Available online at www.ijpab.com

DOI: http://dx.doi.org/10.18782/2582-2845.7882

ISSN: 2582 – 2845

Ind. J. Pure App. Biosci. (2019) *7*(6), 226-233

Research Article

Indian Journal of Pure & Applied Biosciences

Genetic Variability, Correlation and Path Analysis for Yield and Its Contributing Traits in Virginia Groundnut (*Arachis hypogaea* L.)

S. M. Solanki*, S. B. Chaudhari, M. H. Sapovadiya and Vijaykumar Damor

Department of Genetics and Plant Breeding,

Junagadh Agricultural University, Junagadh – 362001, India

*Corresponding Author E-mail: sonalipln@gmail.com

Received: 3.11.2019 | Revised: 5.12.2019 | Accepted: 11.12.2019

ABSTRACT

The present study was carried-out to assess genetic variability, correlation coefficients, path analysis in 60 genotypes of groundnut. The observations were recorded on 14 characters. The highest genotypic coefficient of variation was observed for plant height. Heritability was observed high for days to 50% flowering followed by biological yield per plant, number of matured pods per plant, shelling out-turn, plant height, pod yield per plant, number of pods per plant, number of immature pods per plant, 100-kernel weight, sound mature kernel, harvest index, days to maturity, number of branches per plant. Genetic advance expressed as percentage of mean was found high for plant height followed by number of matured pods per plant, pod yield per plant, number of immature pods per plant, biological yield per plant, number of pods per plant, harvest index, days to 50% flowering, shelling out-turn and 100-kernel weight. Pod yield per plant was significantly and positively correlated at both genotypic and phenotypic levels with number of matured pods per plant, number of pods per plant, sound mature kernel, 100-kernel weight, biological yield per plant and harvest index. Whereas, matured pods per plant 100-kernel weight, biological yield and harvest index showed high positive direct effects on pod yield per plant. Thus, these characters were identified as the most important yield components and due emphasis should be placed on these characters while selecting for high yielding genotypes in virginia groundnut.

Keywords: *Variability, Correlation, Path analysis, Virginia groundnut*

INTRODUCTION

Cultivated groundnut (*Arachis hypogaea* L.) is a self-pollinated crop. Groundnut is an important oilseed crop, with oil content around 40-50% and is extensively used for cooking purposes. Oil is a rich source of vitamin A, B and E. Besides being an important source of vegetable oil, it is also used as an important source of food, feed, nutrition and fodder. Groundnut is also known as the "King" of oilseeds or "Wonder nut" or "Poor man's cashew nut".

Cite this article: Solanki, S.M., Chaudhari, S.B., Sapovadiya, M.H., & Damor, V. (2019). Genetic Variability, Correlation and Path Analysis for Yield and Its Contributing Traits in Virginia Groundnut (*Arachis hypogaea* L.), *Ind. J. Pure App. Biosci. 7*(6), 226-233. doi: http://dx.doi.org/10.18782/2582-2845.7882

The total groundnut production in India during the year 2018-19 was about 5.20 million tones with 3.89 million hectares area and 1336 kg/ha productivity. Groundnut is the major oilseed crop of Gujarat with 1.47 million hectares area and 2.08 million tones of production with 1421 kg/ha productivity (Annon, 2018). Assessment of genetic variability in the base population is the first step in any breeding programme. The variability parameters certainly determine the extent and quality of variability. The yield is a complex character resulting from inter play of various yield contributing characters, which have positive or negative association with yield and among themselves also. To assess the magnitude of characters association of various quantitative characters with pod yield and their direct and indirect influence on yield would give clue for favouring the character in selection. A positive correlation between desirable characteristics favorable to the plant breeder because it helps in simultaneous improvement of both the characters. Path analysis measures the direct and indirect contribution of various independent characters to a dependent character and is based on all possible simple correlations among various characters (Singh & Narayanan, 2000).

MATERIALS AND METHODS

The experimental material consisted of 60 genotypes of groundnut derived from different origins like 16 from J.A.U. Junagadh, 21 from ICRISAT (Patancheru), 7 from ANGRAU (Andhra Pradesh), 7 from CSAUA & T (Mainpuri), 7 from Rajasthan, 1 from PDVK (Akola) and 1 is exotic collection. The genotypes were obtained from the Main Oilseeds Research Station, Junagadh Agricultural University, Junagadh. These genotypes grown in a Randomized Block Design with three replications at the Instructional Farm, College of Agriculture, J.A.U., Junagadh during *kharif* 2018. Each genotype was accommodated in a single row of 3.0 meter length with a spacing of 60 cm between rows and 15 cm between plants within the row. The experiment was surrounded by two guard rows to avoid damage and border effects. The observations were recorded on five randomly selected plants from each entry and replication for fifteen different characters. The observations were recorded on 14 characters *viz*., days to 50% flowering, days to maturity, plant height (cm), number of branches per plant, number of matured pods per plant, number of immature pods per plant, number of pods per plant, pod yield per plant (g), sound mature kernel (%), 100-kernel weight (g), shelling out-turn (%), biological yield per plant (g), harvest index (%) and oil content (%). Heritability in broad sense and genetic advance were calculated as per Johnson et al. (1955). The correlation coefficients and path analysis were carried out following the methods of Al-Jibouri et al. (1958) and Dewey and Lu (1959) respectively. The genotypic path coefficient analysis was done as per the method suggested by Dewey and Lu (1959) by using Indo Stat Ver. 7.5 software programme.

RESULTS AND DISCUSSION

Variability parameters

A wide range of variation for several characters among single as well as multi-genotype clusters was observed. However, the differences were clearer for harvest index followed by number of immature pods per plant, number of pods per plant, pod yield per plant and plant height. The highest value of GCV was observed for plant height. Nath and Alam (2002), Korat et al. (2009), Devangana et al. (2015) and Mahesh et al (2018) had been also found highest value of GCV for plant height.

While, moderate values of GCV were observed for number of matured pods per plant, pod yield per plant, number of immature pods per plant, number of pods per plant, biological yield per plant, harvest index, 100-kernel weight, days to 50% flowering and shelling out-turn. The results of the present study are in agreement with findings of Korat et al. (2009) for pod yield per plant, biological yield per plant, harvest index and 100-kernel weight; Zaman et al. (2011) for number of matured pods per plant, 100-kernel weight and

shelling out-turn and Vishnuvardhan et al. (2012) for number of matured pods per plant, pod yield per plant, harvest index.

Highest PCV in the present study was observed in plant height followed by number of matured pods per plant and pod yield per plant. The present findings are also in agreement with those obtained by Thakur et al. (2011) for plant height and Nath and Alam (2002), Devangana et al. (2015), Mukesh and Lal (2017) for plant height and pod yield per plant.

Maximum heritability (broad sense) was observed for days to 50% flowering followed by biological yield per plant, number of matured pods per plant, shelling out-turn, plant height, pod yield per plant, number of pods per plant, number of immature pods per plant, 100-kernel weight, sound mature kernel, harvest index, days to maturity, number of branches per plant. High heritability estimates indicated that the characters were least influenced by the environmental effects. The high magnitude of heritability has also been earlier reported by Maurya et al. (2014), Rao (2016), Mukesh and Lal (2017), Mahesh et al. (2018), Patil et al. (2015) for days to 50% flowering and plant height; Vishnuvardhan et al. (2012) and Gupta et al. (2015) for days to 50% flowering.

High estimates of heritability coupled with high genetic advance expressed as percentage of mean was observed for days to 50% flowering, plant height, number of matured pods per plant, number of immature pods per plant, number of pods per plant, pod yield per plant, 100-kernel weight, shelling out-turn, biological yield and harvest index. Which may be attributed to the preponderance of additive gene action and possess high selective value and thus, selection pressure could profitably be applied on these characters for their rationale improvement (Panse et al., 1957). Similar results in same have been reported for days to 50% flowering Maurya et al. (2014) and Patil et al. (2015); for plant height Nath and Alam (2002), Maurya et al. (2014), Patil et al. (2015) and Mukesh and Lal (2017); for number of matured pods per plant Patil et al. (2015) and Mahesh et al. (2018) and for number of immature pods per plant Mahesh et al (2018).

High estimate of heritability with moderate genetic advance expressed as percentage of mean was observed for sound mature kernel which revealed the presence of non-additive gene action and influence of environment in the expression of these characters and thus, the selection would be less effective. Similar results in same have been reported by Maurya et al. (2014) and Mukesh and Lal (2017).

Correlation coefficients

Pod yield per plant had strong positively correlated at both genotypic and phenotypic level with characters *viz*; number of matured pods per plant, number of pods per plant, sound mature kernel, 100-kernel weight, biological yield per plant and harvest index. So these characters should be given more weightage in selection process. The results indicated the importance of the characters towards contribution of pod yield per plant. Such positive inter-relationship between pod yield per plant and these attributes has also been reported in groundnut by several researchers. The result of present study is in conformity with Babariya and Dobariya (2012) and Tulsi et al. (2017) for number of matured pods per plant, biological yield per plant and harvest index; Kumar et al. (2014), Tulsi et al. (2017) and Mahesh et al. (2018) for sound mature kernel and Ashutosh et al. (2017) and Tulsi et al. (2017) for 100-kernel weight.

Days to 50% flowering had strongly high significant and positive association with days to maturity at both genotypic as well as phenotypic level, while positive significant correlation only at phenotypic level with number of immature pods per plant and strongly high significant and positive association at genotypic level.

Days to maturity was strongly high significant and positive association with days to 50% flowering at both genotypic as well as phenotypic level. Mahesh et al. (2018) revealed similar result for correlation between

days to maturity and days to 50% flowering. Number of matured pods per plant had strong positive and highly significant correlation with number of pods per plant, sound mature kernel, biological yield per plant and harvest index at both genotypic and phenotypic level, which indicated that the improvement in these characters will be improve results for number of matured pods per plant. The results are in conformity with findings of Babariya and Dobariya (2012) Tulsi et al. (2017) for sound mature kernel and biological yield per plant. Number of immature pods per plant seemed to have strong positive and highly significant correlation with number of pods per plant and biological yield at both genotypic as well as phenotypic level.

The correlation of number of pods per plant with number of matured and immature pods per plant, sound mature kernel, biological yield per plant and harvest index was highly significant and strong positive which confirms that the improvement in one character would results improvement in another character. The results are in conformity with findings of Babariya and Dobariya (2012); Babariya and Dobariya (2012) and Trivikrama et al. (2017) for biological yield per plant and number of matured pods per plant respectively. Sound mature kernel was highly significant and positively correlated with number of matured pods per plant, number of pods per plant, biological yield per plant and harvest index at both levels. The results are in conformity with findings of Tulsi et al. (2017) for number of matured pods per plant, biological yield per plant and harvest index.

The character 100-kernel weight showed highly significant and strong positive correlation with shelling out-turn at both levels and negative significant correlation with plant height at both levels, which revealed that decrease in plant height will results in improvement in 100-kernel weight.

Shelling out-turn revealed highly significant and strong positive correlation with 100-kernel weight and negative highly significant correlation with plant height at both levels. The character biological yield showed highly significant and strong positive correlation with number of matured pods per plant, number of immature pods per plant, number of pods per plant and sound mature kernel. The results are in conformity with findings of Tulsi et al. (2017) for number of matured pods per plant and sound mature kernel.

Harvest index revealed highly significant and strong positive correlation with number of matured pods per plant, number of pods per plant and sound mature kernel. The results are in conformity with findings of Tulsi et al. (2017) for number of matured pods per plant and sound mature kernel.

Path analysis

Path analysis measures the direct and indirect contribution of various independent characters to a dependent character and is based on all possible simple correlations among various characters (Singh & Narayanan, 2000). The path analysis revealed that number of matured pods per plant, 100-kernel weight, biological yield and harvest index exhibited high and positive direct effect on pod yield per plant. Thus, these characters turned-out to be the major components of pod yield. High and positive direct effect of number of matured pods per plant have also been reported by Patil et al. (2015) and Ashutosh et al. (2017) for harvest index. Number of pods per plant revealed the highly significant positive phenotypic correlation with pod yield per plant followed by number of matured pods per plant, sound mature kernel, harvest index, biological yield per plant and 100-kernel weight. It revealed true relationship between them and direct selection for these traits, it will be rewarding for yield improvement. The result of present study is in agreement with findings of Rathod et al. (2015) and Ashutosh et al. (2017) for number of pods per plant, harvest index and 100-kernel weight; Bhargavi et al. (2017) for 100-kernel weight and biological yield per plant.

Table 1: Mean, range of variation, phenotypic (PCV%) and genotypic (GCV%) coefficients of variation, heritability (broad sense), genetic advance and genetic advance expressed as percentage of mean for 14 characters in virginia groundnut

Character	Mean	Range	PCV (%)	GCV (%)	Heritability (broad sense) $h^2_{(bs)}$ (%)	Genetic advance (Gs)	Genetic advance expressed as percentage of mean GAM (%)
Days to 50% flowering	43.28	31.01-52.33	10.77	10.43	93.79	9.01	20.81
Days to maturity	128.88	117.41-139.20	3.30	2.74	68.99	6.04	4.69
Plant height (cm)	21.13	12.71-33.30	20.95	20.07	91.82	8.37	39.62
No. of branches per plant	3.05	2.37-3.63	7.56	5.86	60.02	0.28	9.35
No. of matured pods per plant	12.25	6.07-20.50	20.69	19.87	92.26	4.82	39.32
No. of immature pods per plant	4.91	3.43-8.03	18.25	16.37	80.44	1.49	30.24
No. of pods per plant	17.09	10.08-25.30	16.13	14.88	85.03	4.83	28.26
Pod yield per plant (g)	14.17	9.00-20.76	20.59	19.66	91.21	5.48	38.68
Sound mature kernel (SMK) %	77.62	56.05-89.99	6.39	5.61	77.08	7.87	10.14
100-kernel weight (g)	42.72	31.20-51.97	12.31	10.94	78.94	8.55	20.02
Shelling out-turn (%)	75.17	56.16-88.26	10.75	10.31	92.00	15.31	20.37
Biological yield per plant (g)	59.33	39.73-72.00	15.22	14.68	92.96	17.30	29.16
Harvest index (%)	24.85	15.16-33.94	16.31	14.12	74.96	6.26	25.19
Oil content (%)	45.88	41.40-50.18	4.09	2.72	44.22	1.71	3.72

Table 2: Genotypic (r_g) and phenotypic (r_p) correlation coefficients among 14 characters in 60 genotypes of virginia groundnut

Character	Corr.	Days to 50% flowering	Days to maturity	Plant height (cm)	Number of branches per plant	Number of matured pods per plant	Number of immature pods per plant	Number of pods per plant	SMK %	100-kernel weight (g)	Shelling out-turn (%)	Biological yield (g)	Harvest index (%)	Oil content (%)
Pod yield per plant (g)	r_g	0.2044	0.0281	-0.1195	-0.1432	0.8216**	0.3246*	0.8660**	0.7618**	0.4728**	0.3565**	0.6113**	0.7083**	-0.0077
	r_p	0.1689	0.0195	-0.1176	-0.0829	0.7457**	0.2590	0.7568**	0.6317**	0.4128**	0.3388*	0.5748**	0.6051**	-0.0002
Days to 50% flowering	r_g	**1.0000**	1.0510**	0.2070	-0.2307	0.1207	0.3769**	0.1822	0.1726	0.0617	0.0989	0.1218	0.2132	-0.1005
	r_p	**1.0000**	0.8347**	0.1894	-0.1645	0.1146	0.3226*	0.1911	0.1511	0.0639	0.0887	0.1135	0.1647	-0.1053
Days to maturity	r_g		**1.0000**	0.1733	-0.2383	-0.0139	0.2604	0.0433	0.0497	0.1242	0.0709	0.0241	0.0479	-0.2417
	r_p		**1.0000**	0.1355	-0.1396	-0.0093	0.1873	0.0271	0.0289	0.0629	0.0646	0.0241	0.0414	-0.1562
Plant height (cm)	r_g			**1.0000**	0.0254	-0.0554	0.1671	-0.0238	-0.0763	-0.3394*	-0.4608**	-0.0203	-0.0657	-0.1261
	r_p			**1.0000**	0.0016	-0.0437	0.1303	-0.0069	-0.0542	-0.3301*	-0.4091**	-0.0092	-0.0718	-0.0555
Number of branches per plant	r_g				**1.0000**	-0.0266	-0.0326	-0.0038	0.0847	-0.1178	0.0032	0.0860	-0.2243	0.4471**
	r_p				**1.0000**	-0.0087	0.0119	-0.0133	0.0439	-0.0369	0.0010	0.0901	-0.1102	0.2284
Number of matured pods per plant	r_g					**1.0000**	0.1338	1.0588**	0.9532**	-0.0048	-0.0610	0.5962**	0.6607**	0.1203
	r_p					**1.0000**	0.1134	0.9520**	0.8782**	-0.0054	-0.0624	0.5709**	0.5475**	0.0634
Number of immature pods per plant	r_g						**1.0000**	0.4817**	0.1990	-0.0547	0.0359	0.4248**	0.1285	-0.2443
	r_p						**1.0000**	0.3792**	0.1474	-0.0301	0.0152	0.3556**	0.1003	-0.1374
Number of pods per plant	r_g							**1.0000**	0.9985**	0.0142	-0.0345	0.6707**	0.7007**	0.0625
	r_p							**1.0000**	0.8425**	0.0076	-0.0186	0.6002**	0.5453**	0.0097
SMK%	r_g								**1.0000**	0.0312	0.0029	0.5222**	0.6479**	0.2284
	r_p								**1.0000**	0.0152	0.0022	0.4776**	0.5106**	0.1011
100-kernel weight (g)	r_g									**1.0000**	0.9818**	0.2458	-0.1134	0.0874
	r_p									**1.0000**	0.8354**	0.2247	-0.0223	0.0241
Shelling out-turn (%)	r_g										**1.0000**	0.1429	0.0849	-0.0895
	r_p										**1.0000**	0.1382	0.0651	-0.0241
Biological yield per plant (g)	r_g											**1.0000**	-0.1246	-0.0287
	r_p											**1.0000**	-0.1010	-0.0345
Harvest index (%)	r_g												**1.0000**	0.0105
	r_p												**1.0000**	0.0237
Oil content (%)	r_g													**1.0000**
	r_p													**1.0000**

***, ** Significant at 5% and 1% levels, respectively**

Table 3: Phenotypic path coefficient analysis showing direct (diagonal and bold) and indirect effects of different characters on pod yield per plant in virginia groundnut

Characters	Days to 50% Flowering	Days to maturity	Plant height (cm)	No. of branches per plant	No. of matured pods per plant	No. of Immature pods per cluster	No. of pods per plant	SMK (%)	100-kernel weight (g)	Shelling out-turn (%)	Biological yield per plant (g)	Harvest index (%)	Oil content (%)	Phenotypic correlation with pod yield per plant
Days to 50% flowering	**0.0250**	-0.0702	0.0105	0.0074	0.1059	0.0723	-0.1068	-0.0264	0.0234	0.0017	0.0405	0.0843	0.0011	0.1689
Days to maturity	0.0209	**-0.0841**	0.0075	0.0063	-0.0086	0.0420	-0.0152	-0.0050	0.0231	0.0013	0.0086	0.0212	0.0016	0.0195
Plant height (cm)	0.0047	-0.0114	**0.0555**	-0.0001	-0.0404	0.0292	0.0039	0.0094	-0.1212	-0.0080	-0.0033	-0.0368	0.0006	-0.1176
No. of branches per plant	-0.0041	0.0117	0.0001	**-0.0448**	-0.0081	0.0027	0.0075	-0.0077	-0.0135	0.0000	0.0321	-0.0565	-0.0024	-0.0829
No. of matured pods per plant	0.0029	0.0008	-0.0024	0.0004	**0.9241**	0.0254	-0.5324	-0.1532	-0.0020	-0.0012	0.2035	0.2804	-0.0007	0.7457**
No. of immature pods per plant	0.0081	-0.0158	0.0072	-0.0005	0.1048	**0.2242**	-0.2121	-0.0257	-0.0111	0.0003	0.1267	0.0514	0.0014	0.2590
No. of pods per plant	0.0048	-0.0023	-0.0004	0.0006	0.8797	0.0850	**-0.5592**	-0.1470	0.0028	-0.0004	0.2139	0.2793	-0.0001	0.7568**
SMK (%)	0.0038	-0.0024	-0.0030	-0.0020	0.8115	0.0330	-0.4712	**-0.1744**	0.0056	0.0000	0.1702	0.2615	-0.0010	0.6317**
100-kernel weight (g)	0.0016	-0.0053	-0.0183	0.0017	-0.0050	-0.0068	-0.0042	-0.0027	**0.3670**	0.0163	0.0801	-0.0114	-0.0020	0.4128**
Shelling out-turn (%)	0.0022	-0.0054	-0.0227	0.0000	-0.0576	0.0034	0.0104	-0.0004	0.3066	**0.0195**	0.0493	0.0333	0.0002	0.3388**
Biological yield per plant (g)	0.0028	-0.0020	-0.0005	-0.0040	0.5275	0.0797	-0.3356	-0.0833	0.0825	0.0027	**0.3564**	-0.0517	0.0004	0.5748**
Harvest index (%)	0.0041	-0.0035	-0.0040	0.0049	0.5060	0.0225	-0.3050	-0.0891	-0.0082	0.0013	-0.0360	**0.5122**	-0.0002	0.6051**
Oil content (%)	-0.0026	0.0131	-0.0031	-0.0102	0.0586	-0.0308	-0.0054	-0.0176	0.0088	-0.0005	-0.0123	0.0121	**-0.0103**	-0.0002

*, ** Significant at 5% and 1% levels, respectively
Residual effect, R = 0.3370

CONCLUSION

It could be inferred from the present study that pod yield per plant, number of matured pods per plant, 100-kernel weight, biological yield per plant and harvest index are the major yield contributing characters in groundnut. Therefore, due emphasis should be given to these traits in formulating the criterion in the selection programmes to evolve high yielding genotypes of groundnut.

REFERENCES

Al-Jibouri, H. A., Miller, P. A., & Robinson, H. F. (1958). Genotypic and environmental variances in an upland cotton cross of interspecific origin. *J. Agron.*, *50*, 633-635.

Anonymous, (2018). *Kharif*-2018 survey of groundnut crop, http://apeda.gov.in/apedawebsite/HACCP/2018_Groundnut_Survey_Report.pdf Date: 14/07/2019.

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 (*Arachis hypogaea* L.). *Indian J. of Ecology*, *43*(2), 85-89.

Babariya, C. A., & Dobariya, K. L. (2012). Correlation coefficient and path coefficient analysis for yield components in groundnut (*Arachis hypogaea* L.). *Electon. J. Plant. Breed.*, *3*(3), 932-938.

Bhargavi, G., Satyanarayana Rao, V. R., & Narsimha Rao K. L. (2016). Genetic variability, heritability and genetic advance of yield and related traits of Spanish bunch groundnut (*Arachis hypogaea* L.). *Agric. Sci. Digest.*, *36*(1), 60-62.

Devangana, H., Jaiswal, N. K., Gabrial, M. L., & Rai, P K. (2015). Study on genetic

variability on groundnut (*Arachis hypogaea* L.*)* germplasms. *Inter. J. Agric. Sci. Res., 5*(1), 19-22.

Dewey, D. R., & Lu, K. H. (1959). A correlation and path coefficient analysis of components of crested wheat grass seed production. *J. Agron., 51*(9), 515-518.

Johnson, H. W., Robinson, H. F., & Comstock, R. E. (1995). Genotypic correlations in soybean and their implications in selection. *Agron. J*., *47*, 477-483.

Korat, V. P., Pithia, M. S., Savaliya, J. J., Pansuriya, A. G., & Sodavadiya, P. R. (2009). Studies on genetic variability in different genotypes of groundnut (*Arachis hypogaea* L.). *Legume Res.*, *32*(3), 224-226.

Kumar, C. P., Rekha R., Venkateswarulu, O., & Vasanthi, R. P. (2014). Correlation and path coefficient analysis in groundnut (*Arachis hypogaea* L.). *Int. J. App. Bio. Pharm. Tech., 5*(1), 8-11.

Mahesh, R. H., Hasan, K., Temburne, B. V., Janila, P., & Amaregouda, A. (2018). Genetic variability, correlation and path analysis studies for yield and yield attributes in groundnut (*Arachis hypogaea* L.). *J. Pharmaco. and Phytochem., 7*(1), 870-874.

Maurya, M. K., Rai, P. K., Kumar, A., Brazil, A. Singh, & Chaurasia, A. K. (2014). Study on genetic variability and seed quality of groundnut (*Arachis hypogaea* L.) genotypes. *Int. J. Emerg. Tech. Adv. Engg., 4*(6), 818-823.

Mukesh, B., & Lal, G. M. (2017). Estimation of genetic variability, correlation and path analysis in groundnut (*Arachis hypogaea* L.) germplasm. *Chem. Sci. Rev. Lett., 6*(22), 1107-1112.

Nath, U. K., & Alam, M. S. (2002). Genetic variability, heritability and genetic advance of yield and related traits of groundnut (*Arachis hypogaea* L.). *Online J. Biol. Sci., 2*(11), 762-764.

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.). *Int. J. Recent Scientific Res., 6*(6), 4568-4570.

Rathod, S. S., Toprope, V. N., & Misal, A. M. (2015). Character association and path analysis in groundnut (*Arachis hypogaea* L.). *Int. J. Curr. Res. Biosci. Plant Biol., 2*(12), 64-68.

Singh P., & Narayanan, S. G. (2000). Biometrical techniques in Plant Breeding. Kalyani Publishers, New Delhi.

Thakur, S. B., Ghimire, S. K., Pandey, M. P., Shrestha, S. M., & Mishra, D. B. (2011). Genetic variability, heritability and genetic advance of pod yield component traits of groundnut (*Arachis hypogaea* L.). *J. Inst. Agric. Anim. Sci., 32*, 133-144.

Trivikrama, A. R., Reddi, M. S., Vijayabharathi, A. T., Lakshmi, P., Lakshmikantha, G. R., & Jayalakshmi, V. (2017). Correlation and path analysis of kernel yield and its components in groundnut (*Arachis hypogaea* L.). *Int. J. Curr. Microbiol. App. Sci., 6*(12), 10-16.

Tulsi, R. D., Hemlata, S., Ramesh, K., & Ram, K. (2017). Correlation and path analysis for yield and its contributing traits in groundnut (*Arachis hypogaea* L.). *Int. J. Agri. Sci., 9*(10), 3997-3999.

Vishnuvardhan, K. M., Vasanthi, R. P., Reddy, K. H., & Reddy, B. V. B. (2012). Genetic Variability studies for yield attributes and resistance to foliar diseases in groundnut *(Arachis hypogaea* L.). *Int. J. App. Bio. Pharm. Tech., 3*(1), 390-394.

Zaman, M. A., Khatun, M. T., Ullah, M. Z., Moniruzzamn, M., & Alam, K. H. (2011). Genetic variability and path analysis of groundnut (*Arachis hypogaea* L.). *Sci. J. Kri. Foun., 9*(1&2): 29-36.