

## Studies on the performance of Groundnut (*Arachis hypogaea* L.) genotype for seed yield and quality parameters

Sita Ram and Prashant Kumar Rai

Department of Genetics and Plant Breeding, Sam Higginbottom Institute of Agriculture, Technology & Sciences, (Deemed-To-Be-University) Allahabad-211007 (U.P.) India  
Email: srkumawat32@gmail.com

Accepted 28 August 2016

### Abstract

The present investigation was carried out with 11 groundnut genotypes including one check (K-6) during *kharif*-2015 in RBD with three replication at field experimentation Center, Department of Genetics and Plant Breeding, Allahabad School of Agriculture, SHIATS, Allahabad to conduct study on agronomic and seed quality traits. Analysis of variance showed highly significant differences among 11 groundnut genotypes for 4 agronomic and 11 seed quality characters. Genotype ICG 5179 was identified as the best genotype for pod yield and kernel yield per plant.

**Keywords:** Groundnut, *Arachis hypogaea* L., agronomic and seed quality traits, physical characters.

### Introduction

Groundnut (*Arachis hypogaea* L.) known as King of oilseed crops, is believed to be native of Brazil (South America). It was introduced in India during first half of the sixteenth century. It belongs to the family Leguminosae and sub family Papilionaceae. The cultivated form of groundnut has been classified into two major groups viz., Valencia or Spanish type (*Arachis hypogaea* sub spp. *fastigiata*) and Virginia type (*Arachis hypogaea* sub spp. *hirsuta*).

Groundnut has first place in India among the oilseed crops (Rai *et al.* 2014). It is primarily grown for its high oil content for making cooking purposes (Zaman *et al.* 2011, Patidar *et al.* 2014). Seedcake, after extraction of oil is fed to livestock because of its residual protein value and also used as manure. The crunchy nuts are used for making a variety of cuisines and several valuable products like bread, Peanut butter, groundnut flour, and milk substitutes (Raj *et al.* 2002, Patil *et al.* 2014, Anon 2012-2013,) roasted (in oil or hot sand) the seed is sold in small packets and is consumed as a snack and is always in great demand.

Various morphological and yield contributing characters determine the productivity of the groundnut genotypes. The discussion reveals such

characteristic which are important in respect of productivity of groundnut. The harvest index is the best indicator of photosynthetic translocation efficiency of the genotype. The present experiment was conducted to evaluate groundnut genotype for agronomic traits and categories the groundnut genotype on the basis of seed quality parameter.

### Materials and methods

Experimental materials for present study consist of 11 genotypes (including check) of Groundnut which were obtained from the Department of Genetics and Plant Breeding, SHIATS, Allahabad, U.P. The experiment for the present study was laid out in randomized block design (RBD) with three replications at Experimentation Centre of Department of Genetics and Plant Breeding, Allahabad School of Agriculture, Sam Higginbottom Institute of Agriculture, Technology and Sciences, Allahabad, (U.P.) during *kharif*, 2015. Standard agronomic practices and plant protection measures were adopted as per schedule. Observations were recorded on five randomly selected plants per replication for days to 50% flowering, plant height, number of branches/plant, days to maturity, pod yield/plant, Pod yield (q/ha), Kernel yield (q/ha), seed index, shelling %, were recorded on plot basis and physical parameter (according to DUS guideline) pod reticulation, pod

constriction, pod presence of beak, kernel colour, pod number of kernels, kernel shape. The field data were analyzed statistically as per randomized block design (RBD) as suggested by Panse & Sukhatme (1967).

## Results and discussion

The mean sums of square value for agronomic characters were subjected to analysis of variance for experimental design (Table 1).

Days to 50% flowering ranged from 23.33 to 30.00 with grand mean value 26.67. Genotype ICG-163 (23.33) had earliest days to 50% flowering followed by ICG- 2738 (24.00), ICG- 4684 (26.33), and highest for ICG- 13858 (30.00) (Table 2, 3). The similar findings were reported by Khan *et al.* (2000), Borkar & Dharanguttikar (2014), Kumar *et al.* (2014) and Patra *et al.* (2014). Seed Index varied from 31.23 g to 48.58 g with mean value of 39.43 g. The highest 100 grain weight was recorded in genotype ICG-2713 (48.58 g) had highest hundred kernel weight (gm) followed by ICG-4684 (47.80) and lowest hundred kernel weight observed in ICG-13858 (31.23). Pod yield q/ha varied from 36.02 q to 21.30 q with mean

value of 28.24 q. The highest pod yield q/ha was recorded in genotype ICG-5179 (36.02 q/ha) had highest pod yield (q/ha) followed by ICG-13858 (31.03) and lowest pod yield (q/ha) ICG-5891 (21.30). The similar findings were reported by Kokkiripati *et al.* (2015). Shelling percentage varied from 61.00 to 77.37 with mean value of 70.61%. The highest shelling percentage was recorded in genotype ICG-2106 (77.37%) followed by ICG-163 (76.23), ICG-4684 (75.67) and lowest shelling % in ICG-2738 (61.00). The results were obtained from the experiment conducted during Kharif 2015 to study the yield performance and quality parameters among the groundnut genotypes. The variation in growth parameters among the genotypes can be attributed due to the response of different genotypes to environment and genetic makeup of the genotype. The significant differences observed in this study indicate that agronomic variation exists across the 11 groundnut genotypes. This could be due to differences in the genetic composition of these genotypes. This finding is very useful for selecting agronomically favourable genotypes for breeding programmes.

**Table 1: Analysis of variance for agronomic characters in 11 Groundnut genotypes during Kharif, 2015**

S. No.	Characters	Mean sum of squares		
		Replications (d.f. =02)	Treatment d.f =10	Error =20
1.	Days to 50% flowering	5.30	11.13**	0.97
2.	Plant height	5.18	132.13**	2.71
3.	Number of branches/plant	0.26	2.30**	0.10
4.	Days to maturity	3.84	11.93**	2.54
5.	Pod yield per plant	0.03	5.02**	0.14
6.	Pod yield	0.27	41.03**	1.21
7.	Hundred kernel weight	0.06	107.68**	1.93
8.	Shelling percentage	2.11	69.62**	6.33
9.	Kernel Yield	0.48	31.66**	0.93

\*\*Significant at 1% level of significance.

**Table 2 Mean performance of agronomic traits in Groundnut genotypes during Kharif, 2015**

Genotype	Day of 50% flowering	Plant height (cm)	Day to Maturity	No. of branch/plant	100 Seed wt. (g)	Pod yield /plant	Pod yield (q/ha)	Kernel yield (q/ha)	Shelling Percentage
ICG-2106	27.67	49.67	118.67	5.53	33.13	10.60	30.29	23.43	77.37
ICG-5179	26.67	62.60	117.67	5.73	45.97	12.61	36.02	25.27	70.17
ICG-5745	26.33	58.27	122.33	5.40	38.80	9.69	27.70	19.33	69.80

Table Contd. ...

ICG-14710	27.67	51.80	120.00	4.87	41.57	9.20	26.29	19.00	72.30
ICG-5891	27.67	43.33	119.67	3.67	34.03	7.45	21.30	13.89	65.23
ICG-2713	28.33	65.20	118.33	4.67	48.58	9.76	27.89	19.22	68.93
ICG-13858	30.00	50.80	115.33	7.13	31.23	10.86	31.03	21.53	69.40
ICG-163	23.33	55.60	121.00	6.13	39.53	10.25	29.28	22.32	76.23
ICG-2738	24.00	48.93	116.33	5.67	35.00	9.53	27.24	16.62	61.00
ICG-4684	26.33	60.07	119.00	5.73	47.80	9.97	28.50	21.56	75.67
KADRI-6 (Check)	25.33	58.57	118.00	5.23	38.10	8.79	25.12	17.75	70.63
Grand mean	26.67	54.98	118.76	5.43	39.43	9.88	28.24	19.99	70.61
Min range	23.33	43.33	115.33	3.67	31.23	7.45	21.30	13.89	61.00
Max range	30.00	65.20	122.33	7.13	48.58	12.61	36.02	25.27	77.37
SE(d)	0.80	1.34	1.30	0.27	1.14	0.32	0.90	0.79	2.05
CV%	3.69	2.99	1.34	6.09	3.53	3.91	3.91	4.85	3.56

**Table 3 Physical Parameters Score based of 11 Groundnut Genotypes**

No.	Genotypes	P.R	P.C	P.B	S.P.	K.C	K.S	P.N
1.	ICG-2106	3	3	1	7	3	2	1
2.	ICG-5179	5	1	9	5	9	1	1
3.	ICG-5745	3	5	1	5	8	3	1
4.	ICG-14710	1	3	1	5	8	1	1
5.	ICG-5891	3	5	1	3	8	3	1
6.	ICG-2713	3	3	9	5	8	3	3
7.	ICG-13858	3	1	1	5	9	2	1
8.	ICG-163	3	3	9	7	9	3	1
9.	ICG-2738	5	5	1	3	8	3	3
10.	ICG-4684	3	1	9	7	3	1	1
11.	KADIRI-6 (check)	5	1	1	5	8	2	1

**Legends:-**

P.C. - Pod constriction

P.B. – Pod beak

K.C. –Kernel colour

P.N. - Pod number of kernel

P.R. - Pod reticulation

S.P. – Shelling percentage

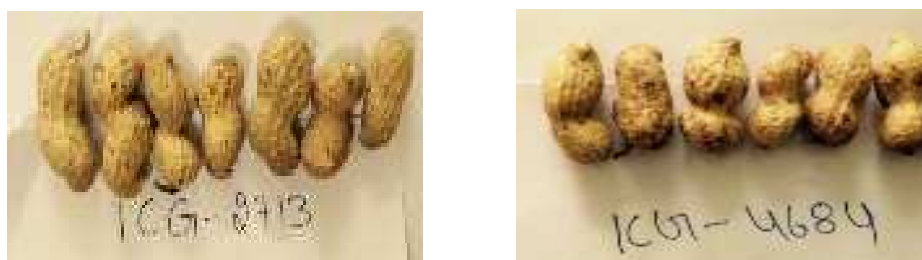
K.S. - Kernel shape



**Figure - Pod reticulation**



**Figure -Kernel colour**



**Figure -Pod beak**

## Conclusion

The present study concluded that the genotype ICG-5179 was identified as the best genotype for pod yield (36.02 q/ha), and kernel yield (25.27 q/ha), Genotype ICG -2713 recorded highest 100 kernel

weight (48.58 gm.). Days to maturity was earliest in genotype ICG-13858 (115.33) followed by ICG-2738 (116.33). Also, significant variation was observed for all the different agronomic and seed quality characters studied among the genotypes.

## References

- Anon, 2012-13. State agricultural produce marketing board. Uttar Pradesh.
- Borkar, V. H. & V. M. Dharanguttikar 2014. Evaluation of groundnut genotypes for physiological traits. *Int. J. Scientific Res. Publicat.*, **4** (1): 23-29.
- Khan, M.I., A. Ryan, M. Rahim & M. Tahir 2000. Genetic variability and criterion for the selection of high yielding genotypes. *Pakistan J. Ag. Res.*, **16**(1): 9-12.
- Kumar, C.V.S. & S. Rajamani 2004. Genetic variability and heritability in groundnut (*Arachis hypogaea* L.). *Prog. Ag.*, **4**(1): 69-70.
- Panse, V. G. & P. V. Sukhatme 1967. Statistical methods for agricultural workers. ICAR New Delhi., 2<sup>nd</sup> Education.pp.381.
- Patidar, S., P.K. Rai & A. Kumar 2014. Evaluation of groundnut (*Arachis hypogaea* l.) genotypes for quantitative character & yield contributing traits. *Int. J. Emerg. Technol. Advan. Eng.*, **4**: 500-504.
- Patil, A.S., A.A. Punewar, H.R. Nandanwar & K. P. Shah 2014. Estimation of variability parameters for yield and its component traits in groundnut (*Arachis hypogaea* L.) *The Bioscan Int. Quar. J. Life Sci.*, **9**(2): 749-754.
- Patra, P.S., A.C. Sinha & S.S. Mahesh 2011. Yield, nutrient uptake and quality of groundnut (*Arachis hypogaea* L.) kernels as affected by organic sources of nutrient. *Indian J. Agron.*, **56**(3): 237-241.
- Rai, P. K., K. Kumar, K., A. Kumar, BazilAvinash Singh & A. K. Chaurasia 2014. Study on the performance of groundnut (*Arachishypogaea* L.) genotypes for quantitative traits in Allahabad region. *Caribbean J. Sci. Technol.*,
- Zaman, M.A., M. Tuhina-Khatun, M.Z. Ullah, M. Moniruzzamn & K.H. Alam 2011. Genetic Variability and Path Analysis of Groundnut (*Arachis hypogaea* L.) *The Agriculturists*, **9**: 29-36.