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CHARACTER ASSOCIATION IN PIGEONPEA (*Cajanus cajan* (L.) Millsp.

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ABSTRACT

Studies on correlation for fifteen characters with forty early maturing genotypes of pigeonpea (*Cajanus cajan* (L) Millsp.) revealed that seed yield showed positive and significant correlation with DMP, number of pods, number of clusters, number of branches, plant height, LAI, seeds per pod, days to flowring, pods per cluster, days to maturity, 100-seed weight, harvest index and pod length.

KEY WORDS : Pigeonpea, correlation, seed yield.

Grain yield is a complex trait influenced by a large number of other component traits. A knowledge of the association among the components can help in improving the efficiency of selection. Information on th degree and direction of the association of yield with other traits and among the components themselves would help in planning the breeding programme. Accordingly the present study was undertaken to gather information on association between yield and related characters in pigeonpea.

MATERIALS AND METHODS

Forty early maturing genotypes of pigeonpea were grown in a randomized block design with four replications during 1985-86 at the School of Genetics, Tamil Nadu Agricultural University, Coimbatore. Each entry was assigned to a row of 4 m length with a distance of 45 cm and 20 cm between rows and plants respectively.

Five competitive plants per replication at the middle of the row were selected in each genotype and observations were recorded on individual plants for fifteen morphological and developmental characters. Phenotypic, genotypic and environmental correlation coefficients were calculated using the method given by Johnson *et al.* (1955).

RESULTS AND DISCUSSION

The estimates of genotypic, phenotypic and environmental correlation coefficients are presented in the Table. The genotypic correlation coefficients were in general higher than the phenotypic correlation coefficients. This may be due to the effect of environment in modifying the total expression of the genotype thus altering the phenotypic expression (Nandpuri *et al*., 1973).

Seed yield was found to be positively associated with dry matter production, number of pods, number of clusters, number of branches, plant height, leaf area index, seeds per pod, days to flowering, pods per cluster, days to maturity, 100 seed weight, harvest index and pod length which was evident from the significant correlation estimate at the genotypic level. Based on the magnitude of correlation, characters such as DMP, number of pods, number of clusters, number of branches, plant height and LAI were found to have greater association with seed yield than others. The same trend was also observed by Veeraswamy *et al.* (1973) , Mukewar and Muley (1974), Wakankar and Yadav (1975) and Balyan and Sudhakar (1985) in pigeonpea.

Among the independent variables, protein content had a negative trend of association with seed yield, although non significant, as also reporeted by Dahia *et al*. (1977).

The inter correlation estimated for the yield components in the present study revealed that plant height, days to flowering, days to maturity, number of branches, number of clusters, pods per cluster, number of pods, seeds per pod, LAI and DMP were significantly and positively associated with each other. It indicates the possibility of simultaneous improvement of these traits by selection.

At environmental level, characters such as plant height, number of branches, number of pods, number of clusters, LAI and DMP were associated positively with seed yield. Among the fourteen characters, plant height, number of branches, number of clusters, number of pods, LAI and DMP were positively correlated with one another at environmental level.

From this study, it is concluded that characters such as plant height, days to flowering, days to maturity, number of branches, number of pods, seeds per pod, number of clusters, pods per cluster, LAI and DMP can be simultaneously improved by selection. This, in turn, will improve the seed yield since they are positively correlated with seed yield.

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Table. Genotypic, phenotypic and ...

Characters		Days to flowering	Days to maturity	Number of branches	Number of clusters	Pods per cluster	Number of pods	Seeds per pod	Pod Length	100-seed weight	Protein content	LAI	Harvest index	DMP	Seed yield
Plant height	G	0.64**	0.55**	0.85**	0.90**	0.65**	0.90**	0.69**	0.42**	0.39*	-0.11	0.82**	0.61**	0.87**	0.89**
	P	0.35*	0.39*	0.75**	0.82**	0.32*	0.83**	0.35*	0.25	0.26	-0.10	0.74**	0.37*	0.79**	0.81**
	E	-0.24	-0.15	0.61**	0.71**	-0.00	0.70**	0.20	0.07	-0.03	-0.07	0.58**	-0.17	0.63**	0.60**
Days to flowering	G		0.98**	0.60**	0.57**	0.41**	0.54**	0.83**	0.57**	0.80**	-0.39*	0.72**	0.48**	0.66**	0.66**
	P		0.86**	0.27	0.24	0.29	0.28	0.26	0.28	0.64**	-0.27	0.47**	0.37*	0.43**	0.45**
	E		0.56**	-0.25	-0.24	0.18	-0.17	-0.06	-0.04	0.26	-0.05	-0.01	0.21	-0.55	-0.03
Days to maturity	G			0.56**	0.52**	0.42**	0.50**	0.76**	0.38*	0.72**	-0.42**	0.67**	0.39*	0.60**	0.59**
	P			0.34*	0.31	0.27	0.32*	0.27	0.21	0.64**	-0.29	0.49**	0.35*	0.45**	0.47**
	E			-0.15	-0.17	0.11	-0.12	-0.09	-0.04	0.37*	0.06	0.01	0.24	-0.00	0.02
Number of branches	G				0.99**	0.69**	0.99**	0.81**	0.28	0.31*	-0.20	0.85**	0.45**	0.90**	0.90**
	P				0.82**	0.26	0.81**	0.28	0.14	0.15	-0.10	0.70**	0.19	0.74**	0.73**
	E				0.60**	-0.11	0.54**	0.02	0.01	-0.15	0.04	0.47**	-0.25	0.49**	0.43**
Number of clusters	G					0.54**	0.94**	0.65**	0.34*	0.30	-0.12	0.81**	0.51**	0.90**	0.93**
	P					0.18	0.94	0.28	0.18	0.14	-0.08	0.75**	0.26**	0.83**	0.83**
	E					-0.18	0.89**	0.12	0.03	-0.14	-0.03	0.65**	-0.15	0.72**	0.70**
Pods per cluster	G						0.67**	0.44**	-0.03	-0.28	-0.29	0.66**	0.31*	0.63**	0.61**
	P						0.42**	0.23	0.02	0.19	-0.10	0.37*	0.19	0.44**	0.44**
	E						0.20	0.15	0.07	0.11	0.09	0.10	0.06	0.27	0.29
Number of pods	G							0.62**	0.29	0.31*	-0.14	0.84**	0.51**	0.92**	0.94**
	P							0.31*	0.19	0.18	-0.08	0.78**	0.30	0.88**	0.89**
	E							0.17	0.08	-0.07	0.01	-0.69**	-0.12	0.83**	0.83**
Seeds per Pod	G								0.70**	0.84**	-0.49**	0.84**	0.23	0.83**	0.80**
	P								0.41**	0.34*	-0.20	0.37*	0.10	0.40*	0.39*
	E								0.30	0.05	-0.05	0.13	0.03	0.18	0.19
Pod length	G									0.74**	-0.18	0.32*	0.22	0.50**	0.48**
	P									0.46**	-0.07	0.19	0.15	0.31*	0.31*
	E									0.13	0.03	0.05	0.08	0.11	0.11
100 seed weight	G										-0.41**	0.50**	0.35*	0.59**	0.58**
	P										-0.28	0.38	0.33*	0.50**	0.51**
	E										-0.01	0.12	0.26	0.25	0.30
Protein content	G											-0.11	-0.18	-0.27	-0.23
	P											-0.125	-0.11	-0.19	-0.18
	E											-0.14	0.01	-0.05	-0.06
LAI	G												0.43**	0.87**	0.88**
	P												0.27	0.81**	0.82**
	E												-0.06	0.69**	0.70**
Harvest index	G													0.41**	0.53**
	P													0.23	0.38*
	E													-0.18	-0.00
DMP	G														0.98**
	P														0.98**
	E														0.97**

* Significant at P = 0.05 ** Significant at P = 0.01.

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EFFECT OF CERTAIN TILLAGE PRACTICES AND AMENDEMENTS ON PHYSICO-CHEMICAL PROPERTIES OF PROBLEM SOILS

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ABSTRACT

Three tillage treatments *viz*, country ploughing, mammutty digging upto 30 cm and iron rod digging upto 45 cm and five amendments such as gypsum at 200 and 400 Kg/ha, saw dust, groundnut shell powder, coir dust and farm yard manure each at 2.5 and 5.0 tons/ha, besides control were tested for their effect on the nutrient availability in the soil and on th physical properties of red soil with characteristic surface hard pan. The trials were conducted during summer 1984 and 1985 and *Kharif* 1985. The results showed an increase in the available NPK status of soil due to application of amendments like coir dust, FYM and groundnut shell powder. The above organic amendments improved the soil physical characteristics like infiltration rate, total porosity and hydraulic conductivity of redsoil with hard pan.

KEY WORDS : Soil properties, Tillage practices, soil amendments.

In many parts of South Arcot district where groundnut is grown in red soil, the soils are characterised by high content of iron and alumina. Hard pan in soil surface especially on drying after rains was observed in such soils. The hardness in the root zone severely affects the peg formation, penetration, pod development and maturity resulting in poor yield of groundnut. Rubensam and Koepke (1964) reported that deep ploughing accompanied by deep placement of organic