



Research Note

Association analysis among the yield and yield attributes of early season drought tolerant groundnut (*Arachis hypogaea* L.)

M. Vaithiyalingan, V.Manoharan and N.Ramamoorthi

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Abstract:

Correlation and path coefficients were worked out for nine traits involving 40 hybrids and 14 parents in groundnut. Pod yield exhibited significant positive association with pods per plant, dry matter production, kernel weight and harvest index. Path analysis revealed maximum direct effect of pods per plant followed by dry matter production, and kernel weight on pod yield.

Key words:

Groundnut, correlation and path analysis

Before initiating any breeding program, it is essential to obtain information regarding the interrelationship between various yield attributing characters with pod yield. A knowledge of association between yield and yield components will serve to make simultaneous selection for more characters. Groundnut is largely a small holders crop, grown under rainfed conditions in semi arid areas. To develop elite genotypes, knowledge on inter relationship among yield and its component characters and direct and indirect contribution towards yield is important. Hence, the present study was undertaken to derive information on phenotypic, genotypic correlation, direct and indirect effects of yield components in early season drought tolerant groundnut genotypes.

Ten lines and four testers and their resultant 40 hybrids were raised in a randomized block design with three replications at Oilseeds Research Station, Tindivanam during Kharif 2009 under rainfed conditions. Each genotype was raised in a single row of 3 m in length with a spacing of 30cm between

rows and 10 cm within the rows. Observations were recorded on five randomly selected plants in each genotype per replication for the following traits viz., days to 50% flowering, plant height, pods per plant, dry matter production, 100 kernel weight, harvest index, maturity, SPAD chlorophyll meter reading and pod yield. The genotypic and phenotypic correlations coefficients (Singh and Chaudhary, 1979) and path analysis (Dewey and Lu, 1959) were worked out.

Analysis of variance revealed that all the entries were significantly different for the characters studied. The genotypic and phenotypic correlation co-efficients for nine characters are presented in Table 1. The genotypic correlations were higher than their corresponding phenotypic correlations which may be due to modifying effect of environment on association of characters at genetic level.

Pod yield had highly significant and positive association with pods per plant, dry matter production, kernel weight and harvest index. Similar results were obtained by Ladole et al., (2009). This reveals the importance of those components in increasing the seed yield. The highest degree of association between pods per plant and pod yield was the most reliable component of yield and could be

very well utilized as an indicator of yield. The earlier studies also indicate the importance of pods per plant as one of the important yield component (Parameswarappa et al., 2008; Rosemary and Ramlingam, 1997). Pods per plant, dry matter production, kernel weight and harvest index showed significant and positive inter correlations among themselves. Similar results were recorded by Reddy and Gupta (1992). Days to 50% flowering had significant negative association with pods per plant, dry matter production and kernel weight.

The path coefficient analysis on genotypic correlation in respect of pod yield is given in table 2. The direct effect was high and positive for pods per plant, kernel weight, dry matter production followed by harvest index. The indirect effect of, kernel weight, dry matter production, harvest index through were positive. These results are in conformity with Parameswarappa et al. (2008). It could be inferred that reliance on pod per plant followed by dry matter production and kernel weight will result in improvement of pod yield in groundnut.

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Table 1. Genotypic (G) and phenotypic correlation coefficients between different traits

Traits		Days to 50% flowering	Plant height	Pods per plant	Dry matter production	100 kernel weight	Harvest index	Days to maturity	SCMR	Pod yield
Days to 50% flowering	G		-0.509**	-0.496**	-0.895*	-0.885*	-0.371	-0.098	0.002	-0.610*
	P		-0.204	-0.199	-0.105	-0.289	-0.109	0.122	0.003	-0.265
Plant height	G			1.033**	0.926*	1.473*	0.17	0.623*	0.343*	0.878**
	P			0.359*	0.124	0.384*	0.239	0.311*	0.185	0.468**
Pods per plant	G				2.601*	2.592*	0.947*	0.528*	0.381*	1.717**
	P				0.090	0.231	0.264	0.0351	0.228	0.327*
Dry matter production	G					-1.109*	-0.867*	1.226*	0.320*	1.603**
	P					0.256	-0.121	0.151	0.052	0.258
100 kernel weight	G						1.408*	1.071	0.175	1.372**
	P						0.163	0.261	0.062	0.0533
Harvest index	G							0.022	0.399**	0.982**
	P							0.030	0.179	0.137
Days to maturity	G								0.143	0.592**
	P								0.132	0.258
SCMR	G									0.064
	P									0.031

*, ** Significant at P = 0.05 and P 0.01 level, respectively



Table 2. Direct and indirect effects of different traits on seed yield

Traits	Days to 50% flowering	Plant height	Pods per plant	Dry matter production	100 kernel weight	Harvest index	Days to maturity	SCMR	Genotypic correlation with Pod yield
Days to 50% flowering	0.084	0.380	-0.524	-0.267	-0.289	-0.010	0.017	-0.001	-0.0610*
Plant height	-0.043	-0.748	1.091	0.276	0.482	0.004	-0.110	-0.076	0.878**
Pods per plant	-0.041	-0.773	1.057	0.776	0.849	0.027	-0.094	-0.084	1.717**
Dry matter production	-0.075	-0.693	2.749	0.298	-0.363	-0.024	-0.217	-0.071	1.603**
100 kernel weight	-0.074	-1.102	2.739	-0.331	0.328	0.040	-0.190	-0.039	1.372**
Harvest index	-0.031	-0.127	1.001	-0.259	0.461	0.028	-0.004	-0.088	0.982**
Days to maturity	-0.008	-0.466	0.558	0.366	0.350	0.001	-0.178	-0.032	0.592**
SCMR	0.001	-0.256	0.402	0.096	0.057	0.011	-0.025	-0.221	0.064

Diagonal values denote direct effect.