Bulletin of Environment, Pharmacology and Life Sciences
Bull. Env. Pharmacol. Life Sci., Vol 7 [12] November 2018: 111-114

Online ISSN 2277-1808
Journal's URL:http://www.bepls.com
CODEN: BEPLAD
Global Impact Factor 0.876
Universal Impact Factor 0.9804
NAAS Rating 4.95

ORIGINAL ARTICLE **OPEN ACCESS**

A Study of Correlation and Path Analysis in Peanut (*Arachis hypogaea* L.)

Shankar M.*[1], Harish Babu B.N.[2], Gobu R.[1], Sheshaiah[1]
[1] College of Agriculture, Shivamogga, [2] College of Horticulture, Hiriyur, University of Agricultural and Horticultural Sciences, Shivamogga, Karnataka.
*Corresponding author: agrishankar11@gmail.com

ABSTRACT
Correlation and path co-efficient analysis were carried out for pod yield and its component traits in 49 genotypes of groundnut. The genotypic correlation coefficients were found to be of relatively closer to the corresponding phenotypic correlation coefficients, representing strong inherent association between the traits. The correlation study revealed that pod yield per plant had a positive and significant association with kernel yield per plant, number of pods per plant, number of mature pods per plant, pod yield per plot, plant height at 90 days after sowing, plant height at 60 days after sowing, number of immature pods per plant, harvest index, test weight, number of primary branches per plant and plant height at 30 days after sowing. Path co-efficient analysis revealed high direct effects of kernel yield per plant had highest direct positive effect on pod yield followed by number of pods per plant, number of mature pods per plant, pod yield per plot, 90 plant height at 60 days after sowing, plant height at 60 days after sowing, number of immature pods per plant, harvest index, test weight, number of primary branches per plant, plant height at 30 days after sowing and shelling out turn (%). Therefore, it would be worthwhile to give due importance on the selection of these traits for fast improvement in pod yield of groundnut.
Key words: Correlation Co-efficients, Path Co-efficients, Pod yield, Kernel yield, Peanut

Received 11.08.2018 Revised 11.09.2018 Accepted 19.10.2018

INTRODUCTION
Groundnut (*Arachis hypogaea* L.) is also called as peanut and is one of the most important oilseed crops of India. In groundnut, Direct selection for pod yield would not be a reliable approach owing to its quantitative inheritance that constituted by number of yield attributes. Clear Information on contribution of each component attributes that influence the complex trait would come out through the study of correlation co-efficient and causation of path co-efficient analysis [2]. A true picture of the correlation co-efficient between the yield attributes and pod yield, and Information on relative importance of direct and indirect effects of these attributes on pod yield is the pre-requisite for crop improvement to attain the goal of augmented production by increasing the yield potential of crop. Accordingly, the present investigation was carried out to obtain information on the association of pod yield and its component traits, interrelationships among themselves and to assess their relative importance.

MATERIAL AND METHODS
The material for the present study comprised 49 groundnut genotypes, grown in a Randomized Block Design with three replications during *Rabi* 2016 at Hiriyur, University of Agricultural and Horticultural Sciences, Shivamogga, Karnataka. All agronomic practices were followed for raising good crop as per recommendations of the concerned crop. Inter row spacing of 30 cm and plant to plant spacing 10 cm were followed. Observations were recorded on random five plants from each genotype in each replication for 16 quantitative and qualitative characters *viz.,* plant height at 30 days after sowing (cm), plant height at 60 days after sowing (cm), plant height at 90 days after sowing (cm), number of primary branches per plant, number of days to flower initiation, number of days to maturity, number of pods per plant, number of matured pods per plant, number of immature pods per plant, pod yield per plant (g), pod yield per plot (g), test weight (g), shelling out turn (%), oil content (%), kernel yield per plant (g) and harvest index. The

phenotypic and genotypic correlation coefficients were computed using the technique suggested by Al-Jibouri *et al.* [1]. The correlation coefficients were used to find out the direct and indirect effects of the component traits on pod yield as per the method of Dewey and Lu [5]. The analysis was done by using the WINDOSTAT software.

RESULTS AND DISCUSSION

Correlation Co-efficient Studies

Significant differences were observed among the 49 genotypes for all the 16 characters studied. In general, the phenotypic correlation coefficients were greater than their respective genotypic correlation coefficients that may be due to influence of environment on phenotypic expression. The results indicated that the trends of phenotypic and genotypic correlation were almost similar for all the characters. The dry pod yield per plant showed a positive and significant association with kernel yield per plant (0.93), number of pods per plant (0.81), number of mature pods per plant (0.81), pod yield per plot (0.66), plant height at 90 days after sowing (0.51), plant height at 60 days after sowing (0.50), number of immature pods per plant (0.43), harvest index (0.40), test weight (0.39), number of primary branches per plant (0.36) and plant height at 30 days after sowing (0.25). Similar results were reported by Lakshmidevamma *et al*. [9], Patil *et al.* [11], Surbhi *et al.*[13] and John K, *et al*. [7]. Babariya and Dobariya, [3] reported that similar association of pod yield per plant with other yield contributing traits. Sumathi *et al.* [12] and Dhaliwal *et al.* [6] also observed that significant positive association for pod yield per plant with kernel yield and 100 seed weight that supports present findings. Positive and significant association between 100 kernel weight and pod yield plant was reported by Korat *et al.* [8]. But it had non-significant negative association with number of days to flower initiation, number of days to maturity and oil content (%).

The estimates of phenotypic parameters revealed that the genotypic coefficient of variation along with least difference from phenotypic coefficient of variation observed for characters viz., plant height at 30 DAS (cm) (PCV 12.74% and 9.73%), plant height at 60 DAS (cm) (PCV 15.37% and 12.83%), plant height at 90 DAS (cm) (PCV 18.80 % and 16.11%), number of primary branches per plant (PCV 11.16 % and 6.97%), number of days to flower initiation (PCV 11.41 % and 9.01%), number of days to maturity (PCV 2.28 % and 2.17%), number of pods per plant (PCV 30.96 % and 26.27%), number of matured pods per plant (PCV 31.96 % and 28.94%), number of immature pods per plant (PCV 36.18 % and 33.46%), pod yield per plant (g) (PCV 36.67 % and 32.63%), pod yield per plot (g) (PCV 33.19 % and 28.14%), test weight (g) (PCV 17.07 % and 13.96%), shelling out turn (%) (PCV 13.36 % and 8.78%), oil content (%) (PCV 5.45 % and 4.75%), kernel yield per plant (g) (PCV 41.05 % and 35.40%) and harvest index (PCV 18.78 % and 15.21%), indicating that lower influence of environment on the expression of traits, entire genetic determinants are converted into phenotype.

Path Co-efficient Studies

To know the direct and indirect effects of these characters on pod yield per plant, correlation coefficients were further partitioned into measures of direct and indirect effects through path co-efficient studies (Table 3) which indicated that kernel yield per plant (0.9303), number of pods per plant (0.8084), number of mature pods per plant (0.8064), pod yield per plot (0.6622), 90 plant height at 60 days after sowing (0.5097), plant height at 60 days after sowing (0.5034), number of immature pods per plant (0.4303), harvest index (0.3998), test weight (0.3845), number of primary branches per plant (0.3597), plant height at 30 days after sowing (0.2486) and shelling out turn (0.1482) had direct positive effect on pod yield. Among these component characters kernel yield per plant had highest direct positive effect on pod yield followed by number of pods per plant (0.8084).This clearly indicates that if other characters are kept constant, an increase in that kernel yield per plant and number of pods per plant will certainly increase the yield significantly. However, number of days to maturity (-0.1231), number of days to flower initiation (-0.0963) and oil content (-0.0346) had direct negative effect on pod yield. Among these traits, number of days to maturity had highest negative effect on pod yield followed by number of days to flower initiation. The low residual effect shows that the important yield components have been included in the present investigation for path analysis. Dhaliwal *et al.* [6] also reported that high positive direct contribution of kernel yield per plant to the pod yield per plant. Bera *et al.* [4] observed that positive direct contribution of harvest index to the pod yield irrespective of location and year effect. Padmaja *et al.* [10] emphasized that number of mature pods per plant, total number of pods plant and haulm weight per plant for selecting high yielding lines in groundnut.

Table1. Estimates of phenotypic correlation coefficients for 16 different characters in groundnut genotypes

	X1	X2	X3	X4	X5	X6	X7	X8	X9	X10	X11	X12	X13	X14	X15	X16
X1	**1.00**															
X2	0.78**	**1.00**														
X3	0.66**	0.86**	**1.00**													
X4	0.17*	0.24**	0.15	**1.00**												
X5	0.05	-0.12	-0.16	0.34**	**1.00**											
X6	-0.20*	-0.34**	-0.31**	0.31**	0.73**	**1.00**										
X7	0.34**	0.49**	0.45**	0.42**	-0.12	-0.12	**1.00**									
X8	0.40**	0.57**	0.52**	0.33**	-0.22**	-0.22**	0.96**	**1.00**								
X9	-0.0001	0.04	0.02	0.49**	0.20*	0.24**	0.63**	0.40**	**1.00**							
X10	0.14	0.38**	0.45**	0.22**	-0.03	0.03	0.55**	0.53**	0.36**	**1.00**						
X11	0.31**	0.42**	0.38**	0.24**	0.35**	0.19*	0.15	0.15	0.07	0.42**	**1.00**					
X12	0.39**	0.32**	0.27**	0.14	-0.09	-0.05	0.29**	0.29**	0.14	0.23**	0.24**	**1.00**				
X13	-0.17*	-0.17*	-0.05	0.002	-0.10	0.02	-0.02	-0.05	0.09	-0.03	-0.02	0.05	**1.00**			
X14	0.23**	0.22**	0.06	0.16*	-0.01	-0.05	0.30**	0.34**	0.04	0.25**	0.28**	0.33**	-0.07	**1.00**		
X15	0.36**	0.56**	0.55**	0.36**	-0.12	-0.12	0.80**	0.81**	0.41**	0.66**	0.43**	0.49**	-0.01	0.46**	**1.00**	
X16	0.25**	0.50**	0.51**	0.36**	-0.10	-0.12	0.81**	0.81**	0.43**	0.66**	0.39**	0.15	-0.04	0.40**	0.93**	**1.00**

Where, ** - Significance at 1 % (r = >0.2118) * - Significance at 5% (r = > 0.1619)

X1-Plant height at 30 DAS (cm)
X2-Plant height at 60 DAS (cm)
X3-Plant height at 90 DAS (cm)
X4-No. of primary branches/plant
X5-No. of days to flower initiation
X6-No. of days to maturity
X7-No. of pods/plant
X8-No. of matured pods/plant
X9- No. of immature pods/plant
X10-Pod yield/plot (g)
X11-Test weight (g)
X12-Shelling out turn (%)
X13- Oil content
X14-Harvest index
X15-Kernel yield/plant (g)
X16-Pod yield/plant (g)

Table 2. Estimates of direct (diagonal) and indirect effects (of diagonal) of yield components on pod yield at genotypic level in groundnut genotypes

	X1	X2	X3	X4	X5	X6	X7	X8	X9	X10	X11	X12	X13	X14	X15
X1	**-0.0030**	-0.0023	-0.0020	-0.0005	-0.0002	0.0005	-0.0010	-0.0012	0.0000	-0.0004	-0.0009	-0.0012	0.0005	-0.0007	-0.0011
X2	0.0043	**0.0055**	0.0047	0.0013	-0.0007	-0.0018	0.0027	0.0031	0.0002	0.0021	0.0023	0.0018	-0.0009	0.0012	0.0031
X3	-0.0065	-0.0084	**-0.0098**	-0.0015	0.0016	0.0031	-0.0044	-0.0051	-0.0002	-0.0045	-0.0037	-0.0027	0.0005	-0.0006	-0.0055
X4	0.0026	0.0036	0.0023	**0.0152**	0.0051	0.0047	0.0064	0.0050	0.0075	0.0034	0.0037	0.0022	0.0000	0.0025	0.0054
X5	0.0000	-0.0001	-0.0001	0.0002	**0.0007**	0.0005	-0.0001	-0.0001	0.0001	0.0000	0.0002	-0.0001	-0.0001	0.0000	-0.0001
X6	0.0065	0.0111	0.0104	-0.0101	-0.0240	**-0.0330**	0.0038	0.0072	-0.0078	-0.0009	-0.0063	0.0017	-0.0007	0.0017	0.0038
X7	1.6128	2.3749	2.1355	2.0121	-0.5930	-0.5576	**4.8044**	4.6319	3.0269	2.6384	0.7104	1.3776	-0.0920	1.4287	3.8550
X8	-1.6001	-2.3039	-2.0920	-1.3159	0.8709	0.8791	-3.8954	**-4.0405**	-1.6209	-2.1203	-0.6122	-1.1801	0.2190	-1.3695	-3.2651
X9	0.0002	-0.0509	-0.0258	-0.6661	-0.2768	-0.3193	-0.8526	-0.5429	**-1.3533**	-0.4867	-0.0906	-0.1826	-0.1251	-0.0468	-0.5474
X10	0.0023	0.0064	0.0076	0.0037	-0.0005	0.0005	0.0092	0.0087	0.0060	**0.0167**	0.0071	0.0039	-0.0005	0.0042	0.0111
X11	0.0041	0.0056	0.0051	0.0032	0.0046	0.0026	0.0020	0.0020	0.0009	0.0057	**0.0134**	0.0032	-0.0002	0.0038	0.0057
X12	-0.1522	-0.1267	-0.1069	-0.0566	0.0357	0.0203	-0.1124	-0.1144	-0.0529	-0.0906	-0.0937	**-0.3918**	-0.0192	-0.1290	-0.1907
X13	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	**-0.0002**	0.0000	0.0000
X14	0.0053	0.0050	0.0013	0.0037	-0.0002	-0.0012	0.0068	0.0078	0.0008	0.0057	0.0065	0.0076	-0.0016	**0.0230**	0.0106
X15	0.3722	0.5836	0.5796	0.3709	-0.1197	-0.1216	0.8389	0.8448	0.4229	0.6936	0.4485	0.5087	-0.0141	0.4814	**1.0455**
X16(r-value)	0.2486	0.5034	0.5097	0.3597	-0.0963	-0.1231	0.8084	0.8064	0.4303	0.6622	0.3845	0.1482	-0.0346	0.3998	0.9303

Residual effect = 0.1012

Where,

X1-Plant height at 30 DAS (cm)
X2-Plant height at 60 DAS (cm)
X3-Plant height at 90 DAS (cm)
X4-No. of primary branches/plant
X5-No. of days to flower initiation
X6-No. of days to maturity
X7-No. of pods/plant
X8-No. of matured pods/plant
X9- No. of immature pods/plant
X10-Pod yield/plot (g)
X11-Test weight (g)
X12-Shelling out turn (%)
X13- Oil content
X14-Harvest index
X15-Kernel yield/plant (g)
X16-Pod yield/plant (g)

CONCLUSION

From this study, it may be concluded that improvement in pod yield per plant could be brought through by selecting most important morphological traits like kernel yield per plant, number of pods per plant, number of mature pods per plant, pod yield per plot, plant height at 90, 60 and 30 days after sowing, number of immature pods per plant, harvest index, test weight, number of primary branches per plant and shelling out turn % that should be given due emphasis while selecting genotypes.

ACKNOWLEDGEMENT
I am highly grateful to Dr. Harish Babu B.N., Department of Genetics and Plant Breeding, College of Horticulture, Hiriyur, University of Agricultural and Horticultural Sciences, Shivamogga, Karnataka for providing necessary facilities and constructive suggestions.

REFERENCES
1. Al-Jibouri, H.A., Miller, P.A. & Robinson, H.F. (1958). Genotypic and environmental variances in upland cotton cross of interspecific origin. Agron. J., 50: 633-635.
2. Ashutosh, K., Soma, G., Sheetal, R.S. & Pradhan, K. (2016). Genetic variability, correlation coefficient and path coefficient analysis for yield and component traits in groundnut. Indian J. Eco., 43 (2): 85-89.
3. Babariya, C.A. & Dobariya, K.L.,. Correlation coefficient and path coefficient analysis for yield components in groundnut (*Arachis hypogaea* L.). Electron. J. Plant Breed., 3(3): 932-938 (2012).
4. Bera, S.K. & Das, P.K. (2000). Path co-efficient analysis in groundnut at different locations and years. J. Agri. Sc. Digest., 20(1): 9-12.
5. Dewey, D.R. & Lu, K.H.A. (1959). Correlation and path coefficient analysis of components of crested wheat grass seed production. Agron. J., 51: 515-518.
6. Dhaliwal, G.P.S., Nagada, A.K. & Mittal, V.P. (2010). Intertrait associations and path analysis studies in groundnut (*Arachis hypogaea* L.). J. Crop Improv., 37(1): 57-60.
7. John, K., Vasanthi, R.P., Venkateswarlu, O. & Naidu, P.H. (2005). Variability and correlation studies for quantitative traits in spanish bunch groundnut (*Arachis hypogaea* L.). Legume Res., 28(3): 189-193.
8. Korat, V.P., Pithia, M.S., Savaliya, J.J., Pansurya, A.G. & Sodavadiya, P.R. (2009). Studies on genetic variability in different genotypes of groundnut (*Arachis hypogaea* L.). Legume Res., 32(3): 224-226.
9. Lakshmidevamma, T.N., Byre Gowda, M. & Mahadevu, P. (2004). Character association and path analysis in groundnut (*Arachis hypogaea* L.). MJAS., 38(2): 221-226.
10. Padmaja, D., Eswari, K.B., Nigam, S.N. & Brahmeswar Rao, M.V. (2015). Character association and path analysis in recombinant inbred line population of the cross JL 24 X ICG 13919 in groundnut (*Arachis hypogaea* L.). IJSRD., 3(5): 1346-1351.
11. Patil, S., Shivanna, S., Irappa, B.M. & Shweta. (2015). Genetic variability and character association studies for yield and yield attributing components in groundnut (*Arachis hypogaea* L.). IJRSR., 6(6): 4568-4570.
12. Sumathi, P. & Muralidharan, V. (2007). Character association and path coefficient analysis in confectionery type groundnut (*Arachis hypogaea* L.). Madras Agri. J., 94 (1-6): 105-109.
13. Surbhi, J., Singh, P.B. & Sharmma, P.P. (2016). Correlation and path analysis in groundnut (*Arachis hypogaea* L.). IJCR., 8, (08): 35811-35813.

CITATION OF THIS ARTICLE
Shankar M., Harish Babu B.N., Gobu R., Sheshaiah. A Study of Correlation and Path Analysis in Peanut (*Arachis hypogaea* L.). Bull. Env. Pharmacol. Life Sci., Vol 7 [12] November 2018 : 111-114

