ld (kg/ha)

Grain yield	
SW	NE
1685	1633
1440	1537
1154	1149
69	76
147	160
1282	1454
1574	1430
1524	1434
69	76
147	N.S.
1502	1456
1402	1433
1375	1431
24	11
49	22

Madras agric. J. 68 (2) : 105 – 109, February 1981

Genotypic Correlations and Path Coefficient Analysis in Blackgram Vigna mungo (L) Hepper**

A. R. MUTHIAH[1] and V. SIVASUBRAMANIAN[2]

Correlation Coefficients and path coefficients were computed for yield components in 50 types ot blackgram. The results indicated that all the characters studied showed significant positive association with seed yield at genotypic and phonotypic levels. Pod number and cluster number not only showed high positive association among themselves but also showed positive correlation with other characters with the exception of hundred seed weight. Besides pod yield, pod number was themost important character in deciding the grain yield per plant. Pod length had a negative direct effect, The indirect effect of all the yield components via pod length were always negative. The residual effect was of a low magnitude.

A study was undertaken on 50 Indian types of blackgram to asses 1) the phenotypic, genotypic and environmental correlations between yield and its components as well as between different components themselves and 2) the direct and indirect influence of the various components on the yield.

MATERIAL AND METHODS

A set of 50 types of blackgram of indigenous origin were selected for the present study. These types were raised in randomised blocks replicated three times at the experimental area of Tamil Nadu Agricultural University. Coimbatore. Each genotype was represented by a single row of three metre length. The rows were spaced 60 cm apart with intervals of 15 cm between the plants. Five plants were selected at random from each treatment in every replication and observations were recorded for nine quantitative characters viz.. plant height, number of branches, number of clusters per plant, number of pods per plant, length of pod, number of seeds per pod, hundred seed weight, pod yield per plant and seed yield per plant. The mean values of these five plants were used for the statistical analysis. The path coefficient analysis developed by Wright 1921 was applied to the data and the estimates were obtained by the method adopted by Dewey and Lu(1959).

RESULTS AND DISCUSSION:

Genotypic. phenotypic and environmental correlations between the different pairs of characters were estimated and presented in Table. 1. All the characters studied showed significant positive association with seed yield at genotypic and phenotypic levels. The

** Forms a Part of M. Sc. (Ag) thesis of the first author submitted to the Tamil Nadu Agrl. University, Coimbatore-641 003.

1, 2 – Dept. Agrl. Botany TNAU. Coimbatore-3.

envioronmental correlation coefficients were in almost all cases lower than the genotypic and phenotypic correlations indicating that the traits selected for the study are less influenced by the environment. The high degree of positive correlation between cluster number and pod number as well as those between these characters and yield indicate the utility of these characters for the development of high yielding varieties. Similar significant postive association of pod number with seed yield was also observed by Verma and Dubey (1970) and Singh *et. al.* (1972) in black gram and also in red gram by Joshi (1973). Significant positive correlation of cluster number with seed yield of blackgram was also indicated by Singh *et al.* (1975). Singh and Malhotra (1973) also reported that the number of clusters and pods showed significant positive association with seed yield of red gram. In the present study cluster number and pod number also showed positive genotypic correlations with other characters except 100 seed weight. However, Singh *et al.* (1975) in black gram reported that while cluster number was highly and positively associated with plant height and primary branches no association with hundred seed weight was observed.

The results of a path analysis of the data is presented in Table 2 The analysis indicated that other than the pot yield the pod number and seeds per pod had significant direct effect on seed yield with 44.65 per cent and 26.31 per cent contribution respecitively. Singh *et al.* (1972) in blackgram also reported the direct positive effect of pod number. Very high positive effect of pod number on seed yield of soybean was reported by Lal and Md. Fazulul Haque (1972). In the present study the high correlation of cluster number with seed yield was mainly due to the indirect effects via pod number (39.05%). A negative indirect effect of cluster number Via pod number was however observed in Soybean by Sengupta and Kataria (1971).

The indirect influence of plant height and branches via pod number was also considerable. This type of relationship has been observed in Soybean by Malhotra *et. al* (1972) Considering the genetic correlations together the results of path analysis, pod number and seeds per pod appear to be the most important criteria determing yield Pod length had a negative direct effect. The indirect effect of all the yield components viz pod length were always negative. The result was in accordance with the result of chandel *et al.* (1973) in green gram.

In the present study, the residual effect was of low magnitide (0.2691) suggestion that most of the important contributing to seed yield have been utilised.

REFERENCES

CHANDEL, K. P. S., B. S. JOSH and K. C. PANT 1973. Yield of mung beans and its components *Indian J. Genet.*, 33: 271-76

DEWEY, D. R. and K, H. LU. 1959. A correlation and path coefficient anaiysis of components of crested wheat grass seed production *Agron* J., 51: 515-18

JOSHI, S. N. 1973. Variability and Correlation studies in pigeon pea (*Cajanus Cajan L) Madras Agric, J.* 60 412-14

LAL, V. S. and Md., FAZULUL HAQUE 1971. Path analysis of yield components in soybean. *Indian J. Genet.*, 31: 357-62

MALHOTRA, R. S., K. B. SINGH and H. S. DHALIWAL. 1972. Correlation and path coefficient analysis in Soybean (*Glycine max* (L) *Merr.) Indian J, Agril. Sci.* 42: 26-29

SENGUPTA K and K. S. KATARIA, 1971. Path coefficient analysis for some characters in Soybean *Indian J. Genet.* 31: 290-95

SINGH, K. B. and R. S. MALHOTRA 1973. Yield components in Pigeon pea *Madras Agric* J. 60: 364-66.

SINGH, U. P., U. SINGH and P. SINGH. 1975. Estimates of variability heritability and correlation for yield and its components in *Urd, Madras Agric. J.* 62: 71-72

SINGH, K. B G. S. BHULLAR, R. S. MALHOTRA and J. K. SINGH 1972. Estimates of genetic variability, correlation and path coefficients in Urd and their importance in selection *J. Res. PAU*, 9: 410-16

VERMA, S. N. P. and C. S. DUBEY 1970. Correlation studies in blackgram (*Phaseolus mungo* L.) Allahabad Farmer 44: 419.

WRIGHT S. 1921. Correlation and causation. *J. Agric. Res.* 20: 557-85

TABLE-1 Genotypic, Phenotypic and environmental correlations between different pairs of characters

		Plant height	Branches	Cluster number	Pod length	Seeds per pod	100 seed weight	Pod yield	Seed yield
Plant height	G		+0,5973**	+0.7937**	+0.7302**	+0.7056**	+0 4450**	+0.8241**	+0.7899**
	P		+0,5978**	+0.7685**	+0.6827**	+0.6262**	+0.4270**	+0 8019**	+0.7674**
	E		+0.1960**	+0.2652**	+0.0489	+0.0028	−0.0048	+0.2246**	+0.2229**
Branches	G			+0.7435**	+0.5502**	+0.4459**	+0.3956**	+0.6757**	+0.6685**
	P			+0.7154**	+0.5050**	+0.3852**	+0.3753**	+0.6541**	+0.6461**
	E			+0.2447**	−0.0297	−0.0646	−0.0142	+0.2137**	+0.2130**
Cluster number	G				+0.5627**	+0.5546**	+0.2792**	+0.8758**	+0 8505**
	P				+0 5262**	+0.4907**	+0.2667**	+0.8699**	+0.8434**
	E				+0.1208**	+0·0515	+0.0566	+0.7731**	+0.7738**
Pod length	G				+0.3367**	+0.3677**	+0.0749	+0 8776**	+0.8981**
	P				+0.3185**	+0.3296**	+0.0721	+0 8782**	+0.8967**
	E				+0.0841*	+0.0430	−0.0035	+0.8976**	+0.8916**
Seeds per pod	G					+0.9213**	+0.6446**	+0.5993**	+0.5581**
	P					+0.9002**	+0.5967**	+0.5554**	+0.5208**
	E					+0.8160**	+0.0092**	+0.0809*	+0.0814*
100 seed weight	G						+0.4585**	+0.5989**	+0.5717**
	P						+0.4030**	+0.5316**	+0.5035**
	E						−0 0100	+0.0259	+0.0287
Pod yield	G							+0.0259**	+0.02831**
	P							+0.2754**	+0.2700**
	E							+0.0276	+0.0122
									+0.9511**
									+0.9499**
									+0.9626**

Note: ** Significant at 1% level (P=0.01)
* Significant at 5% level (P=0.05)

Note: ** Significant at 1% level (P=0.01)
* Significant at 5% level (P=0.05)

TABLE 2 Path analysis of correlation coefficients

	Direct effect	Indirect effect via variables								Total genotypic correlation coefficient
		Plant height	Branches	Cluster number	Pod number	Pod length	Seeds per pod	100 seed weight	Pod yield	
Seed yield and plant height	0.0957 (12.11)	--	0.0513 (6.49)	−0.0978 (−12.38)	0.2553 (32.32)	−0.0975 (−12.34)	0.1061 (13.43)	0.0326 (4.13)	0.4442 (56.23)	0.7899
Seed yield and branches	0.0859 (12.85)	0.0572 (8 56)	--	−0.0916 (−13.70)	0.2302 (34.43)	−0.0735 (−10.99)	0.0670 (10.02)	0.0290 (4.34)	0.3643 (54.49)	0.6685
Seed yield and cluster number	−0.1232 (−14−49)	0.0759 (9.92)	0.0638 (7.50)	--	0 3321 (39.05)	−0.0751 (−8.83)	0·0834 (9.81)	0.0205 (2.41)	0.4731 (55 63)	0.8505
Seed yield and pod number	0.4010 (44.65)	0.0609 (6.78)	0 0493 (5.49)	−0.1020 (−11.36)	--	−0.0450 (−5.01)	0.0553 (6.16)	0.0055 (0.61)	0.4731 (52.68)	0.8981
Seed yield and pod length	−0.1336 (−23.94)	0.0699 (12.52)	0.0473 (8.47)	−0.0683 (12.42)	0.1350 (24.19)	--	0.1385 (24.82)	0.0472 (8.46)	0.3231 (57.89)	0 5581
Seed yield and seeds per pod	0.1504 (26.31)	0.0675 (11.81)	0.383 (6.70)	−0.0683 (−11.95)	0.1474 (25.78)	−0.1230 (−21−51)	--	0.0366 (6 40)	0.3228 (56.46)	0.5717
Seed Yield and 100 seed weight	0.0733 (25.89)	0.0426 (15.05)	0.0340 (12.01)	−0.0344 (−12.15)	0.0302 (10.67)	−0.0861 (−30.41)	0,0689 (24.34)	--	0.5546 (54.61)	0.2831
Seed yield and pod yield	0.5391 (56.68)	0.0789 (8.30)	0.0580 (6.10)	−0.1079 (−11.34)	0.3520 (37.01)	−0.0800 (−8.41)	0.0900 (9.46)	0.0210 (2.21)	--	0.9511

Residual value = 0.2691

Note: Figures in parantheses denote percentages

v. r.