

Genetic Variability in Greengram (*Vigna radiata* (L.) Wilczek)*

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An analysis of relative phenotypic and genotypic contributions to the yield contributing characters in ninety varieties of greengram is presented. A wide range of variability was noticed in all the eleven characters studied, especially in plant height and pod number. Heritability estimate was found to be invariably high for all the characters studied. Pod length, 100 seed weight, cluster number and seed yield showed higher genetic advance with higher heritability estimates.

The natural variability for yield and its component traits are very narrow in a highly self pollinated crop like green gram and the scope of selection is limited. However, proper evaluation of the extent of genetic variation available for yield attributes, their heritability values and genetic advance that could be effected will be of immense help to the breeders. In the present investigation an attempt has been made to find out the magnitude of variability available in greengram and the heritable components with genetic parameters such as genetic coefficient of variation, heritability estimates and genetic advance.

MATERIAL AND METHODS

Ninety varieties of greengram of diverse geographical origin were studied in a randomised block design with three replications during 1978 in Agrl. College & Res. Instt. Madurai. Eleven characters were taken into consideration. Mean

of five plants selected at random from each replication and variety was used for statistical analysis. The genotypic coefficients of variability was worked out after Burton (1952) and heritability and genetic advance were worked out after Lush (1940) and Johnson *et al.* (1955).

RESULTS AND DISCUSSION

The range, mean, phenotypic and genotypic variance, genotypic coefficient of variability, heritability, genetic advance and genetic advance as percentage of mean are presented in Table.

The estimates of variances due to genotypic, phenotypic and environmental effects for the eleven characters of greengram showed wide variation among different characters. In the present study a wide range of phenotypic variability was observed among all the characters considered. It was found to be the highest for pod number followed by

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TABLE : Genetic parameters for different characters in green gram.

Characters	Range	Mean	Variance		PCV (%)	GCV (%)	PCV GCB	Heritability (%)	Genetic Advance	GA as % of mean
			Pheno- typic	Geno- typic						
Plant height (cm)	9.40 — 58.66	21.49	94.68	93.79	45.28	45.04	0.24	99.05	0.92	4.28
Branch Number	4.00 — 10.36	6.00	1.93	1.47	23.17	20.17	3.00	75.88	9.36	6.00
Cluster number	3.00 — 18.06	7.03	9.65	8.94	44.24	42.53	1.71	92.56	0.84	11.95
Pod number	6.88 — 76.55	27.61	140.99	131.30	42.99	41.51	1.48	93.12	0.82	2.97
Pod weight (g)	3.46 — 40.35	11.59	27.84	25.26	45.56	43.40	2.16	90.72	0.95	7.33
Pod length (cm)	5.32 — 10.17	7.04	0.71	0.69	11.97	11.79	0.18	97.18	1.69	24.01
Seed number	6.80 — 15.00	11.05	4.35	0.64	18.91	7.24	11.67	98.05	0.25	2.26
Days to 50% flowering	31.33 — 57.33	36.72	19.07	17.49	11.88	11.36	0.52	91.70	0.22	0.60
Days to 50% maturity	44.33 — 57.33	52.30	46.32	45.07	13.02	12.93	0.09	98.58	0.26	0.50
100 Seed weight	1.90 — 6.80	3.13	0.57	0.57	23.96	23.96	0.00	100.00	0.50	15.97
Seed yield (g)	2.30 — 23.33	7.69	11.43	10.23	43.05	41.61	2.34	89.45	0.81	10.53

plant height and days to 50 per cent maturity. The variability expressed as coefficient over mean also confirmed the high variability existing in most of the characters. Similar high estimate of phenotypic coefficient of variability for pod number and plant height was recorded by Veeraswamy *et al.* (1973 b) in blackgram. Genotypic coefficient of variation would be more useful for assessing the variability, since it depends upon the heritable portion of variability (Allard, 1970). High GCV estimates obtained for plant height, pod weight, cluster number, seed yield and pod number indicated that these traits are potentially variable. Several reports in other pulses are in support of this view. In greengram similar results were reported by Gupta and Singh (1969) for pod number and seed yield and Singh and Malhotra (1970) and Veeraswamy *et al.* (1973 a) for pod number, seed yield and cluster number. Parallel reports by Veeraswamy *et al.* (1973 c) for plant height, cluster number, pod weight and seed yield in cowpea were made.

Among the characters studied seed number showed minimum variability as evident from the low value of GCV. This is in conformity with the earlier reports by Gupta and Singh (1969) and Veeraswamy *et al.* (1973 a) in green gram. In the present study there was no difference between PCV and GCV estimates for 100 seed weight. This clearly indicates the absence of environ-

mental influence on this trait. Similar findings were earlier reported by Bapna and Joshi (1973) in cowpea. The difference between PCV and GCV was the highest for seed number indicating the predominant influence of environmental factors affecting this trait.

Evidently the amount of the variability in the various characters was affected differently by environmental as well as genetic factors.

Heritability estimates in the broad sense were found to be invariably high for all the characters studied. Similar high estimates of heritability for all the characters have been reported in black gram by Veeraswamy *et al.* (1973 b). High heritability estimates are helpful in making selection of superior genotypes on the basis of phenotypic performance of quantitative characters. But Johnson *et al.* (1955) have reported that heritability estimates along with genetic advance will be more useful than heritability value alone in selecting the best individuals. In the present investigation high heritability for days to 50 per cent flowering and maturity were not associated with high genetic advance. Similar reports have been made by Liang and Walter (1968). This means that there is less scope for further improvement by selection for these characters. But in the case of 100 seed weight, pod length, cluster number, pod number and seed yield, the higher heritability was associated with the higher genetic advance indi-

cating the presence of additive gene effects for these characters. Similar reports have been made by Liang and Walter (1968) in Sorghum. Therefore it might be worth while to select plants for these characters. But in greengram Veeraswamy *et al.*, (1973) have reported moderate estimates of genetic gain while Gupta and Singh (1969) and Singh and Malhotra (1970) have reported low estimates of genetic gain for pod number.

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