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Studies on Character Association Medium fertilizer level for pod yield Its components In Groundnut [*Arachis hypogaea* (L)]

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Abstract

An Experiment was conducted in kharif 2008 and 2009 in medium fertilizer condition in 23 semi & spreading type varieties of ground nut at R.B.S College Bichpuri Agra to know character association and path analysis. The estimates of genotypic correlation coefficients in general were higher than their corresponding phenotypic correlation coefficients indicating strong inherent association among pod yield and its contributing characters. Days to pegging, days to maturity, number of pods/plant, 100 pod weight and 100 kernel weight were found to have positive and significant association with pod yield per plant at both the genotypic and phenotypic levels in both the years, Genotypic inter relationship was found significant with days to 50 % flowing only Genotypic correlations of above said pod yield 'components with pod yield were also strong. In both the years the genotypic and phenotypic path analysis revealed the highest positive direct effects of number of pegs per plant, being followed in order by pods/plant, 100 pod weight and shelling percentage towards pod yield in both the years at both the genotypic and phenotypic levels. In the year 2008, 100 kernel weight had significant effect at phenotypic level and in year -2009 at genotypic level. Hundred kernel weight contributed highest indirect effect on genotypic level in 2008 and at phenotypic level in 2009.

Key words: genotypic, phenotypic, correlation, maturity

Introduction

Groundnut [Arachies hypogaea(L)] is an annual legume crop being grown on marginal lands and under rain fed conditions. In India groundnut is grown in an area of about 7.6 million ha with a production of 7.8 million tones of pods and 1060 kg/ha productivity. Groundnut is an allotetraploid (C2n=4X=40) with a basic chromosome number of X=10 (stalka1997) It is highly self–pollinated crop and has cleistogamous flowers. Cultivated groundnuts belong to the three sub-species Valencia, Spanish and Virginia, the Virginia sub – species includes both bunch and runner form plant habits groundnut verities from the compact bunch type with very little lateral spread to the spreading runner forms under better growing conditions the runner forms predominates in India, the spreading Virginia type are generally grown under rain fed condition during monsoon season while irrigated one type under winter or summer condition. The Spanish bunching types predominates some Virginia bunch type are also grown during this season(Reddy et al 1984) In Agra now a day's semi spreading types are grown during kharif season but Spanish bunch type are grown during summer season. Most of the characters of breeder's interest are complex and are the result of interaction of a number of components, understanding the relationship among yield and yield components is of paramount importance for making the best use of this relationship in selection. The correlation coefficient may be confounded with indirect effect due to common association inherent in trait inter relationship. Therefore information derived from the correlation coefficients can be augmented by partilationing correlations.

Materials and Methods

The experimental material comprised of twenty three bunch and semi spreading type groundnut genotypes. The experiment was lay out in randomized block design with their replications at experimental farm of R.B.S College Bichpuri agra under irrigated condition during kharif 2008 & 2009 Each entry was accommodated in three rows each of 3 meter length with a spacing of 30 X 12 in cm in medium fertilizer level the observation recorded on five randomly selected plants from each entry and replication and their mean values were used for the computation of the phenotypic and genotypic correlation coefficient among the character under study worked – out through covariance analysis as per Al–Jibour et al (1958) The phenotypic as well as genotypic path coefficient analysis were done as per the method suggested by Dewey and Lu (1959).

Results and Discussion

In general genotypic correlation (Table1&2) were higher than their corresponding phenotypic correlations indicating the high degree of association between two variables at genotypic level. Its phenotypic expression was deflected by the influence of environment. It has also been indicated that there was an inherent relationship between the characters studies which is in agreement with conclusions of Singh & Singh (1999). In most of the cases the direction and magnitude of phenotypic & genotypic correlations between various characters remained almost same; this is very helpful to Plant Breeder because breeder can practice selection on the basis of phenotypic expression of the character for the improvement of pod yield. The phenotypic correlation coefficient in very few cases were higher than their corresponding genotypic correlation coefficient which might be due to the non genetic causes probably environment inflated the value of phenotypic correlation. At both the phenotypic and genotypic levels the number of pods/ per plant, 100 pod weight and kernel weight had highly significant and positive association with pod yield per plant in both the years. Similar results were also reported by Yogendra et al(2001);Suneetha et al (2004) and Golakia et al (2005). Development al trait, days to maturity showed positive and highly significant correlation with pod yield per plant in both the years, This indicated the importance of maturity duration for increasing the pod yield under kharif showing in both the years. They can serve as marker/indicator characters for the improvement in pod yield Other characters viz number of pegs per plant and shelling percentage did not show any relationship with pod yield per plant, contrary to our findings Mahalakshmi et al (2005) noticed significant and positive correlation of above mentioned yield contributing characters with pod yield per plant in their investigation this might be due to environments effect and the inclusion of genetic material other than used in the present study. Characters like days to 50% flowering which decide the earliness/lateness of genotype had significant and positive genotypic and phenotypic association with days to pegging, days to maturity, number of pegs per plant

Table 1: Genotypic and Phenotypic Correlations (2008)

Correlation Characters		Days to 50% flowering	Days to pegging	Days to maturity	No. of pegs/ plant(g)	No. of pods/ plant (g)	100 pod weight (g)	100 Kernel weight (g)	Shelling percentage	Dry pod yield plant (g)
Days to 50% flowering	G		0.5514**	0.9645**	0.5431**	0.3983	0.4674*	0.5727**	0.2028	0.5399**
	P		0.5010*	0.9453**	0.5055*	0.3176	0.4575*	0.5770**	0.1510	0.5190*
Days to pegging	G			0.6399**	-0.0181	0.6463**	0.3284	0.3469	0.1286	-0.4841*
	P			0.5745**	-0.0188	0.4192*	0.2925	0.3129	0.0281	0.4088
Days to maturity	G				0.5164*	0.4133*	0.5292**	0.6266**	0.2660	0.5993**
	P				0.4766	0.3210	0.5262**	0.6245**	0.2174	0.5805**
No. of pegs / plant	G					0.0339	0.2274	0.4009	-0.0317	0.2121
	P					0.0327	0..2054	0.3655	-0.0061	0.1896
No. of pods / plant (g)	G						0.1564	0.0502	-0.0856	0.4302*
	P						0.1154	0.0502	0.0417	0.4692*
100 pod weight (g)	G							0.7866**	-0.0313	0.9587**
	P							0.7818**	-0.0353	0.9306**
100 Kernel weight	G								-0.0363	0.7293**
	P								-0.0282	0.7103**
Shelling perc-entage	G									-0.0536
	P									-0.0163
Dry pod yield / plant(g)	G									0.000
	P									0.000

and hundred kernel weight in both the years. Only at genotypic level number of pods per plant days to pegging had significant and positive correlation with days to maturity no, of pegs per plant, 100 pod weight and hundred kernel weight are genotypic and phenotypic level both the year, days to maturity was had significant correlations with no. of pegs per plant 100 pod weight & 100 kernel weight at genotypic and phenotypic level, and only at genotypic level it positive and significant correlation with pods per plant in both the years. Correlation 100 pod weight had significant correlations with 100 kernel weight at both genotypic and phenotypic levels, in both the years. Most of the characters of breeder's interest are complex and are the result of interaction of a number of components of correlations between yields components are of paramount importance but correlation coefficient may be confounded with direct effect due to common association of inherent interrelationship. Therefore information derived from the correlation coefficient should be used by partitioning genotypic and phenotypic correlation into direct and indirect effects.

Table 2: Genotypic and Phenotypic Correlations (2009)

Correlation Characters		Days to 50% flowering	Days to pegging	Days to maturity	No. of pegs/ plant(g)	No. of pods/ plant (g)	100 pod weight (g)	100 Kernel weight (g)	Shelling percentage	Dry pod yield plant (g)
Days to 50% flowering	G		0.6203**	0.9248**	0.4400*	0.3412	0.5610**	0.6274**	0.2505	0.6291**
	P		0.5288**	0.8886**	0.3905	0.2532	0.5395**	0.6065**	0.1896	0.5923**
Days to pegging	G			0.6694**	0.0077	0.7401**	0.4120	0.4076	0.1660	0.5868**
	P			0.5673**	-0.0138	0.4630*	0.3521	0..3545	0.0579	0.4775*
Days to maturity	G				0.4538*	0.3985	0.5269**	0.6117**	0.3024	0.6179**
	P				0.4111	0.2661	0.5137*	0.6037*	0.2641	0.5785**
No. of pegs / plant	G					-0.1226	0.2339	0.3931	0.0987	0.2241
	P					-0.0580	0.2038	0.3338	0.1403	0.2147
No. of pods / plant (g)	G						0.1265	0.0537	-0.1776	0.4151*
	P						0.0718	0.0482	-0.0069	0.4209*
100 pod weight (g)	G							0.7900**	0.1073	0..9544**
	P							0.7807**	0.0639	0.9120**
100 Kernel weight	G								0.0819	0.7507**
	P								0.0714	0.7222**
	(g)									
Shelling perc-entage	G									0.0417
	P									0.0777
Dry pod yield / plant(g)	G									0.000
	P									0.000

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