Int.J.Curr.Microbiol.App.Sci (2019) *8*(11): 1392-1398

International Journal of Current Microbiology and Applied Sciences
ISSN: 2319-7706 **Volume 8 Number 11 (2019)**
Journal homepage: http://www.ijcmas.com

Original Research Article https://doi.org/10.20546/ijcmas.2019.811.162

Effect of Land Configurations and Varieties on Growth and Quality of Summer Groundnut

S.S. Bharade[1], B.V. Asewar[1], B.R. Bobade[2*] and I.A.B. Mirza[1]

[1]*Department of Agronomy, VNMKV, Parbhani (M.S), India*
[2]*Department of FASAL Agricultural Meteorology, VNMKV, Parbhani (M.S), India*

**Corresponding author*

Keywords

Groundnut, Land configuration, Varieties, Growth, Quality

Article Info

Accepted:
12 October 2019
Available Online:
10 November 2019

A B S T R A C T

The field investigation was conducted at experimental farm, Department of Agronomy, College of Agriculture, VNMKV, Parbhani, during summer 2014 to find out results of growth and quality parameters. The experimental field was levelled and well drain. The soil was clay in texture, low in nitrogen, medium in phosphorous, medium in potash and alkaline in reaction. The experiment was laid out in a Split plot design with 12 treatment combinations, which comprised of four land configurations and three varieties. The main plots treatments were L_1- Ridges and furrows, L_2- BBF, L_3- Sara method and L_4- Flat beds and varieties were LGN-1, TAG-24, and SB-XI. Each experimental unit was replicated three times. Amongst land configuration BBF recorded significantly higher growth parameters viz., plant height (cm), number of branches, functional leaves, leaf area, number of nodules, total dry matter (g), number of gynophores, developed pods and developed pods and in Quality parameters, shelling percent, oil content and protein content, followed by Ridges and furrows. Among the varieties TAG-24 recorded highest values of growth and quality parameters as compared to the varieties SB-XI and LGN-1.

Introduction

Groundnut, also called pea nut, earth nut, monkey nut, goober nut, manila nut, pinder and panda nut is a native of South American leguminous oil seed (Hammons, 1982). It was first found in Brazil or Peru as early as 950 B.C. (Higgins, 1951). According to Weiss (1983), a peanut was probably brought to West Africa from Brazil in the 16^{th} century and then to the African East coast and to India. In India the plant was introduced by the Portuguese in 16^{th} century as an oil seed crop for commercial cultivation.

In the developed world, major pea nut produce is processed in to a variety of food products such as pea nut butter, salted pea nut, candies, salads, cheese and yoghurt like products, protein concentrate and pea nut meals (Chavan *et al.*, 1990).

Pea nut is fairly good source of some dietary minerals. The total minerals contains in pea nut ranges from 1.08 to 1.3 %. It contains (Mg per 100 g.) primary element such as Ca 50 to 90 mg, Mg 200 to 250 mg, P 340 to 430 mg, S 240 to 300 mg, K 500 to 730 mg and certain trace elements such as Mn 1.3 to 2 mg. Zn 2.3 to 4 mg, Boron 0.9 to 1.8 mg, Iron 2.3 to 3.2 mg. As groundnut helps to maintain blood cholesterol levels they have been recognized as heart friendly.

Ground nuts provides over 30 essential nutrients are considered a rich source of fiber, vitamin (niacin, folate and vit. E) and minerals (Mg, Mn and P) and free from Na. The vitamins contents in pea nut have been studied by several authors (Rao and Rao, 1981) and reported that pea nut have little or no vitamin A, D, K and B_{12}. Groundnut is a good source of all vitamins B except B_{12}. This is a rich source of thiamin, riboflavin, nicotinic acid and vit E. The choline, inositol and pentathenic acid were present relatively higher amounts.

India share 23 per cent of the world’s groundnut area and production. In India, it is grown in area of 4.77 M ha with total production 4.75 MT. Above 80 % of the area under groundnut is concentrated in five states *viz.* Gujarat, Andhra Pradesh, Tamil Nadu, Maharashtra and Karnataka.

Gujarat occupies the first place in regard to area and production. The average yield of groundnut in India is 999 kg ha^{-1}, which is less than the average yield of groundnut in world has 1600 kg ha^{-1}. Maharashtra is one of the important groundnut growing states in India. The total area under groundnut in Maharashtra is 3.57 lacks ha out of which 2.57 in kharif and 0.87 summer with total production of 4.44 lack tonnes with average yield of 1150 kg ha^{-1} (*www.indiastat.com*).

The botanical name of groundnut, *Arachis hypogaea* L. is derived from Greek world *Arachis* meaning a legume and hypogaea meaning below ground, referring to the formation of pods in the soil. Ground nut belongs to the genus *Arachis* of sub-family papilionaceae of the family Leguminaceae *Arachis hypogaea* L. ssp. procumbent are always trailing, runner or spreading type with a central axis which does not bear inflorescence and has produce lateral branches, plant are late maturing and prostrate habit. The plants of *Arachis hypogaea* L. ssp. fastigiated are always bushy upright erect or bunchy type with inflorescence in the central axis and without a regular pattern in the sequence of reproductive and vegetative branches. Fruits are concentrated around the central axis and plants are early maturing.

Materials and Methods

The field investigation was conducted at experimental farm, Department of Agronomy, College of Agriculture, VNMKV, Parbhani, during summer 2014 to find out results of growth and quality parameters. The topography of experimental plot was fairly levelled. The soil was medium black in colour, and fairly well drained. The soil was clay in texture, low in nitrogen, medium in phosphorous, medium in potash and alkaline in reaction. The experiment was laid out in a Split plot design with 12 treatment combinations, which comprised of four land configurations and three varieties. The experiment was laid out in split plot design where in the main plot were assigned to four land configuration (Flatbed, Ridges and furrow, BBF and Sara method) and subplots to three varieties of groundnut (LGN-1, TAG-24 and SB-XI) and the treatment combinations were randomly replicated thrice. The treatments were allotted randomly to each replication. The gross plot size was 5.4 m x 4.2 m and net plot size was 4.8 m x 3.8 m. The recommended dose of fertilizer was 25: 50: 00 kg NPK ha^{-1} which is applied through Urea and D.A.P.

Results and Discussion

Data pertaining to the effect of various treatments growth parameters are presented in Table 1. The effect of different land configurations on mean plant height was found significant. The maximum plant height (28.12 cm) was observed with BBF which was significantly superior over ridges and furrows, sara method and flat beds. The mean plant height of variety SB-XI (27.62 cm) was found significantly higher over TAG-24 and LGN-1.

The variety TAG-24 was found to be significantly higher mean plant height over LGN-1. The land configuration BBF produced more vegetative growth in early period of crop growth. This might be due to the better root development and root nodulation which direct influenced height similar result was obtained by Baskaran *et al.,* (2003) and Patra *et al., (*1996)

The mean number of branches $plant^{-1}$ (9.19) with BBF was found to be significantly superior over rest of the land configurations. The mean number of branches $plant^{-1}$ on ridges and furrows was found to be significantly superior over sara method and flat beds. The mean number of branches $plant^{-1}$ (9.22) of variety TAG-24 was found significantly higher over SB-XI and LGN-1. The variety SB-XI was found to be significantly higher mean branches over LGN-1. This may be due to better nodulation which probable increased nitrogen supply to plant. These results are in conformity with the finding reported by Patil *et al.,* (2007).

The mean number of functional leaves $plant^{-1}$ (87.44) with BBF was found significantly superior over ridges and furrows, Sara method and flat beds. The mean number of functional leaves per plant on ridges and furrows was found to be significantly superior over Sara method and flat beds. The mean number of functional leaves $plant^{-1}$ (84.65) of variety TAG-24 was found significantly higher over SB-XI and LGN-1. It might be due to higher better root growth, better nodulation and aeration. Similar findings were reported by Desai (1989). The significantly highest mean number of leaf area $plant^{-1}$ (19.66) was observed on BBF. The lowest leaf area was observed on flat beds (16.19). The mean leaf area $plant^{-1}$ (18.59) of variety TAG-24 was found significantly higher over SB-XI and LGN-1.

The maximum mean number of nodules $plant^{-1}$ (20.23) and mean number of gynophores $plant^{-1}$ (6.06) observed with BBF was found to be significantly superior over rest of the land configurations. The mean number of nodules $plant^{-1}$ and mean number of gynophores $plant^{-1}$ on ridges and furrows was found to be superior over sara method and flat beds. The mean highest number of nodules $plant^{-1}$ (20.42) and mean number of gynophores $plant^{-1}$ (5.17) of variety TAG-24 was found to be significantly superior over SB-XI and LGN-1. The variety SB-XI was found to be significantly superior over LGN-1. Land configuration with BBF 3% increased nodules per plant over flat bed. This may be due to more porosity and moisture in soil. Similar result was reported by Hadvani *et al.,* (1993). Increase in gynophores might be due to higher soil moisture availability and more surface area for peg penetration. Similar result was reported by Tarde (1984) and Patil (1995).

The dry matter accumulation $plant^{-1}$ (24.55 g) with BBF was found to be significantly higher over ridges and furrows (22.60 g), Sara method (20.59 g) and flat beds (19.12 g). The land configuration ridges and furrows were found to be significantly superior over Sara method and flat beds. The higher dry matter accumulation plant^{-1} (24.11 g) of variety TAG-24 was found to be significantly superior over SB-XI and LGN-1. The mean total dry matter accumulation plant^{-1} of variety SB-XI was found to be significantly superior over LGN-1. This may be due increased developed pods and number of branches. The interaction effect of land configurations and varieties on different growth parameters was found to be non-significant.

Data on mean number of developed pods plant^{-1}, mean number of undeveloped pods plant^{-1} and quality parameters as influenced by various treatments are presented in Table 2. The highest mean number of developed pods plant^{-1} (32.79) with BBF was found to be significantly superior over ridges and furrows, Sara and flat beds. The mean number of developed pods plant^{-1} on ridges and furrows were found to be significantly superior over Sara and flat beds. The mean number of developed pods plant^{-1} (34.01) of variety TAG-24 was found to be significantly higher over SB-XI and LGN-1. The effect of land configurations and varieties on mean number of undeveloped pods plant^{-1} was found to be non-significant. The highest mean number of undeveloped pods plant^{-1} (8.50) was observed on flat beds at all crop growth stages. The lowest undeveloped pods plant^{-1} (6.83) were observed on BBF. The highest mean number of undeveloped pods plant^{-1} (8.29) was observed in the variety TAG-24 than SB-XI and JL-24.

The effect of land configurations on shelling percentage was found to be non-significant. The higher shelling percentage (67.80%) was recorded on BBF as compared to other land configurations. The response of varieties on shelling percentage was found to be non-significant. The higher mean shelling percentage (68.52%) recorded in the variety TAG-24 followed by the varieties SB-XI and LGN-1. The effect of land configurations on oil content (%) was found to be non-significant. The land configuration BBF (50.25%) recorded significantly higher mean oil content over rest of the land configurations. The response of varieties on oil content was found to be significant. The variety LGN-1 (49.92%) recorded significantly higher mean oil content as compared to the varieties TAG-24 and SB-XI. Similar result was reported by Jadhav (1983) and Trade (1984).

The effect of land configurations on protein content (%) was found to be non-significant. The land configuration BBF (25.41%) recorded higher mean protein content compared to all other land configurations. The response of varieties on protein content was found to be significant.

The variety TAG-24 (25.75%) recorded significantly higher mean protein content as compared to the varieties LGN-1 and SB-XI. Similar result was reported by Rasve *et al.,* (1993). The interaction effect of land configurations and varieties on shelling percentage, oil content and protein content was found to be non-significant.

Growth parameters like, Plant height, mean number of branches plant^{-1}, Mean number of functional leaves plant^{-1}, Mean leaf area (dm^2) per plant^{-1}, Mean number of nodules plant^{-1}, Dry matter accumulation plant^{-1} (g), Number of gynophores plant^{-1} were recorded significantly higher values with the land configuration BBF followed by ridges and furrows. Quality parameters was found to be non-significant but recorded higher shelling percentage, oil content and protein content with the land configuration BBF. The lower values of growth parameters were recorded by flat beds only.

Table.1 Plant height, mean number of branches plant^{-1}, mean number of functional leaves plant^{-1}, mean leaf area (dm^2) per plant^{-1}, mean number of nodules plant^{-1}, dry matter accumulation plant^{-1} (g), number of gynophores plant^{-1} as influenced by land configurations and varieties of summer groundnut

Treatments	Plant height (cm)	Mean number of branches plant^{-1}	Mean number of functional leaves plant^{-1}	Mean leaf area (dm^2) per plant^{-1}	Mean number of nodules plant^{-1}	Dry matter accumulation plant^{-1} (g)	Number of gynophores plant^{-1}
Land Configuration (L)							
L_1- Ridges and Furrow	27.18	8.74	81.56	18.25	19.38	22.60	4.61
L_2- BBF	28.12	9.19	87.44	19.66	20.23	24.55	6.06
L_3- Sara Method	25.52	8.36	80.00	17.50	18.27	20.59	3.17
L_4- Flat Method	24.18	7.71	76.11	16.19	17.35	19.12	2.28
S.E.±	0.25	0.084	0.65	0.16	0.19	0.28	0.04
C.D.at 5%	0.85	0.29	2.25	0.56	0.64	0.96	0.14
Varieties (V)							
V_1- TAG-24	26.00	9.22	84.65	18.59	20.42	24.11	5.17
V_2- SB-XI	27.62	8.32	81.16	17.69	18.60	21.00	3.00
V_3- LGN-1	25.12	7.95	78.00	17.42	17.40	20.04	3.92
S.E.±	0.14	0.075	0.48	0.09	0.21	0.26	0.04
C.D.at 5%	0.43	0.22	1.48	0.28	0.64	0.78	0.12
Interaction (L×V)							
S.E.±	0.57	0.30	1.99	0.37	0.85	1.04	0.16
C.D.at 5%	NS	NS	NS	NS	NS	NS	NS

Table.2 Mean number of developed pods plant^{-1}, mean number of undeveloped pods plant^{-1}, shelling percentage (%), oil (%), protein (%) as influenced by land configurations and varieties of summer groundnut

Treatments	Mean number of developed pods plant^{-1}	Mean number of undeveloped pods plant^{-1}	Shelling percentage (%)	Oil (%)	Protein (%)
Land Configuration (L)					
L_1- Ridges and Furrow	31.04	7.94	67.59	49.32	25..35
L_2- BBF	32.79	6.83	67.80	50.25	25.41
L_3- Sara Method	29.49	8.38	63.00	48.68	25.03
L_4- Flat Method	27.83	8.50	62.20	48.63	24.78
S.E.±	0.29	0.14	0.60	0.21	0.38
C.D.at 5%	1.02	NS	NS	NS	NS
Varieties (V)					
V_1- TAG-24	34.01	7.40	68.52	49.49	25.75
V_2- SB-XI	28.98	8.29	64.12	48.23	25.06
V_3- LGN-1	27.88	8.05	62.74	49.92	24.64
S.E.±	0.25	0.07	0.87	0.12	0.22
C.D.at 5%	0.75	NS	NS	0.37	0.67
Interaction (L×V)					
S.E.±	1.00	0.29	0.34	0.50	0.22
C.D.at 5%	NS	NS	NS	NS	NS

The variety TAG-24 recorded maximum value of the above mentioned growth parameters except plant height as compared to the varieties SB-XI and LGN-1 among various varieties. Quality parameters were found to be non-significant like, shelling percentage and protein content recorded maximum value with TAG-24 and higher oil content observed with LGN-1.

References

Baskaran, R., Solaimalai, A. and Subbaramu, K. (2003). Effect of water harvesting techniques and IPM practices on productivity of a rainfed groundnut. *Crop research*. 26(3): 424-428.

Chavan, U. D., J. K. Chavan., M. B. Pinjari., and S. S. Kadam. (1990). Nutritional composition and oil quality of promising groundnut cultivars. J. Mah. Agril. Univ. 16: 48-50.

Desai, M.M. (1989). Effect of planting layout and gypsum level on the growth, yield and quality of groundnut variety Phule Pragati during *Kharif*. M.Sc. Agri. Thesis, MPKV, Rahuri.

Hadvani, R.G., Ahlawat, I.P.S. and Trivedy, J. (1993). Effect of method of sowing and levels of sulphur on growth and yield of groundnut. *Indian Journal of Agronomy*. 38 (2): 325-327.

Hammons, R. O. (1982). Origin and early history of the pea nut. In pea nut science and Technology, ed. H.E. Pattee and C.T. young, pp.-1-20.

Higgins, B.B. (1951). Origin and early history of the pea nut. The pea nut the Unpredictable lrgume. Washington: National Fertilizer Association.

Jadhav, A.P. (1983) Response of gram Phule-5 to irrigation applied at physiological growth stages, layouts and plant densities. M.Sc. Agri. Thesis. MPKV, Rahuri.

Patil, S.H., Kale, D.M., Deshmukh, S.N., Fulzele, G.R. and Weginwar, B.G. (1995). Semi dwarf, early maturing and high yielding new groundnut variety variety, TAG-24. *Journal of Oilseed Research*. 12 (2): 254-257.

Patil H.M, Kolekar P.T. and Shete B.T. (2007). Effect of layouts and spacing on yield and quality of bold seeded summer groundnut. *International Journal of Agric.Sci.Vol.*3 (2):210-213.

Patra, A. K., Samui, R. C., and Tripathy, S. K. (1996). Response of summer groundnut varieties to potassium and planting methods. *Journal of Oilseed Research*. 13 (1): 26-31.

Rao, P.V. and Rao, S.P. (1981) Chemical composition of fatty acid profile of high yielding varieties of oil seeds. *Indian J. of Agric. Science*. 51: 703-707.

Rasve, S. D., Bharambe, P. R. and Ghonsikar, G. P. (1983). Effect irrigation frequency and method of cultivation on yield and quality of summer groundnut. *J. Maharashtra Agric. Univ*. 8 (1): 57-59.

Tarde, N.R. (1984). Studies on growth, yield and quality performance of bunch type groundnut (*Arachis hypogea*) variety FSB-7-2) as influenced by planting layout between row spacing and plant population under summer condition. M.Sc. Agri. Thesis, MPKV, Rahuri.

Weiss, E.A. (1983). Oilseed crops, Tropical agriculture series, London: Longman.

How to cite this article:

Bharade, S.S., B.V. Asewar, B.R. Bobade and Mirza, I.A.B. 2019. Effect of Land Configurations and Varieties on Growth and Quality of Summer Groundnut. *Int.J.Curr.Microbiol.App.Sci.* 8(11): 1392-1398. doi: https://doi.org/10.20546/ijcmas.2019.811.162