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Interrelationship of Seed Yield With its Components in F_5 Generation of Cowpea

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The phenotypic and genotypic correlation coefficients were estimated in respect of 180 paired combinations of nine characters in five selection procedures of four cowpea crosses and are appended in Table 1. Five selection procedures viz., pedigree selection for early flowering [PS(EF)], pedigree selection for high yield [PS(HY)], mass selection [MS], single seed descent [SSD] and random bulk population [RBP] applied in F_2 (Summer, 1991), F_3 (*kharif*, 1991) and F_4 (Summer, 1992) generations in four cowpea crosses. PS (EF), PS (HY) and MS were conducted by selecting 80 superior plants from F_2 to F_4. One seed from each plant taken and bulked under SSD. Seeds from remaining plants were bulked for RBP. A total of 500 plant to progenies (25 plants selected in each F_4 for each of the five selection procedures) were evaluated in F_5 (*Kharif*, 1992) in Compact Family Block Design with two replications. The plot size was single row of 5.25 m length for progenies at 45 x 15 cm spacing. Observations were recorded in five randomly selected plants in each progeny per replication in respect of yield and its component traits (Table 1). Correlation coefficients at genotypic and phenotypic levels were computed according to Al-Jibouri *et al.* (1958).

The results indicated that in general the values of genotypic correlation were slightly higher than the corresponding phenotypic correlation counterparts between seed yield and its components in most of the selection procedures of four crosses. These results are in agreement with the findings of Jambukia (1987) and Solanki (1991) in cowpea. Cheverud (1988) suggested that these observations of high genotypic correlaton may partly be due to the bias towards high integration of the correlation matrix inherent in the method of estimating the genetic covariance matrix. In a few cases, however, the phenotypic correlations were slightly higher than their genotypic correlations which suggested that non-genetic causes inflated the values of genotypic correlation.

The main usefulness of genotypic correlation is to strengthen the interpretations based on phenotypic correlation (Pandey and Gritton, 1975). In the present study, seed yield per plant exhibited strong and positive association at genotypic as well as significant

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TABLE 1

Correlation coefficients of various characters with seed yield per plant in F5 generation of cowpea.

Selection procedures		*Days to 50% flowering*	*Days to maturity*	*Plant height*	*Branches per plant*	*Clusters per plant*	*Pods per plant*	*Pod length*	*Seeds per pod*
				Pusa Falguni x V 269 (cross 1)					
PS (EF)	G	0.23	0.43	0.16	0.89	0.41	0.90	0.14	0.20
	P	0.08	0.16	0.11	0.85**	0.41*	0.87**	0.41*	0.09
PS (HY)	G	-0.01	0.17	0.46	0.65	0.48	0.87	0.25	0.22
	P	-0.02	0.01	0.45*	0.64**	.0.47*	00.86**	-0.26	0.15
SSD	G	0.16	-0.18	-0.28	0.92	0.73	0.98	-0.09	0.06
	P	0.08	-0.08	-0.16	0.86**	0.67**	0.95**	-0.04	0.06
MS	G	-0.32	-0.06	0.28	0.88	0.82	0.96	-0.20	-0.30
	P	-0.15	-0.03	0.10	0.84**	0.77**	0.94**	-0.11	.-0.28
RBP	G	-0.12	0.47	0.38	0.91	0.66	0.94	0.34	0.34
	P	-0.14	0.17	0.21	0.88**	0.65**	0.94**	0.23	0.21
				GC 1 x RC 8 (cross 2)					
PS (EF)	G	-0.10	-0.43	0.38	0.84	0.81	0.93	0.14	0.13
	P	-0.10	-0.19	0.27	0.82**	0.75**	0.85**	0.07	0.03
PS (HY)	G	0.06	0.19	0.20	0.93	0.81	1.03	-0.22	-0.02
	P	-0.05	0.04	0.12	0.91**	0.78**	0.93**	-0.18	-0.02
SSD	G	0.14	0.35	-0.08	0.98	0.98	0.96	0.03	0.19
	P	0.17	0.25	-0.03	0.95**	0.93**	0.95**	0.04	0.13
MS	G	0.62	-0.05	0.06	0.96	0.79	0.99	-0.10	0.01
	P	0.42*	0.03	0.05	0.93**	0.78**	0.93**	-0.02	0.04
RBP	G	-0.28	-0.10	-0.04	0.81	0.85	0.89	-0.22	-0.06
	P	-0.14	0.10	-0.16	0.79**	0.73**	0.91**	-0.07	0.01

1.		2.	3.	4.	5.	6.	7.	8.	9.
GC 2 x V 16 (cross 3)									
PS (EF)	G	2.56	0.34	-0.04	0.91	0.80	0.98	0.19	-0.15
	P	0.31	0.13	0.06	0.90**	0.75**	0.94**	0.08	-0.01
PS (HY)	G	0.32	0.29	0.30	0.92	0.90	0.99	0.40	0.02
	P	0.28	0.25	0.27	0.90**	0.85**	0.97**	0.31	0.02
SSD	G	0.20	-0.17	-0.12	0.94	0.91	0.96	0.04	0.29
	P	0.13	-0.17	-0.02	0.91**	0.84**	0.95**	0.00	0.16
MS	G	0.28	0.27	0.16	0.82	0.76	0.87	-0.33	0.13
	P	0.26	0.19	0.06	0.81**	0.73**	0.81**	-0.22	0.09
RBP	G	0.01	0.14	0.03	0.60	0.61	0.83	0.05	0.28
	P	-0.02	-0.04	0.03	0.67**	0.60**	0.85**	0.07	0.24
GC 2 x V 240 (cross 4)									
PS (EF)	G	-0.30	-0.31	-0.35	0.87	0.82	0.98	-0.28	-0.24
	P	-0.28	-0.23	-0.30	0.86**	0.77**	0.93**	-0.21	-0.21
PS (HY)	G	-0.06	0.22	0.07	0.96	0.90	0.98	0.53	-0.27
	P	-0.05	0.22	0.07	0.95**	0.87**	0.94**	0.37	-0.13
SSD	G	0.06	0.04	-0.28	0.94	0.91	0.95	-0.01	-0.42
	P	0.05	-0.01	-0.20	0.91**	0.87**	0.92**	0.08	-0.25
MS	G	0.03	0.07	-0.23	0.94	0.92	0.96	0.11	-0.09
	P	-0.01	0.05	-0.23	0.89**	0.87**	0.94**	0.05	0.03
RBP	G	-0.02	-0.39	-0.38	0.82	0.74	0.97	0.17	0.42
	P	-0.08	-0.11	-0.24	0.84**	0.74**	0.93**	0.22	0.11

*, ** Significant at P = 0.05 and P = 0.01 levels, respectively.
G and P indicates genotypic and phenotypic correlation, respectively.

and positive association at phenotypic levels with branches per plant, clusters per plant and pods per plant in all the five selection procedures of all the four crosses. This indicated that functionally related traits tend to be highly integrated morphologically and their phenotypic correlation structure confirms to the functional relationship structure (Cheverud, 1982). In addition to these associations, significant and positive relationship of seed yield with pod length on PS (EF) and plant height in PS (HY) were observed in cross 1 and with days to 5 per cent flowering in MS method of cross 2. The rest of the phenotypic associations of seed yield with other traits were non-significant.

Considering the interrelationship of various component characters with seed yield, it would be possible to develop an ideal plant type of cowpea having large number of pods with profused branching and bearing more bundles of pods per plant. Due weightage should be given to these traits in selection schemes in order to improve yield potential of cowpea.

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