Environment and Ecology 39 (3) : 537—544, July—September 2021
ISSN 0970-0420

Genetic Variability, Correlation Coefficient and Path Analysis for Yield and its Attributing Characters in Groundnut (*Arachis hypogaea* L.) Genotypes

Patel D.G.*, Chandaragi M.K., Hingu J.N., Patel J.A.

Received 10 May 2021, Accepted 11 June 2021, Published on 5 July 2021

ABSTRACT

The field experiment was undertaken to evaluate the genetic variability, heritability and genetic advance involving twenty four groundnut genotypes. The characters considered for evaluation were significantly differed from each other. Higher phenotypic and genotypic coefficient of variations were observed for kernel yield kg per ha, pod yield kg per ha, haulm yield kg per ha, 100 kernels and 100 pods weight. High heritability were observed for the traits viz.,100 kernel weight, pod and kernel yield kg per ha, days to first flowering, days to 50 % flowering, haulm yield kg per ha, shelling percentage and 100 pods weight. Considerable high genetic advance was noticed in final and initial plant stand per ha, kerneland pod yield kg per ha and haulm weight. Kernel and pod yield kg per ha, haulm weight kg per ha and weight of 100 kernels have recorded high PCV and moderate GCV with high heritability and genetic advance as per cent mean. It reveals that process of additive gene action and these traits can be improved by simple selection.

Keywords Genetic variability, Heritability, Phenotypic and genotypic correlations, Groundnut.

Patel D.G.*, Chandaragi M.K., Hingu J.N., Patel J.A.
Cotton Research Station, Sardarkrushinagar Dantiwada Agricultural University, Talod 383215, Sabarkhantha, Gujarat, India
Email:dgpatel@sdau.edu.in
*Corresponding author

INTRODUCTION

The groundnut is an allotetraploid (2n = 40), supposed to have originated from a cross involving the diploid species of *A. duranensis* and *A. ipaensis* (Seijo 2007). It is self pollinated, annual, herbaceous legume belonging to the family Leguminoseae. Groundnut kernels are rich source of oil (48-50%), protein (25-28%), carbohydrates (10-20%) and provide 564 kcal of energy for every 100 g of kernels (Arya *et al.* 2016). Groundnut is a source of antioxidants, vitamins, minerals and healthiness of bioactive compounds such as resveratrol, tocopherol, arginine (Murali and Janila 2017). It is an important oil, food and feed crop of the India. The area under groundnut cultivation in Gujarat was 1.69 m ha with production 4.64 mt and productively of 2751 kg/ha during 2019-2020 (Anon 2019).

Genetic variability for a trait in available genetic stock is the basic requirement for crop improvement. Effectiveness of selection is dependent upon the nature, extent and magnitude of genetic variability present in the breeding material for the target trait. Heritability is an important parameter because it determines the response to selection. It is the proportion of phenotypic variance among individuals in a population that is due to heritable genetic effects known as narrow sense heritability while proportion of phenotypic variance that is attributable to an effect for the whole genotype, comprising the sum of

additive, dominance and epistatic effects known as broad sense heritability (Falconer and Mackay1996). Heritability and genetic advance are very useful biometrical tools for breeders in determining the direction and magnitude of selection. High heritability alone is not enough to make efficient selection in the advanced generations and unless accompanied by substantial amount of genetic advance. Correlation measures the level of dependence among traits, but it is often very difficult to determine the actual mutual effects among traits if correlation values are similar for certain pairs of traits, direct effects for some of them and especially indirect effects via other traits can differ for some traits (Vaithiyalingan 2016). Path coefficient analysis is very important technique for partitioning the correlation coefficient in to direct and indirect effect of independent variables on dependent variable. Path coefficient analysis takes into account the casual relationship in addition to degree of relationship (Mahajan *et al.* 2011). Therefore, the present study was undertaken using 21 diverse groundnut genotypes and 3 varieties to estimate the genetic variability parameters including genotypic coefficient of variation (GCV), phenotypic coefficient of variation (PCV), heritability at broad sense (h_2), genetic advance (GA), genetic advance as percentage of mean (GAM), character associations and path coefficient in groundnut genotypes.

MATERIALS AND METHODS

The experimental material consisted of 21 genotypes of Virginia breeding lines with three high yielding popular groundnut varieties viz., GG 20, GJG-22 and Kaushal. The experiment was laid out in a Randomized Complete Block Design with four replications during *kharif* 2019 at Catton Research Station, Sardarkrushinagar Dantiwada Agricultural University, Talod farm (73.00º E longitudes and 23.01º N latitudes at an altitude of 110.75 mts) in sandy loamsoil. The seeds of each genotype were sown in five row of 5 m length at 60 cm spacing between rows and l5 cm between plants. Recommended package of practices were followed for raising the crop. Supplementary irrigation was given as and when required to protect the crop. Chemical spraying of insecticide was done to prevent damage from insects-pests as and when required. The observations were recorded on days to flower initiation, days to 50% flowering, days to maturity,100-pod weight (g), 100-kernel weight(g), shelling out turn (%), haulm yield (kg/ha), sound mature kernel % (SMK), initial plant stand, final plant stand and kernel andpod yield (kg/ha). The data were subjected to statistical analysis and calculated analysis of variance (Panse and Sukhatme l96l). Genotypic variance (Vg) and phenotypic variance (Vp) were estimated for the character having significant mean square due to the genotypes. Genotypic coefficient of variation (GCV) and phenotypic coefficient of variation (PCV) were calculated formula suggested by Burton (1952). Heritability (h^2) was estimated in broad sense by formula suggested by Lush (1940). Genetic gain (GAM), the percent expected genetic advance over the population mean, was computed by formula suggested by Johnson *et al.* (1955). Phenotypic (rp) and genotypic (rg) correlations between characters were estimated using the method described by Miller *et al.* (1958). Path coefficient analysis was estimated as per method suggested by Dewey and Lu (1959).

RESULTS AND DISCUSSION

Analysis of variance (Table1) revealed that highly sig-

Table 1. Analysis of variance (mean squares) for yield and yield attributes in groundnut genotypes. * Significance at 1% ** Significance at 5%.

Source of variance	df	Days to initial flowering	Days to 50 % flowering	Haulm weight kg/ha	Shelling percentage	Weight of 100 kernels	SMK (%)
Replication	3	2.01**	1.13	399253.45	2.81	229.08**	27.70**
Genotype	23	2.206	1.90**	1505025.75**	11.28**	233.22**	41.87**
Error	69	0.22	0.46	312152.07	3.03	17.04	5.28
SEM		0.2348	0.34	279.35	0.86	2.06	1.14
CD at 5%		0.66	0.96	788.13	2.45	5.82	3.24
CV %		1.94	2.58	13.04	2.44	7.20	2.58

Table 1. Continued.

Source of variance	df	Weight of 100 pods	Initial plant stand /ha	Final plant stand /ha	Days to maturity	Kernel yield kg/ha	Pod yield kg/ha
Replication	3	451.51*	402665.92	3590033.54	4.78	97366.39*	141788.85
Genotype	23	905.456	1695246.74*	4685183.60**	11.39*	306138.75**	529477.89**
Error	69	123.14	817776.74	1676473.95	5.80	31581.61	62901.61
SEm		5.54	452.15	647.39	1.20	88.85	125.40
CD at 5%		15.65	1275.66	1826.48	3.40	250.69	353.79
CV %		7.23	0.82	1.19	1.94	10.14	10.23

nificant differences among the genotypes for the traits indicating thereby sufficient variability present in the material studied. Among the different genotypes JVB-2524 recorded 25.0 days for days to 50% flowering, whereas JVB-2524 and GG-20 matured early (121 days). Regarding pod yield, GG-20 recorded highest mean value of 3162 kg/ha followed by GJG-22 (3073 kg/ha) and GVB-2524 (2955 kg/ha). The genotypes-GVB-2523 and GVB-2524 exhibited highest mean values for sound mature kernel 93.75% and 92.75% and maximum shelling percentage of 74.57% was recorded from GG-20. For character 100 pod weight GJG-22 recorded highest mean values of 183.25 g and least exhibited by JVB-2525 (132.5 g) (Table 2).

The various genetic parameters like phenotypic and genotypic variance (PV and GV), phenotypic andgenotypic coefficient of variance (PCV and GCV), heritability and genetic advance as percent mean are presented in Table 3. High genotypic and phenotyp-

Table 2. Mean values of yield and its attributing characters in groundnut genotypes.

Sl. No.	Entries	Days to initial flowering	Days to 50 % flowering	Haulm yield kg/ha	Shelling percentage	Weight of 100 kernels (g)	SMK (%)
1	JVB-2508	24.25	27.00	4580	73.13	61.25	90.75
2	JVB-2510	24.25	27.00	3797	73.28	61.25	89.25
3	JVB-2511	24.75	27.00	4196	71.82	52.38	88.25
4	JVB-2512	25.00	27.25	4122	72.93	57.50	89.75
5	JVB-2514	24.50	27.00	5319	73.26	62.00	87.75
6	JVB-2517	24.25	27.00	5467	71.04	55.75	90.00
7	JVB-2518	23.00	25.25	4403	68.89	55.63	79.00
8	JVB-2520	24.75	26.75	4728	69.74	59.13	85.50
9	JVB-2521	25.75	26.00	4051	73.29	56.38	90.25
10	JVB-2523	23.50	26.00	4778	72.17	59.88	93.75
11	JVB-2524	23.00	25.00	4580	71.16	50.13	92.75
12	JVB-2525	23.75	26.25	4861	69.77	54.63	92.25
13	JVB-2527	24.00	26.00	3989	71.04	59.13	89.50
14	JVB-2528	25.50	26.50	5423	69.96	54.63	87.50
15	JVB-2533	24.50	25.50	3590	70.20	54.00	82.50
16	JVB-2536	24.25	27.00	3251	72.29	52.75	86.75
17	JVB-2538	24.75	27.00	3915	70.53	69.50	91.00
18	JVB-2539	24.50	27.00	4329	70.18	51.13	90.25
19	JVB-2541	23.00	25.25	3650	67.63	63.25	89.50
20	JVB-2543	23.50	25.75	4199	70.54	46.00	89.50
21	JVB-2561	24.00	27.00	3783	72.81	43.88	90.50
22	GG-20 (C)	23.75	26.50	4625	72.98	76.63	91.75
23	GJG-22 (C)	23.25	26.00	3783	74.57	70.25	86.75
24	Koushal (C)	24.50	27.00	3392	71.02	48.63	90.50
	Mean	24.17	26.41	4283.79	71.42	57.32	88.97
	SEm±	0.23	0.34	279.35	0.86	2.06	1.14
	CD @ 5%	0.66	0.96	788.13	2.45	5.82	3.24
	CV (%)	1.94	2.58	13.04	2.44	7.20	2.58

Table 2. Continued.

Sl. No.	Entries	Weight of 100 pods (g)	Days to maturity	Initial plant stand /ha	Final plant stand /ha	Kernel yield kg/ha	Yield kg/ha
1	JVB-2508	158.50	125	110225	108747	1727	2364
2	JVB-2510	148.00	126	111111	109929	1798	2453
3	JVB-2511	153.00	125	111111	109043	1827	2541
4	JVB-2512	147.25	127	111111	108747	1962	2689
5	JVB-2514	170.50	126	110816	109043	1731	2364
6	JVB-2517	141.50	125	109929	108452	1470	2069
7	JVB-2518	145.75	123	111111	109929	1669	2423
8	JVB-2520	147.25	126	110816	109043	1647	2364
9	JVB-2521	157.25	126	110816	109338	1642	2240
10	JVB-2523	167.00	123	111111	109043	2061	2855
11	JVB-2524	138.00	121	111111	109043	2104	2955
12	JVB-2525	132.50	122	111111	108747	1670	2394
13	JVB-2527	157.25	124	111111	109634	1890	2660
14	JVB-2528	150.25	126	108747	105792	1302	1862
15	JVB-2533	140.75	126	111111	109043	1805	2571
16	JVB-2536	172.00	125	110225	106678	1494	2069
17	JVB-2538	173.00	125	109929	107861	1352	1921
18	JVB-2539	134.00	125	110520	108452	1597	2275
19	JVB-2541	168.75	123	111111	109634	1857	2748
20	JVB-2543	142.50	122	109634	109338	1374	1944
21	JVB-2561	137.25	125	110520	108747	2021	2778
22	GG-20 (C)	178.75	121	111111	109338	2303	3162
23	GJG-22 (C)	183.25	124	111111	108452	2292	3073
24	Koushal (C)	137.00	123	109634	106087	1477	2080
	Mean	153.39	124.33	110631	108673	1765	2452
	SEm±	5.54	1.20	452.155	647.39	88.85	125.40
	CD @ 5%	15.65	3.40	1275.66	1826.48	250.69	353.79
	CV (%)	7.23	1.94	0.82	1.19	10.14	10.23

ic coefficient of variation indicated the presence of considerable amount of genetic variability for these characters in the material studied. High phenotypic coefficient of variation (PCV %) was recorded for dry haulm weight per ha (18.24%), kernel yield per ha (18.06%), followed by dry pod yield per ha (17.28%), 100 kernels weight (14.71%) and 100 pod weight (11.64%) confirming with results of Roa *et al.* (2014). However, maximum genotypic coefficient of variation (GCV %) was noticed for kernel yield per ha (14.75%) followed by pod yield per ha (13.93 %), 100 kernel weight (12.83%), dry haulm yield per ha (12.75%) hundred pod weight (9.12%) which are in conformity with reports of Nayak *et al.* (2018).

The magnitude of PCV was higher than GCV for all the characters leading to influence of environment factors upon these traits. The high estimates of heritability in broad sense were found for dry 100 kernel weight (76.03) followed by days to initial flowering (69.24), kernel yield kg / ha (68.49), pod yield kg per ha (64.97) percent sound mature kernel (63.38) and 100 pod weight (61.36) andhaulm yield kg per ha(48.86). Johnson *et al.* (1955) mentioned that heritability estimates along with genetic advance can further helpsto predict yield under phenotypic selection than heritability estimate only. The present findings are in consonance with Savaliya *et al.* (2009), Zongo *et al.*(2017) for high heritability and genetic advance as a percent of mean for hundred kernel weight, Zaman *et al.*(2011) recorded high heritability and genetic advance for kernel yield kg/ha and Roa *et al.* (2014) for high heritability and genetic advance as a percent of mean for hundred kernel weight, kernel and pod yield kg/ha. The characters kernel yield per ha (25.48), pod yield kg per ha (23.12) and weight of 100 kernels (23.03) exhibited higher values for both heritability and genetic advance indicates the strong role of additive gene in expression of traits and selection could be practiced for improving these characters.

Table 3. Genetic variability components for 12 characters of groundnut genotypes. σ^2p =Phenotypic variance, σ^2g= Genotypic variance, $h^2(b)$ = Heritability at broad sense, PGV=Phenotypic coefficient of variation, GCV =Genotypic coefficient of variation, GA= Genetic advance.

Characters	Range	σ^2p	σ^2g	PCV %	GCV%	$h^2(b)$ (%)	GA @ 5%	GA as % of mean
Days to initial flowering	23-25.75	0.7169	0.49	3.50%	2.91%	69.24	1.2	4.99
Days to 50 % flowering	25-27.25	0.825	0.36	3.44%	2.27%	43.65	0.81	3.09
Haulm weight kg/ha	3250.59-5466.90	610370.5	298218.4	18.24%	12.75%	48.86	786.47	18.35
Shelling percentage	67.65-74.57	5.08	2.06	3.16%	2.01%	40.56	1.88	2.64
Weight of 100 kernels	43.87-76.62	71.08	54.04	14.71%	12.83%	76.03	13.2	23.03
SMK (%)	79-93.75	14.43	9.14	4.27%	3.40%	63.38	4.96	5.57
Weight of 100 pods	132.5-183.25	318.71	195.57	11.64%	9.12%	61.36	22.56	14.71
Initial plant dtand /ha	108747.049-111111.11	1037144	219367.5	0.92%	0.42%	21.15	443.44	0.4
Final plant stand /ha	105791.96-109929.08	2428651	752177.4	1.43%	0.80%	30.97	991.44	0.91
Days to maturity	120.5-12	7.19	1.39	2.16%	0.95%	19.4	1.07	0.86
Kernel yield kg/ha	1301.85-2302.76	100220.9	68639.28	18.06%	14.95%	68.49	446.68	25.48
Pod yield kg/ha	1861.70-3161.93	179545.7	116644.1	17.28%	13.93%	64.97	567.13	23.12

The traits like days to initial flowering (4.99), days to 50% flowering (3.09), shelling percentage (2.64), days to maturity (0.86), sound mature kernel weight (5.57), initial plant stand (0.40) and final plant stand (0.91) have low genetic advance as percent of mean and very limited scope to improve through selection as evident by recording high heritability and low genetic advance values. Days to 50% flowering, shelling percentage, initial plant stand per ha, final plantstand per ha and days to maturity recorded moderate heritability with low genetic advance values indicated the prevalence of non-additive gene action on their expression.

Correlation gives the type and magnitude of association of different component traits with yield as well as nature of relationship among the characters. In the present study final plant stand, hundred kernel weights, sound mature kernel and kernel yield/ha exhibited significant positive association with dry pod yield/ha, hence selection for these traits in positive direction could improve the yield. In the present study, magnitude of genotypic correlation coefficients was higher than the phenotypic correlation coefficients (Table 4). It means genes governing characters are similar but the environmental conditions consisting xpressions of these traits have small effects. Genotypic correlation was found more significant than phenotypic correlation indicating that low contribution of environment in the expression of these traits and there would be scope of improving these traits through indirect selection. The genotypic and phenotypic correlations were analyzed for all pairs of characters. At phenotypic level pod yield kg per has howed highly significant positive correlation with kernel yield per ha (0.984), hundred kernel weight (0.272), final plant stand (0.420), initial plant stand (0.574), 100 pod weight (0.215) while, significant negative correlation for duration of days to initial flowering (-0.371) days to 50 % flowering (-0.292) and haulm yield per ha (-0.216). These results are in line with Hampannavar *et al.*(2018) reported that pod yield was significant and positive correlation with kernel yield. Nayak *et al.* (2018) showed pod yield was significant positive correlation with hundred kernel weight, kernel yield and negative correlation for duration of initial flowering and duration of fifty percent flowering.The

Table 4. Genotypic (Lower part) and phenotypic (Upper part) correlations between yield and yield traits in 24 groundnut genotypes during *kharif* 2019. * Significance at 1% , ** Significance at 5%.

Characters	Days to first flowering	Days to 50% flowering	Haulm yield/ha	Shelling %	Wt of 100 pods	Wt of 100 kernels
Days to first flowering	1.000	0.397**	0.045	0.176	-0.023	-0.063
Days to 50 % flowering	0.716**	1.000	0.052	0.210*	-0.029	-0.010
Haulm yield/ha	0.129	0.080	1.000	-0.022	-0.083	0.106
Shelling %	0.219*	0.586**	-0.102	1.000	0.263**	0.196
Wt of 100 pods	-0.138	0.040	-0.111	0.463**	1.000	0.669**
Wt of 100 kernels	-0.098	0.049	0.104	0.283**	0.846**	1.000
% Sound mature kernels	-0.047	0.329**	0.219*	0.305**	0.008	0.062
Initial plant stand	-0.586**	-0.486**	-0.278**	0.303**	0.267**	0.428**
Final plant stand	-0.539**	-0.579**	0.085	0.107	0.013	0.236*
Days to maturity	1.080**	1.104**	-0.065	0.629**	0.440**	0.471**
Kernel yield kg/ha	-0.526**	-0.266**	-0.057	0.532**	0.349**	0.421**
Pod yield kg/ha	-0.596**	-0.374**	-0.050	0.415**	0.305**	0.408**

Table 4. Continued.

Characters	% Sound mature kernels	Initial plant stand	Final plant stand	Days to maturity	Kernel y kg/ha	Pod yield kg/ha
Days to first flowering	0.100	-0.197	-0.243*	0.337**	-0.324**	-0.371**
Days to 50 % flowering	0.063	-0.182	-0.197	0.219*	-0.243*	-0.292**
Haulm yield/ha	0.011	-0.094	-0.035	0.076	-0.208*	-0.216*
Shelling %	0.212*	0.031	-0.070	0.224*	0.317**	0.142
Wt of 100 pods	0.062	0.039	0.038	0.050	0.253*	0.215*
Wt of 100 kernels	0.039	0.183	0.192	0.194	0.298**	0.272**
% Sound mature kernels	1.000	-0.001	-0.026	-0.154	0.136	0.103
Initial plant stand	-0.141	1.000	0.535**	-0.173	0.556**	0.574**
Final plant stand	-0.108	1.050**	1.000	-0.041	0.388**	0.420**
Days to maturity	-0.272**	0.231*	-0.069	1.000	-0.099	-0.143
Kernel yield kg/ha	0.189	0.978**	0.568**	0.081	1.000	0.984**
Pod yield kg/ha	0.160	1.014**	0.600**	-0.007	0.991**	1.000

results on genotypic correlation coefficients revealed that the pod yield was highly significant and positive correlation with shelling percentage (0.415), 100 pod (0.305), 100 kernel weight (0.408), initial plant stand (1.014), final plant stand (0.600) and kernel yield (0.991) while, it was significant and negative correlation with days to first flowering (-0.596) and days to 50 % flowering (-0.374). These find finding are in agreement with reports of Chishti *et al.* (2000) reported positive and significant correlations between pod yield and hundred kernel weight. Roa *et al.* (2014) also revealed that pod yield was significant positively correlated with Kernel yield and hundred kernel weight while significant negative association with days to 50 % flowering.

Path analysis is a better tool for identification of component traits of pod yield and its attributes. The path coefficients between pod yield and its components were worked at genotypic level (Table 5). Path analysis results revealed that kernel yield kg / ha (1.091) exhibited highest positive direct effect on pod yield followed by 100 kernel weight (0.171), days to maturity (0.063) and sound mature kernels (0.063) while 100 kernel weight (-0.180), shelling percentage (-0.295) and days to first flowering (-0.005) revealed high negative direct effects on pod yield. These results are in agreement with Zaman *et al.* (2011) revealed that pod yield has direct effect on days to 50% flowering and days to maturity. Roa *et al.* (2014) who reported that pod yield has direct effect on

Table 5. Genotypic path coefficients between pod yield and its components in groundnut genotypes.

Characters	Days to first fowering	Days to 50% flowering	Haulm yield/ha	Shelling %	Wt of 100 pods	Wt of 100 kernels
Days to first flowering	**-0.0051**	0.0335	0.0022	-0.0645	-0.0237	0.0177
Days to 50 % flowering	-0.0037	**0.0468**	0.0014	-0.1728	0.0069	-0.0089
Haulm yield/ha	-0.0007	0.0037	**0.0173**	0.0299	-0.0191	-0.0187
Shelling %	-0.0011	0.0274	-0.0018	**-0.2950**	0.0794	-0.0511
Wt of 100 pods	0.0007	0.0019	-0.0019	-0.1366	**0.1715**	-0.1524
Wt of 100 kernels	0.0005	0.0023	0.0018	-0.0836	0.1450	**-0.1802**
% Sound mature kernels	0.0002	0.0154	0.0038	-0.0901	0.0013	-0.0112
Initial plant stand	0.0030	-0.0227	-0.0048	-0.0894	0.0457	-0.0771
Final plant stand	0.0028	-0.0271	0.0015	-0.0316	0.0022	-0.0426
Days to maturity	0.0055	0.0516	-0.0011	-0.1855	0.0755	-0.0849
Kernel yield kg/ha	0.0027	-0.0124	-0.0010	-0.1569	0.0598	-0.0758

Table 5. Continued.

Characters	% Sound mature kernels	Initial plant stand	Final plant stand	Days to maturity	Kernel yield kg/ha	Correlation with yield kg/ha
Days to first flowering	-0.0029	-0.0273	-0.0202	0.0688	-0.5743	-0.5958
Days to 50 % flowering	0.0203	-0.0226	-0.0217	0.0703	-0.2902	-0.3742
Haulm yield/ha	0.0135	-0.0129	0.0032	-0.0041	-0.0625	-0.0504
Shelling %	0.0188	0.0141	0.0040	0.0400	0.5800	0..4147
Wt of 100 pods	0.0005	0.0124	0.0005	0.0280	0.3805	0.3051
Wt of 100 kernels	0.0038	0.0199	0.0089	0.0300	0.4591	0.4075
% Sound mature kernels	**0.0617**	-0.0066	-0.0040	-0.0173	0.2066	0.1598
Initial plant stand	-0.0087	**0.0465**	0.0393	0.0147	1.0674	1.0139
Final plant stand	-0.0066	0.0489	**0.0374**	-0.0044	0.6200	0.6005
Days to maturity	-0.0168	0.0108	-0.0026	**0.0637**	0.0881	0.0043
Kernel yield kg/ha	0.0117	0.0455	0.0213	0.0051	**1.0912**	0.9912

kernel yield and days to maturity. It clearly indicated that kernel yield had high positive direct effect and highly significant positive correlation with pod yield. Therefore selection for high kernel yield may increase pod yield in studied groundnut genotypes.

CONCLUSION

Among the twenty four entries, two entries, were recorded significantly superior yield performance viz., JVB-2523 and JVB-2524 and these two entries also shown highest shelling percent, early maturing and sound mature kernel percentage. Then these two genotypes can be used in further breeding program to improve the yield and yield contributing characters in groundnut crop.

REFERENCES

Anon (2019) Directorate of Agriculture, Agriculture, Farmers Welfare and Co-operation Department Government of Gujarat.

Arya SS, Salve AR, Chauhan S (2016) Peanuts as functional food : A review. *J Food Sci Technol* 53 : 31—41.

Burton GW (1952) Quantitative inheritance in grasses. Proc 6th *Int Grasslands Congress J* 1 : 277—283.

Chishti SAS, Akbar M, Aslam M, Anwar M (2000) Morpho-genetic evaluation for pod yield and its components in early spanish genotypes of groundnut (*Arachis hypogaea* L.). *Pak J Biol Sci* 3(5) : 898—899.

Dewey DR, Lu KH (1959) A correlation and path analysis of components of crested wheat grass seed production. *Agron J* 51 : 515—518.

Falconer DS, Mackay TFC (1996) An Introduction to Quantitative Genetics. 4th edn. Prentice Hall, London.

Hampannavar MR, Hasan K,Temburne BV, Janila P, Amaregouda A (2018) Genetic variability, correlation and path analysis studies for yield and yield attributes in groundnut (*Arachis hypogaea* L.). *J Pharmacog Phytochem* 7 (1) : 870—874.

Janila P, Nigam SN (2013) Phenotyping for groundnut (*Arachis hypogaea* L.) improvement. In : Panguluri SN, Kumar AA (eds). Phenotyping for plant breeding : Applications of phenotyping methods for crop improvement. Springer, New York, pp 129—167.

Johnson HW, Robinson HF, Comstock RE (1955) Estimate of genetic and environmental variability in soybeans. *Agron J* 47 : 314—318.

Lush JL (1940) Intrasire correlation or regression of offspring on dam as a method of estimating heritability of characteristics. 33rd Proceedings American Society of Animal Production, pp 293—301.

Mahajan RC,Wadikar PB, Pole SP, Dhuppe MV (2011) Variability, correlation and path analysis studies in sorghum. *Res J Agric Sci* 2(1) : 101—103.

Miller PA, Williams JC, Robinson HF, Comstock RE (1958) Estimates of genotypic and environmental variances and covariances in upland cotton and their implications in selection. *Agron J* 50 : 126—131.

Murali TV, Janila P (2017) Economic and Academic Importance of Peanut. Springer International Publishing AG, Varshney RK *et al.* (eds). The Peanut Genome, Compendium of Plant Genomes.

Nayak GP, Venkataiah M, Revathi P, Srinivas B (2018) Correlation and genetic variability studies in groundnut (*Arachis hypogaea* L.) genotypes. *Int J Genet* 10 (2) : 354—356.

Panse VG, Sukhatme PV (1961) Statistical methods for agricultural workers.2nd edn. ICAR, New Delhi, pp 361.

Rao T,Venkanna V, Bhadru D, Bharathi D (2014) Studies on variability, character association and path analysis on groundnut (*Arachishypogaea* L.). *Int J Pure Appl Sci* 2 (2): 194—197.

Savaliya JJ, Pansuriya AG, Sodavadiya PR, Leva RL (2009) Evaluation of inter and intraspecific hybrid derivatives of groundnut (*Arachishypogaea* L.) for yield and its components. *Legume Res* 32(2) : 129—132.

Seijo GJ, Lavia GI, Fernandez A, Krapovickas A, Ducasse AD, Bertioli DJ, Moscone EA (2007) Genomic relationships between the cultivated peanut (*Arachis hypogaea* L.) and its close relatives revealed by double GISH. *Am J Bot* 94 : 1963—–1971.

Vaithiyalingan M (2016) Combining ability studies in groundnut (*Arachis hypogaea* L.). *Genotypes J Oilseeds Res* 33(2) : 149 —152.

Zaman MA, Tuhina-Khatun M, Ullah MZ, Moniruzzamn M, Alam KH (2011) In press. A Scient J Krishi Found Agricult 9 (1& 2) : 29—36.

Zongo A, Abel T, Mahamadou S, Abdourasman KK, Philippe S, Bonny RN, Haile D (2017) Variability and correlations among groundnut populations for early leaf spot, pod yield and agronomic traits. *Agronomy* 7 (3&52) : 1—11.