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Correlation and Path Analysis in Blackgram

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ABSTRACT

Correlation and path coefficient analysis in 70 diverse genotypes of blackgram (*Vigna mungo* (L.) Hopper) showed a significant positive association of yield per plant with pod clusters per plant, plant height, pods per plant, 100-seed weight and pod length. Days to 50 per cent flowering and days to maturity exhibited significant and positive genotypic correlation with seed yield. Path analysis indicated that pods per plant, plant height and 100-seed weight had direct effect on yield. Thus maximum emphasis for selection of better genotypes should be given to pods per plant, plant height and 100-seed weight.

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INTRODUCTION

Knowledge of correlation and path coefficient analysis helps plant breeder to ascertain the real components of yield and provide an effective basis of selection. Therefore, in the present study, correlation and path coefficient analysis were computed on 70 diverse blackgram genotypes.

MATERIALS AND METHODS

Seventy genotypes of blackgram were grown in a Randomized Block Design with three replications at instructional Farm, College of Agriculture, Gujarat Agricultural University, Junagadh. The sowing was done keeping each plot of one row of four meter length with interrow spacing of 30 cm and plant to plant spacing of 10 cm. The observations were recorded on five randomly selected plants from each plot for nine characters (Table 1). Path coefficient analysis was done following Dewey and Lu (1959).

RESULTS AND DISCUSSION

The genotypic correlation was in general, higher in magnitude than the corresponding phenotypic correlation (Table 1). In all cases the sign of both phenotypic and genotypic correlations were the same. The near agreement in the magnitude and direction of phenotypic and genotypic correlations indicated great importance of genetic variability with common effects than the environmental variability with common effects.

Seed yield per plant had positive and significant correlation with pod clusters per plant, plant height, pods per plant, 100-seed weight

TABLE 1

Estimate of genotypic (r_g) and phenotypic (r_p) correlation coefficients between different characters in blackgram.

Characters		*Day to 50% flowering*	*Dys to maturity*	*Plant height*	*No. of pods per plant*	*No. of cluster per plant*	*No. of pods per cluster*	*No. of seeds per pod*	*Pod length (cm)*	*100-seed weight (g)*
Seed yield per plant (g)	(r_g)	0.258*	0.238*	0.486**	0.383**	0.507**	-0.109	0.181	0.296*	0.318**
	(r_p)	0.229	0.200	0.475**	0.373**	0.496**	-0.106	0.158	0.284*	0.288*
Days to 50% flowering	(r_g)		0.915**	0.550**	0.309**	0.321**	-0.017	0.154	0.276*	0.216
	(r_p)		0.682**	0.474**	0.264*	0.269*	-0.010	0.117	0.245*	0.199
Day to maturity	(r_g)			0.642**	0.499**	0.423**	0.111	0.048	0.285*	0.234
	(r_p)			0.595**	0.432**	0.361**	0.097	0.026	0.236*	0.210
Plant height (cm)	(r_g)				0.624**	0.637**	0.039	0.296*	0.623**	0.426**
	(r_p)				0.621**	0.632**	0.036	0.268*	0.591**	0.385**
Number of pod per plant	(r_g)					0.669**	0.486**	0.164	0.352**	0.133
	(r_p)					0.661**	0.480**	0.144	0.327**	0.113
Number of cluster per plant	(r_g)						-0.298**	0.131	0.246*	0.130
	(r_p)						-0.310**	0.108	0.232	0.111
Number of pods per cluster	(r_g)							0.022	0.143	-0.002
	(r_p)							0.027	0.125	-0.004
Number of seeds per pod	(r_g)								0.576**	0.001
	(r_p)								0.529**	0.012
Pod length (cm)	(r_g)									0.286*
	(r_p)									0.230

* and ** significant at P = 0.05 and 0.01, respectively.

TABLE 2

Direct and Indirect effects of different characters on yield in blackgram.

Characters	*Day to 50% flowering*	*Dys to maturity*	*Plant height (cm)*	*No. of pods per plant*	*No. of cluster per plant*	*No. of pods per cluster*	*No. of seeds per pod*	*Pod length (cm)*	*100-seed weight (g)*	*Genotypic correlation with seed yield (g)*
Days to 50% flowering	**0.0486**	-0.1158	0.1212	0.1439	-0.0054	0.0036	0.0063	-0.0148	0.0262	0.258*
Days to maturity	0.0331	**-0.1312**	0.1422	0.1762	-0.0072	-0.0318	0.0015	-0.0144	0.0284	0.238*
Plant height (cm)	0.0229	-0.0941	**0.2571**	0.2472	-0.0326	-0.0117	0.0139	-0.0357	0.0532	0.486**
Number of pods per plant	0.0127	-0.0733	0.1704	**0.4094**	-0.0132	-0.1583	0.0075	-0.0195	0.0156	0.383**
Number of clusters per plant	0.0130	-0.0614	0.1624	0.2737	**-0.0100**	0.1022	0.0056	-0.0140	0.0152	0.507**
Number of pods per cluster	-0.0005	-0.0164	0.0091	0.1966	0.0062	**-0.3307**	0.0014	-0.0075	-0.0005	--0.109
Number of seeds per pod	0.0059	-0.0048	0.0690	0.0842	-0.0022	0.0088	**0.0520**	-0.0320	0.0012	0.181
Pod length (cm)	0.0119	-0.0404	0.1318	0.1539	-0.0846	-0.0412	0.0275	**-0.0475**	0.0315	0.296*
100-seed weight (g)	0.0092	-0.0349	0.1279	0.0461	-0.0022	-0.0012	0.0004	-0.0137	**0.1387**	0.318**

Residual effect = 0.4322.

* and ** Significant at P = 0.05 and 0.01, respectively
Diagonal underlined figures are direct effect.

and pod length, indicating that these attributes were more influencing the seed yield in blackgram. These results are in agreement with those obtained by Raut *et al.* (1990), Singh *et al.* (1991), Abrahum *et al.* (1992) and Parameswarappa *et al.* (1993). Both at genotypic and phenotypic levels, days to 50 per cent flowering was associated with days to maturity. This suggests that flowering time is an important indicator of maturity. Both days to 50 per cent flowering and maturity exhibited significant and positive association with plant height, number of pods per plant, number of clusters per plant and pod length which is in agrrement with the findings of Singh *et al.* (1991). Plant height showed significant positive correlation with pods per plant, clusters per plant, seeds per pod, pod length and 100 seed weight at both the levels. Pods per plant had significant and positive correlations with clusters per plant, pods per cluster and pod length. Pod length expressed significant and positive correlations with clusters per plant, seeds per pod and 100-seed weight.

Path coefficient analysis revealed that pods per plant had a strong positive direct effect on seed yield followed by plant height and 100-seed weight indicating their relatively high direct contribution to the seed yield. These results are in agreement with findings of Raut *et al.* (1990). Pods per plant showed highly significant positive correlation with seed yield which was mainly due to its high positive direct and indirect effect via plant height. Number of clusters per plant, pod length and days to maturity expressed negative direct effects of low magnitude on seed yield. However, then significant positive correlation with seed yield because of cummulative minor positive indirect effects via rest of the characters. The negative direct effects of low magnitude of these characters was nullified by high positive indirect effects of number of pods per plant and plant height. Days to 50 per cent flowering and positive significant correlation with seed yield, but when partitioned into direct and indirect effects, the direct contribution was very low and indirect effects through pods per plant was relatively high. This suggested that for genetic improvement of blackgram, pods per plant should also be taken into maximum consideration, followed by plant height and 100-seed weight.

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