I J T A
© Serials Publications
National Academy of Agricultural Science (NAAS) Rating : 3.03

Study of Genetic Variability and Correlations in Local Collections of Valencia Botanical Types of Groundnut

S. R. Kamdi[1]*, Shubhangi P. Bhasme[2], P. R. Kadu[3], S.S. Karhale[4], G. J. Bhagat[5] and P.S. Neharkar[6]

ABSTRACT: *Genetic variation and association among nine characters were studied in forty seven local collections of Valencia botanical types of groundnut collected from the tribal farmers of Eastern Vidarbha Zone of Mahrashtra, India. They were evaluated in augmented design for yield and it's contributing characters along with checks viz., TAG-24 and Kopargoan-3 at College of Agriculture, Gadchiroli during 2014-15. Local collection showed significant variation for dry pod yield per plant (2.52 to 12.70), days to 50 % Flowering (34.17 to 49.17), days to maturity (102.17 to 119.71), height of main axis (4.13 to 18.23), number of primary branches per plant (2.97 to 5.67), number of matured pods per plant (3.93 to 14.93), number of immatured pods per plant (0.47 to 5.77), number of wasteful pegs per plant (1.67 to 16.97) and dry haulm yield per plant (10.47 to 32.45).*

Correlations between traits were investigated that revealed strong positive and significant correlations were observed for most of the characters. Dry pod yield per plant was highly positively and significantly correlated with number of primary branches and number of matured pods per plant. Days to 50% flowering were strongly positive and significantly correlated with days to maturity, number of wasteful pegs yield per plant and dry haulm yield per plant. Days to maturity showed highly positive and significant correlation with number of immatured pods per plant, number of wasteful pegs per plant and dry haulm yield per plant. Correlation of number of primary branches per plant with with number of matured pods per plant and number of immatured pods per plant was positive and highly significant. Number of matured pods per plant was positive correlated with number of immatured pods per plant and dry haulm yield per plant.

***Key words*:** *Genetic variability, correlations, Valencia botanical types and groundnut.*

INTRODUCTION

Groundnut is annual leguminous plant and member of family *Leguminosae,* and belongs to the subfamily *Papilionaceae.* In genus *Arachis* only *A. hypogaea* has been domesticated even though several species are available for seed purpose (*A. villosulicaspa,* and *A. sterospermo).* The cultivated groundnut *i. e. (A*rachis *hypogaea* 2n= 4*x*=40) is divided into two subspecies and four varieties. The subspecies *hypogaea* has two varieties *hypogaea* and *hirsuta*. The variety *hypogaea* has market type two varieties Varginia and Runner. The subspecies *fastigiata* has two varieties *fastigiata* and *vulgaris*, the *fastigiata* is called as Valencia and *valgaris* is called Spanish (Fehr, 1987). The crop is primarily used as a source of high quality vegetable oil and as livestock feed. The groundnut contains 45 to 55% oil and 25 to 30 % protein, the kernals of this crop is rich in vitamin and minerals.

It is grown in most tropical as well as subtropical, and temperate regions, especially in India and China (the major world producers), W. Africa, United States and South East Asia. In India the major groundnut producer states are Andra Pradesh, Gujrat, Karnataka, Tamil Nadu, Maharashtra, U.P., M.P., Orissa and Punjab.

In Maharashtra, the varieties of Spanish, Valencia and Varginia botanical types of groundnut is grown in most of districts in all three season. But in Eastern Vidarbha Zone of Maharashtra especially in Kurkheda, Wadasa, Aheri and Korchi talukas of Gadchiroli district and also from some parts of Chandrapur, Bhandara and Gondia districts, the farmers grow low yielding local varieties of Valencia botanical types for table purpose in rabi-summer season after paddy crop. Hence, for replacement of low yielding local varieties of Valencia botanical

[1,2,3,4,5,6]College of Agriculture, Gadchiroli, Dr. PDKV, Akola (MH)
*Corresponding author E-mail: sandeepkamdi@gmail.com, sandeepkamdi@rediffmail.com

types, it is essential to collect and evaluate land races from farmer's field for development of high yielding varieties. Because genetic variability is the prerequisite for crop improvement as this provides wider scope for selection. Thus, effectiveness of selection is dependent upon the nature, extent and magnitude of genetic variability present in material and the extent to which it is heritable. The present study was undertaken to understand variability and the relationship between various characters and their contribution to yield.

MATERIAL AND METHODS

For assessment of variability and correlation, forty seven groundnut Valencia botanical type local collections were collected from the tribal farmers of Eastern Vidarbha Zone of Mahrashtra India. All local collections were evaluated in augmented design along with checks viz., TAG-24 and Kopergoan - 3 at College of Agriculture, Gadchiroli during 2014-15. Each local collection within the block was grown in a two rows of 4m lengths. Distance between rows was 30 cm and 10 cm between plants in a row. All the recommended cultural practices and packages were followed to raise a good and healthy crop. In each entry, five competitive plants were selected randomly, data recorded on nine quantitative viz., dry pod yield per plant, days to 50% flowering, days to maturity, height of main axis, number of primary branches per plant, number of matured pods per plant, number of immatured pods per plant, number of wasteful pegs per plant and dry haulm yield per plant. Data was statistical analysed for augmented design II as per procedure described by Sharma (1998). The simple correlations for all characters were calculated and test for significance as per the procedure given by Singh and Chaudhary (1985).

RESULTS AND DISCUSSION

Mean, standard error and range of variation estimated for each trait in local collections of Valencia botanical type of groundnut are shown in table 1. Result showed that local collections showed highly significant variation for all traits under investigation. In present investigation, variation for dry pod yield per plant ranged from 2.52 to 12.70 g with mean value 7.70 g. Earlier, variation for pod yield was reported between 2.58 to 16.50 g by Maurya *et. al.* (2014) whereas, it was observed between 2.6 to 23.4 by Zaman *et. al.* (2011). Variation for days to 50 % flowering ranged from 34.17 to 49.17 with mean value 42.80 and for days to maturity ranged from 102.17 to 119.17 with mean value 111.19. Maurya *et. al.* (2014) observed variations for number of the days to flowering was ranged from 25.33 to 35.67 and for days to maturity ranged from 116.00 to 121.67. Zaman *et. al.* (2011) reported variations for number of the days to flowering ranged from 34 to 41 and for days to maturity ranged from 141 to 171.

Table 1
Mean value, standard error and range for dry pod yield and its contributing characters in local collections of Valencia botanical types of Groundnut

	Mean	*S. E.*	*Range*	
			Min.	*Max.*
Dry pod yield per plant (g)	7.70	0.29	2.52	12.70
Days to 50 % flowering	42.80	0.55	34.17	49.17
Days to maturity	111.19	0.60	102.17	119.17
Height of main axis	13.36	0.39	4.13	18.23
No. of primary branches	4.64	0.09	2.97	5.67
No. of matured pods per plant	9.07	0.33	3.93	14.93
No. of immatured pods per plant	2.61	0.18	0.47	5.77
No. of wasteful pegs per plant	6.07	0.47	1.67	16.97
Dry haulm yield per plant (g)	17.78	0.74	10.47	32.45

Height of main axis showed variation ranging from 4.13 to 18.23 cm with mean value 13.36 cm. In earlier studies, variation for plant height was between 22.17 and 51.41 cm (Maurya *et. al.* 2014), 17 to 38 cm (Zaman *et. al.* 2011).

The range for number of primary branches per plant was 2.97 to 5.67 exhibiting mean value of 4.64. Range of this trait was 5.13 to 6.40 reported by Maurya *et. al.* (2014) and 8 to 15 by Zaman *et. al.* (2011). Numbers of matured pods per plant were 3.93 to 14.93 showing mean value of 9.07. A range of matured pods per plant was 8 to 28 observed by Zaman *et. al.* (2011). Number of immatured pods per plant showed variation ranging from 0.47 to 5.77 with mean value 2.61. Variation for immatured pods per plant was 4 to 12.2 observed by Zaman *et. al.* (2011). Number of wasteful pegs per plant was more variable, ranging from 1.67 to 16.97 and showed mean value of 6.07. Variation for dry haulm yield per plant ranged from 10.47 to 32.45 g with mean value 17.78 g.

In the present investigation, high amount morphological variations were observed for all traits under study, which suggest existence of genetic variability in local collections of Valencia botanical type of groundnut. Hence, these variations for traits will be useful for developing high yielding in future.

Pod yield is a complex character governed by several characters. So, it is important to know the

correlation of different characters with pod yield for enhancing the usefulness of selection criterion to be followed while developing varieties. Correlations between different characters of local collections of groundnut Valencia botanical type are shown in table 2. The result revealed that strong positive and significant correlations were observed for most of the characters. Dry pod yield per plant was positively and significantly correlated with number of primary branches and number of matured pods per plant. The results are in accordance with Satish Yadlapalli (2014), Chishti *et. al*.(2000), Deshmukh *et. al*.(1996) and Syamasonta(1992). Thirumala Rao *et. al.* (2014) also observed significant and highly positive association between pod yield and number of pods per plant. Dry pod yield per plant was positively correlated with dry haulm yield per plant and negatively correlated with other traits under study.

Days to 50% flowering was positively correlated with all traits except number of matured pods per plant and dry pod yield per plant but strongly positive and significantly correlated with days to maturity, number of wasteful pegs yield per plant and dry haulm yield per plant. Days to maturity showed positive correlation with all traits except number of matured pods per plant and dry pod yield per plant but highly positive and significant correlation with number of immatured pods per plant, number of wasteful pegs per plant and dry haulm yield per plant. Correlation of height of main axis with number of wasteful pegs per plant and dry haulm yield per plant was highly significant and positive. Correlation of number of primary branches per plant with number of matured pods per plant, number of immatured pods per plant, number of wasteful pegs per plant and dry haulm yield per plant was positive but, highly significant with number of matured pods per plant and number of immatured pods per plant. Number of matured pods per plant was positive correlated with number of immatured pods per plant and dry haulm yield per plant. Number of immatured pods per plant was positively correlated with wasteful pegs per plant and dry haulm yield per plant. Wasteful pegs per plant were strongly positive and significantly correlated with dry haulm yield per plant. Satish Yadlapalli (2014) studied correlation between days to 50% flowering, plant height, number of branches per plant, number of pods per plant and 100 seed weight and observed that number of branches per plant exhibited highly significant and positive genotypic correlations with all the characters. Number of pods per plant showed positive and significant correlations with pod yield, days to 50% flowering and number of branches per plant. Plant height showed significant and positive correlation with number of branches per plant plant.

In present study, dry pod yield per plant was positively and significantly correlated with number of primary branches and number of matured pods per plant. Days to 50% flowering were strongly positive and significantly correlated with days to maturity, number of wasteful pegs yield per plant and dry haulm yield per plant. Days to maturity showed highly positive and significant correlation with number of immatured pods per plant, number of wasteful pegs per plant and dry haulm yield per plant. Correlation of number of primary branches per plant with with number of matured pods per plant and number of immatured pods per plant was positive and highly significant. Number of matured pods per plant was positive correlated with number of immatured pods per plant and dry haulm yield per

Table 2
Correlations between dry pod yield and its contributing characters in local collections of Valencia botanical types of Groundnut.

	Dry pod yield per plant	*Days to 50% flowering*	*Days to maturity*	*Height of main axis*	*No. of primary branches / plant*	*No. of matured pods / plant*	*No. of immatured pods / plant*	*No. of wasteful pegs / plant*
Days to 50 % flowering	-0.364*							
Days to maturity	-0.426**	0.984**						
Height of main axis	-0.091	0.163	0.162					
No. of primary branches / plant	0.285*	0.240	0.200	-0.192				
No. of matured pods/plant	0.663**	-0.03	-0.103	-0.328*	0.594**			
No. of immatured pods/plant	-0.298*	0.352*	0.366**	-0.062	0.409**	0.253		
No. of wasteful pegs/plant	-0.125	0.412**	0.409**	0.519**	0.047	-0.011	0.243	
Dry haulm yield per plant (g)	0.018	0.469**	0.483**	0.424**	0.307*	0.043	0.239	0.703**

*, **: Significant at 5% and 1% level of probability, respectively

plant. These positive correlations would be favourable to breeders for their simultaneous genetic improvement.

REFERENCES

Chishti, S. A. S., Akbar, M. Aslam, M. and Anwar (2000), M. Morphogenetic Evaluation for pod yield and its components in early Spanish genotypes of Groundnut (*Arachishypogaea* L.). *Pakistan Jourl. of BioScie.* **3(5):** 898-899.

Deshmukh, S. N., M. S. Basu and P. S. Reddy (1986), Genetic variability, character association and path coefficients and quantitative traits in Virginia bunch varieties of groundnut. *Indian J. of Agr. Sci.* **56:** 816-821.

Fehr, W. R., (1987), Peanut. *Principles of cultivar development.* Vol. 2, PP: 346-348.

Maurya, Mukesh Kumar, Prashant Kumar Rai, Arvind Kumar and Bazil A. Singh, A. K. Chaurasia (2014), Study on genetic variability and seed quality of groundnut (*Arachis hypogaea* L.) genotypes. *International Journal of Emerging Technology and Advanced Engineering*. 4(6): 818-823.

Satish Yadlapalli (2014), Genetic variability and character association studies in groundnut (*Arachis hypogaea* L.). *International Journal of Plant, Animal and Environmental Science*.4 (4): 298-300.

Sharma, J. R. (1998), Statistical and biometrical technique in plant Breeding. *New Age International (P) Limited, Publisher,* New Delhi.

Singh, R. K. and Chaudhary B. D. (1985), Biometrical methods in quantitative genetic analysis. *Kalyani Publication, New Delhi*, PP. 7-8.

Syamasonta, M. B. (1992), 'Pops' screening in groundnut. Prog. of 5th Regional Groundnut workshop for Southern Africa, Patancheru, Andhra Pradesh, Ind.

Thirumala Rao, V., V. Venkanna, D. Bhadru and D. Bharathi (2014), Studies on variability, character association and path analysis on groundnut (*Arachis hypogaea* L.). *International Journal of Pure and Applied Bioscience.* 2 (2): 194-197.

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