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Character association studies in blackgram (*Vigna mungo* (L) Hepper)

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Abstract : Character association analysis in fifty genetically diverse genotypes of blackgram revealed significant positive association of biological yield per plant, pods per plant, clusters per plant, branches per plant, plant height, harvest index and days to maturity with grain yield in decreasing order of their magnitude. Further, it was found that biological yield per plant, harvest index and pods per plant showed high direct effects on grain yield where as high indirect positive effects were shown by other traits through biological yield per plant, harvest index and pods per plant. Hence, these characters appeared to be important for evolving superior genotypes in blackgram. ***(Key words :*** Blackgram, Genotypic & Phenotypic Correlation, Path analysis, Yield components).

Character association analysis reveals the type, nature and magnitude of correlation between yield components with yield and among themselves. Genotypic correlation is the correlation of breeding valus i.e. (Additive + Additive gene action). A knowledge of inter-relationships existing among yield components is essential when selection for improvement is to be effective. Path analysis identifies the yield components which directly and indirectly influence the yield. Hence, the present research work was carried out to study the correlation coefficients and path coefficients in order to formulate a selection criteria for evolving high yielding genotypes in blackgram.

Materials and Methods

Fifty genotypes of blackgram (*Vigna mungo* (L.) Hepper) obtained from Lam, Guntur were used in this experiment and were grown in a randomized block design with three replications at the wetland farm of S.V. Agricultural College, Tirupati during Rabi 1998. Each genotype was sown in a single row of 4.5 m length with a spacing of 30 cm in between the rows and 15 cm between plants within the rows. Observations were recorded on randomly selected five competitive plants in each genotype in each replication for all the characters except days to 50% flowering and days to maturity, which were recordd on per plot basis. Correlation and path coefficients were computed by following standard statistical procedures (Falconer, 1964; Dewey and Lu, 1959).

Results and Discussion

The genotype correlation coefficients are, in general, higher than the phenotypic correlation coefficients for all the characters except for 100-seed a weight, indicating that although there are intrinsic associations between characters studied, the relationship between characters were under the influence of environment and genotype x environment (Table1). Grain yield recorded highly significant positive association with biological yield per plant, pods per plant, clusters per plant, branches per plant, plant height, harvest index and days to maturity. Significant positive association of grain yield with days to maturity, branches per plant, pods per cluster, pods per plant and clusters per plant was observed by Shanmugasundaram and Sreerangaswamy (1995); with plant height was observed by Ram and Singh (1994) and with biological yield and harvest index was observed by Prabhahar and Ganapathy (1996). Hence, simultaneous selection based on these characters could be suggested for improvement in yield.

The character associations revealed that days to 50% flowering had significant positive association with days to maturity, whereas days to maturity in turn registered significant positive association with branches per plant, pods per plant, clusters per plant and biological yield per plant. It is observed that delay in flowering lead to delayed maturity, which could help in increasing the vegetative growth of the plant resulting in an increase of plant height, number of branches per plant, pods per plant, clusters per plant, biological yield and finally the yield. Plant height also had strong positive association with days to maturity, branches per plant, pods per plant, clusters per plant, biological yield per plant and finally the yield. This observation had great significance in practical plant breeding in the sense that plant height being easily observable character, mere selection for plant height would automatically select the plants for the above said characters and in turn for grain yield per plant. Similar kind of association of plant height was also reported by Reddy and Sreeramulu (1990) for days to maturity, pods per plant and clusters per plant and by Shanmugasundaram and Sreerangaswamy (1995) for pods per cluster, branches per plant and days to maturity.

Branches per plant recorded significant positve association with pods per plant, clusters per plant, biological yield per plant and harvest index. Similarly number of pods per cluster had significant positive association with pods per plant and biological yield, while pods per plant registered significant positive association with clusters pr plant, biological yield and harvest index. Shanmugasundaram and Sreerangaswamy (1995) observed similar type of significant positive association between pods per plant and pods per cluster. Similarly, significant positive association of pods per plant with biological yield and harvest index was in confirmity with the findings of Prabhahar and Ganapathy (1996). Pod length had significant positive association with seeds per pod, while it had non-significant association with the remaining traits. The seed weight exerted non-significant association with all other characters indicating its independent inheritance. Biological yield per plant registered significant positive association with seeds per pod and harvest index.

Biological yield exerted the highest direct effect on grain yield followed by harvest index, pods per plant and days to 50% flowering (Table2). Santha and Veluswamy (1997) also observed the high positive direct effect of biological yield on grain yield. Contrary to the above clusters pr plant, pods per cluster, branches per plant, plant height and days to maturity exerted negative direct effects on grain yield. However, they showed high positive indirect effects through biological yield per plant, which nullified the negative direct effects of the above characters and resulted in their positive correlation with grain yield.

Similar kind of result were reported for branches per plant, clusters per plant and pods per cluster (Rao *et al* 1983) for plant height (Santha and Veluswamy, 1997) and for days to maturity (Ramesh Babu, 1998). The indirect effect of biological yield through all other traits were very low indicating that the direct effect of biological yield had its unique contribution towards the grain yield.

The critical analysis of character associations revealed that biological yield, plant height, days to maturity, branches per plant, pods pr plant and clusters per plant are the major yield contributing traits as they had positive association with grain yield as well as among themselves. Hence, simultaneous selection for these traits will be more reliable for deriving high yielding genotypes of blackgram.

Table 1. Phenotypic (r_p) and genotypic (rg) correlation coefficients among thirteen characters in fifty genotypes of black gram

Character		Days to 50% flowering (cm)	Days to maturity (no)	Branches per plant (no)	Pods per cluster(no)	Pods per plant (no)	Pod length (cm)	Clusters per plant (no)	Seeds per pod (no)	100-seed (Weight (g)	Biological yield (g)	Harvest index (%)	Grain yield per plant(g)
Plant height (cm)	r_p	0.0737	0.4837**	0.06467**	0.0522	0.05916**	-0.1338	0.6102**	-0.1667	-0.0504	0.5619**	0.1385	0.5364**
	r_g	0.0785	0.4974	0.6577	0.0522	0.6092	-0.1340	0.6132	-0.1688	-0.0502	0.5655	0.1770	0.5433
Days to 50% flowering (no)	r_p		0.3783**	0.2021	0.1356	0.2167	0.0087	0.1742	-0.1057	-0.0323	0.1701	-0.0047	0.1620
	r_g		0.4163	0.2092	0.1418	0.2451	0.0090	0.1806	-0.1022	-0.0326	0.1787	-0.0395	0.1665
Days to maturity (no)	r_p			0.4024**	0.1247	0.4584**	-0.1140	0.4061**	0.1294	-0.0031	0.4869**	-0.0581	0.4349**
	r_g			0.4218	0.1314	0.4832	-0.1230	0.4209	0.1312	-0.0029	0.5042	-0.0632	0.4541
Branches per plant (no)	r_p				0.1659	0.7762**	-0.0272	0.7950**	-0.511	-0.2457	0.6805**	0.3769**	0.6921**
	r_g				0.1691	0.8094	-0.0268	0.8095	-0.0480	-0.2493	0.6954	0.4874	0.7116
Pods per cluster(no)	r_p					0.3744**	-0.1179	-0.0110	-0.0519	0.0028	0.3786**	-0.0468	0.3318*
	r_g					0.3859	-0.1192	-0.0095	-0.498	0.0022	0.3804	-0.0583	0.3364
Pods per plant(no)	r_p						-0.0186	0.8620**	0.0226	-0.1994	0.8790**	0.4003**	0.8836**
	r_g						-0.0098	0.8907	0.0296	-0.2064	0.9111	0.5157	0.9203
Pod length(cm)	r_p							0.1056	0.5439**	0.2312	0.2215	0.1464	0.2331
	r_g							0.1079	0.5559	0.2331	0.2242	0.1868	0.2385
Clusters per plant (no)	r_p								0.0410	0.2210	0.7851**	0.4720**	0.8089**
	r_g								0.0394	-0.2223	0.7909	0.5999	0.8220
Seeds per pod (no)	r_p									-0.1083	0.2795*	0.0140	0.2679
	r_g									-0.1103	0.2860	0.0154	0.2757
100-seed weight(g)	r_p										0.0294	0.0254	0.0108
	r_g										0.0294	-0.0303	0.0102
Biological yield(g)	r_p											0.3269*	0.9895**
	r_g											0.4155	0.9895
Harvest index (%)	r_p												0.4816**
	r_g												0.5349

* Significant at 5% level ** Significant at 1% level

Table 2. Phenotypic (P) and genotypic (g) path coefficients among grain yield per plant and other yield components in black gram.

		Direct effect	Plant height	Days to 50% flowering	Days to maturity	Branches per plant	Pod per cluster	Pod per plant	Pod length	Clusters per plant	Seeds per pod	100-seed weight	Biological yield	Harvest index	Correlation with grain yield per plant
Plant height	p	-0.0085	—	0.0006	-0.0034	-0.0050	-0.0025	0.0556	-0.0008	-0.0449	-0.0005	0.0007	0.5211	0.0240	0.5434**
	g	-0.0088		0.0011	-0.0026	-0.0104	-0.0013	-0.0338	0.0006	-0.0178	0.0036	0.0019	0.5823	0.0286	0.5434
Days to 50% flowering	p	0.0081	-0.0006	—	-0.0026	-0.0016	0.0065	0.0210	0.0000	-0.0128	-0.0003	-0.0004	0.1577	-0.0008	0.1620
	g	0.0140	-0.0007		-0.0022	-0.0033	-0.0035	0.0136	0.0000	-0.0053	0.0022	0.0012	0.1839	-0.0064	0.1665
Days to Maturity	p	-0.0070	-0.0041	0.0031	—	-0.0031	-0.0060	0.0406	-0.0006	-0.0299	0.0004	0.0000	0.4515	-0.0101	0.4349**
	g	-0.0052	-0.0044	0.0058		-0.0067	-0.0032	-0.0268	0.0006	-0.0122	-0.0028	0.0001	0.5191	-0.0102	0.4541
Branches per plant	p	-0.0077	-0.0055	0.0016	-0.0028	—	-0.0079	0.0737	-0.0002	-0.0584	-0.0002	0.0032	0.6310	0.0653	0.6921**
	g	-0.0158	-0.0058	0.0029	-0.0022		-0.0041	-0.0448	0.0001	-0.0235	0.0010	0.0093	0.7160	0.0786	0.7116
Pods per cluster	p	-0.0479	-0.0004	0.0011	-0.0009	-0.0013	—	0.0383	-0.0007	0.0008	-0.0002	0.0000	0.3510	-0.0081	0.3318**
	g	-0.0245	-0.0005	-0.0020	-0.0007	-0.0027		-0.0214	0.0005	0.0003	0.0011	-0.0006	0.3917	-0.0094	0.3364
Pods per plant cluster	p	0.0928	-0.0051	0.0018	-0.0030	-0.0061	-0.0198	—	-0.0001	-0.0644	0.0000	0.0026	0.8276	0.0750	0.9013**
	g	0.0554	-0.0054	0.0034	-0.0025	-0.0128	-0.0095		0.0000	-0.0259	-0.0006	0.0077	0.9381	0.0832	0.9203
Pod length	p	0.0056	0.0011	0.0001	0.0008	0.0002	0.0057	-0.0019	—	-0.0078	0.0016	-0.0030	0.2054	0.0254	0.2331
	g	-0.0046	0.0012	0.0001	0.0006	0.0004	0.0029	-0005		-0.0031	-0.0119	-0.0087	0.2308	0.0301	0.2385
Cluster per plant	p	-0.0735	-0.0052	0.0014	-0.0028	-0.0061	0.0005	0.0813	0.0006	—	0.0001	0.0029	0.7280	0.0818	0.8089**
	g	-0.0291	-0.0054	0.0025	-0.0022	-0.0128	0.0002	-0.0494	-0.0005		-0.0008	0.0083	0.8143	0.0968	0.8220
seeds per pod	p	0.0030	0.0014	-0.0009	-0.0009	0.0004	0.0025	-0.0007	0.0031	-0.0030	—	0.0014	0.2592	0.0024	0.2679
	g	-0.0214	0.0015	-0.0014	-0.0007	0.0008	0.0012	-0.0016	-0.0025	-0.0011		0.0041	0.2945	0.0025	0.2757
100 - seed weight	p	-0.0132	0.0004	-0.0003	0.0000	0.0019	-0.0001	0.0180	0.0013	0.0162	-0.0003	—	0.0272	-0.0044	0.0108
	g	-0.0372	0.0004	-0.0005	0.0000	0.0039	-0.0001	0.0114	-0.0011	0.00065	0.0024		0.0292	-0.0049	0.0102
Biological yield	p	0.9273	-0.0048	0.0014	-0.0034	-0.0053	-0.0181	0.0829	0.0012	-0.0577	0.0008	-0.0004	—	0.0566	0.9806**
	g	1.0296	-0.0050	0.0025	-0.0026	-0.0110	-0.0093	-0.0505	-0.0010	-0.2300	-0.0061	-0.0011		0.0670	0.9885
Harvest index	p	0.1732	-0.0012	0.0000	0.0004	-0.0029	0.0020	0.0402	0.0008	-0.0347	0.0000	0.0003	0.3031	—	0.4815**
	g	0.1613	0.0016	-0.0006	0.0003	0.0077	0.0014	-0.0009	-0.0009	-0.0175	-0.0003	0.0011	0.4278		0.5349

Phenotypic residual effect = 0.0932* Significant at 5% level   Genotypic residual effect - 0.1027** Significant at 1% level

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Sociological analysis on the paddy crop yield competition of Tamil Nadu

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Abstract : Crop yeild competition scheme was implemeted by the state department of Agriculture at state and district level. This is as Ex-post facto study conducted in eight district of Tamilnadu. The state level respondents numbering eight and district level respondents numbering 22 was selected purposively. The motivating factor behind the participation in the crop yield competition scheme was adequate water supply and favorable farm production circumstance. Two thirds of the prize winners disseminated the technology adopted by them to their friends and neighbours they also exhibited opinion leadership quality in areas such as, crop production and crop protection. *(Key words : Paddy, Crop Yield Competition, Motivating factor, and Opinion leadership)*

Government policies and schemes play a vital role in the technology transfer that will result in overall agricultural development of the nation. Thus, overall agricultural development of the nation is ensured through success in agriculture by the individual farmers.

Crop Yield Competition was launched in Tamil Nadu state during 1950-51 the response from the farmers to this strategy has been overwhelmingly increasing this scheme initially confired to paddy crop only, but it was later extended to other major food crops like bajra, sorghum, fingermillet and commercial crops like bajra, sorghum, fingermillet and commercial crops like groundnut, sugarcane and pulse.

Case prizes of Rs. 10,000 and 5,000 are awarded for the first and second prize winners respectively, at the district level and Rs. 1, 00,000 and Rs. 50,000 for the first and second prize winners respectively at the state level under CYC scheme in paddy.

Diffusion of improved technologies through effective means to other farmers will create interest among them to try that experience, the development of opinion leadership among these prize winners would would help to diffuse the technologies among other fellow farmers in the social system.