

## Inter-relationship Among Yield and Yield Components in grain Varieties of *Cyamopsis tetragonoloba* (L) TOUB

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Seed yield has been observed to have significant and positive association with plant height, branches per plant, pods per plant, seeds per pod and 1000-seed weight. Path analysis indicates that branches per plant, pods per plant and 1000-seed weight are most important yield contributing characters. If other characters are held constant the improvement in any of these three characters will result in enhanced seed yield.

The degree of association of plant characters has always been helpful as a basis for selecting desired strains because such studies can show the relative influence of various yield components on yield. The analysis of path coefficient has been made to identify the important yield attributes by estimating direct and indirect effects on the attributes on yield.

### MATERIAL AND METHODS

Ninety two varieties of Guar were grown in a three replicated randomised block design at the Agricultural Research Station, Durgapure, Jaipur during Kharif 1979-80. Four rows, each six meters long having 45 cms, between the rows and 30 cms between plants comprised net plot. Average of the ten plants was used for statistical analysis. Quantitative observations on six important components were recorded i.e. on plant height, number of branches per plant, number

of pods per plant, number of seeds per pod, 1000-seed weight and seed yield.

The phenotypic, genotypic and environmental correlations have been calculated according to Panse and Sukhatme (1961). Path coefficient analysis was done following the method given by Dewey and Lu (1959).

### RESULTS AND DISCUSSION

Phenotypic, genotypic and environmental correlations between yield and its attributes are presented in Table I. Plant height has been found to be significantly correlated at phenotypic level with branches per plant (0.475), 1000 seed weight (0.301) and seed yield (0.467). Number of branches per plant was significantly correlated with pods per plant (0.619) and yield per plant (0.482). The character pods

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per plant was found to be correlated with seed yield per plant (0.495) while a negative correlation was obtained with 1000-seed weight (-0.275). Seeds per pod highly correlated with yield per plant (0.675). 1000-seed weight was also highly correlated with yield per plant (0.626). Similar results have been reported by Mital and Thomas (1969), Tikka (1975) and Chaudhary and Singh (1976).

Data in Table-I reveal that genotypic correlation coefficients for most of the combinations were high. Seed yield has been observed to have positive correlation with all the characters. On the other hand, 1000-seed weight has been observed to have very strong negative association with all characters except plant height (0.410) at genotypic level. These observations indicate that there may not be any improvement in total yield simply by increasing the number of seeds per pod as it reduces the 1000-seed weight and consequently the yield.

#### Path analysis

Path coefficient analysis was done to estimate the direct and indirect effects of plant height, branches per plant, pods per plant, seeds per pod and 1000-seed weight on seed yield. The results obtained are given in Table II. Tikka (1975) found that seeds per pod had the maximum direct positive effect on seed yield. Pods per plant and pod length were

positively associated with yield but only had an indirect effect on it. Chaudhary and Singh (1976) found that cluster per plant had maximum direct positive effect on seed yield followed by pods per plant and 1000-seed weight.

The data under reference reveal that plant height has no effect directly in the enhancement of yield as its direct contribution is negative (-0.280) which are due to large negative indirect effects mainly through pods per plant resulting very weak association with seed yield. Whatever contribution on seed yield, is mainly through branches per plant.

It is evident from the data (Table-II) that branches per plant, pods per plant, seeds per pod and 1000-seed weight, however, strictly sweeps the top priority position for their contribution as criterion during selection as their direct effects are positive and substantial being 0.814, 0.815, 0.810 and 0.912, respectively.

It is interesting to note that high direct contribution of 1000-seed weight on seed yield has been marked by large negative indirect effects. It is therefore, suggested that during the selection programme stress must be laid on pods per plant, seeds per pod and 1000-seeds weight to achieve the positive results.

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TABLE I. Correlation coefficients between the different pairs of characters in Guar.

Characters		Branches/ plant	Pods/ plant	Seeds/ pod	1000-seed weight	Seed yield
Plant	P	0.475**	0.129	-0.193	0.301**	0.467**
height	G	0.372	-0.469	-0.654	0.410	0.212
	E	0.610	0.597	0.279	0.192	0.507
Branches	P		0.619**	0.160	-0.125	0.482**
per plant	G		0.475	-0.195	-0.410	0.753
	E		0.710	0.210	0.196	0.243
Pods per	P			0.143	-0.275**	0.495**
plant	G			-0.393	-0.590	0.417
	E			0.375	0.110	0.475
Seeds per	P				-0.210	0.675**
pod	G				-0.317	0.516
	E				0.059	0.279
1000-seed	P					0.626**
weight	G					0.406
	E					0.271

\*\* Significant at 1 % level.



TABLE II Estimation of direct and indirect effects of yield components on seed yield.

Components	Phenotypic	Genotypic
Seed yield Vs Plant height (r)	0.467	0.212
Direct effect	0.085	-0.285
Indirect effect		
via branches/plant	0.114	0.354
via pods/plant	0.075	-0.487
via seeds/pod	-0.007	-0.080
via 1000-seed weight	-0.150	0.275
Seed yield Vs branches per plant	0.482	0.753
Direct effect	0.407	0.814
Indirect effect		
via plant height	0.167	-0.087
via pods/plant	0.317	0.416
via seed/pod	0.007	-0.018
via 1000-weight	-0.047	-0.475
Seed yield Vs pods per plant (r)	0.495	0.417
Direct effect	0.510	0.815
Indirect effect		
via plant height	0.017	-0.182
via branches/plant	0.318	0.618
via seeds/pod	0.008	-0.041
via 1000-seed weight	-0.067	-0.510
Seed yield Vs seed plant (r)	0.475	0.417
Direct effect	0.454	0.810
Indirect effect		
via plant height	-0.102	-0.162
via branches/plant	-0.047	-0.218
via pod/plant	0.048	-0.143
via 1000-seed weight	-0.075	-0.416
Seed yield Vs 1000-seed weight (r)	0.626	0.406
Direct effect	0.216	0.912
Indirect effect		
via plant height	0.150	0.082
via branches/plant	-0.075	0.316
via pods/plant	-0.117	-0.410
via seeds/pod	-0.008	-0.060
Residual effects	0.589	0.610