0.1979NS
X5						0.5716**	0.7472**	0.1979NS
X6							0.4048*	0.0427NS
X7								—0.1458NS
X8								
IR 20:								
Y	0.6775**	0.6742**	0.2006NS	—0.4980*	0.3289NS	0.4254*	0.7614**	—0.1160NS
X1		0.7817**	0.0321NS	—0.5202**	0.5475**	0.3250NS	0.7427**	0.0129NS
X2			0.0967NS	—0.6333**	0.4760*	0.2380NS	0.8491**	0.0190NS
X3				—0.2770NS	0.6227**	0.7185**	0.1967NS	0.0248NS
X4					—0.3491NS	0.3082NS	0.6686**	0.1056NS
X5						0.6308**	0.4416*	0.0564NS
X6							0.4060*	0.0255NS
X7								0.0050NS
X8								

Where Y = Grain Yield (Kg/ha)
X1 = No. of prod. tillers X2 = Grain Number/Panicle X3 = LAI
X4 = Percentage of sterility X5 = Days to 50% flowering X6 = Plant height
X7 = Panicle length X8 = 1000 grain weight NS = Not Significant
** Highly Significant at 0.01 level of probability * Significant at 0.05 level of probability

TABLE II Direct and indirect effects of the characters on grain yield in Bhavani and IR 20

Character		X2	X3	X4	X5	X6	X7	X8	Total correction with Y
X1	0.2798	—0.1252	0.1643	0.0172	0.2043	0.1115	—0.0245	—0.0040	0.6234
X2	0.1411	0.2482	0.2207	0.0195	0.2605	0.1359	—0.0195	0.0086	0.5187
X3	0.1292	—0.1540	0.3558	0.0168	0.2261	0.1778	—0.0199	0.0005	0.7313
X4	—0.1943	0.1955	—0.2402	—0.0248	—0.2904	—0.1410	0.0262	—0.1139	—0.6804
X5	0.1700	—0.1924	0.2393	0.0214	0.3361	0.1332	0.0312	0.0094	0.6859
X6	0.1339	—0.1448	0.2715	0.0150	0.1921	0.2330	—0.0165	—0.0020	0.6822
X7	0.1642	—0.1157	0.1691	0.0156	0.2511	0.092	—0.0418	—0.0069	0.5276
X8	0.0232	—0.0450	0.0038	0.0059	0.0665	—0.00 9	0.0061	0.0476	0.0445
IR 20	R^2	0.6922	P^2	0.3178					
X1	0.4466	0.1237	0.0069	—0.0355	—0.2292	0.0689	0.2977	—0.0016	0.6772
X2	0.3491	0.1583	0.0209	0.0432	—0.1993	0.0504	0.3403	—0.0024	0.6742
X3	0.0143	0.0153	0.2163	—0.0189	—0.2607	0.1523	0.7788	0.0031	0.2006
X4	—0.2323	0.1002	—0.0599	0.0682	0.1462	—0.0653	—0.2680	0.0134	—0.4980
X5	0.2445	0.0753	0.1347	0.0238	—0.4187	0.1337	0.1770	0.0072	0.3299
X6	0.1352	0.0377	0.1554	0.0210	—0.2641	0.2120	0.1571	0.0032	0.4254
X7	0.3317	0.1344	0.0425	0.0456	—0.1849	0.0831	0.4008	—0.0006	0.7614
X8	0.0058	0.0030	—0.0054	—0.0072	0.0236	—0.0054	0.0020	—0.1270	—0.1106
	R^2	0.6815	P^2	0.3185					

X1 = No. of productive tillers
X2 = Grain No./panicle
X3 = LAI
X4 = Percentage sterility
X5 = Days to 50% flowering
X6 = Plant height
X7 = Panicle length
X8 = 1000 grain weight.