

Effect of sowing dates and spacings on summer groundnut (*Arachis hypogaea* L.)

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ABSTRACT

A field experiment was conducted during summer, 2012 at Instructional Farm, Department of Agronomy, C.P. College of Agriculture, Sardarkrushinagar Dantiwada Agricultural University, Sardarkrushinagar, to study the "Effect of sowing dates and spacings on summer groundnut (*Arachis hypogaea* L.). The soil of the experimental field was loamy sand in texture, low in organic carbon and available nitrogen, medium in available phosphorus and potash with 7.85 soil pH. Twelve treatment combinations comprising of four levels of dates of sowing viz., 31st January, 10th February, 20th February and 1st March as a main plot treatment and three levels of spacings viz., 22.5 cm, 30.0 cm and 45.0 cm were relegated in sub plot treatment tested under split plot design with four replications. Higher plant height, number of filled pods per plants, total pods per plants and pods weight per plant as well as pod yield (2431 kg/ha) and haulm (3006 kg/ha) yield were recorded with crop sown on 20th February. With regard to spacing, crop sown with 22.5 cm spacing recorded maximum number of filled pods per plants, total pods per plants and pods weight per plant which resulted in produced significantly higher pods (2482 kg/ha) and haulm (3061 kg/ha) yield.

Key words : Sowing dates, spacing, yield, groundnut

Among oilseed crops, groundnut (*Arachis hypogaea* L.) is known as king of oilseed crops and important food legume of tropical as well as sub-tropical part of the world. In India, groundnut is principal oil seed crop, have a vital role in Indian agricultural industries and export trade with the economy of country. The proper time of sowing exerts a distinguished effect on growth and eventually on the yield of summer groundnut. Very early sowing in last week of January and delayed sowing in second week of March resulted in average yield reducing of 16.7 and 31.8 per cent, respectively, then the sowing on second week of February (Patil and Radder, 1978). Spacing related to plant density and is generally dependent upon crop variety, climate and soil fertility status. An optimum plant density is one of the important factor for increasing crop yield per hectare of groundnut. Higher plant population can be achieved by reducing the distance between two rows and also spacing provides better condition for plant growth which resulted in timely commencement

of reproductive phase and formation of more pods. Suitable plant geometry can be obtained by planting the crop at proper row spacing. Therefore, the use of proper row spacing to get appropriate plant stand is a pre-requisite for higher crop yield per unit area. In order to economize and popularize summer groundnut cultivation for such a large community, research on low cost production technology carries great importance.

MATERIALS AND METHODS

A field experiment was conducted during summer, 2012 at Department of Agronomy Instructional Farm, C.P. College of Agriculture, Sardarkrushinagar Dantiwada Agricultural University, Sardarkrushinagar, to study the "Effect of sowing dates and spacings on summer groundnut (*Arachis hypogaea* L.). The soil of the experimental field was loamy sand in texture, low in organic carbon and available nitrogen, medium in available phosphorus and available potash with soil pH of 7.85. Twelve treatment combinations comprising of four levels of dates of sowing viz., 31st January, 10th February, 20th February and 1st March as a main plot

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treatment and three levels of spacings viz., 22.5 cm, 30.0 cm and 45.0 cm were relegated in sub plot treatment tested under split plot design with four replications. Groundnut cultivar GG 2 were treated with biofertilizer rhizobium @ 300 g culture per 10 kg seed and sown manually.

RESULTS AND DISCUSSION

Significantly higher plant height was recorded at harvest (39.83 cm) under 20th February (D₃). The effect of dates of sowing was significant on number of filled pods per plants (16.74), total pods per plants (20.15) and pods weight per plant (9.48 g) of groundnut when crop was sown on 20th February (D₃) but number of unfilled pods per plants (3.41) was decreases at 20th February (D₃) dates of sowing (Table 1). This results are in occurrence with those reported by Rinjumoni (2000). Day to maturity (118) was significantly more due to crop sown at 31st January (D₁). Crop sown on 20th February (D₃) producing significantly higher pods (2431 kg/ha) and haulm (3006 kg/ha) yield followed by 10th February (D₂) sowing. Sowing on 20th February (D₃) produced 3.43, 7.20 and 16.02 per cent higher pod yield over D₂ (10th February), D₁ (31st January) and D₄ (1st March), respectively. Like pod yield, haulm yield was also higher with D₃ (20th February) and produced

1.88, 9.98 and 14.36 per cent higher over D₂, D₁ and D₄, respectively (Table 1). This may be due to favorable climatic condition. This is evidently due to cumulative effect of improvement in growth and yield attributes such as plant height, number of filled pods per plant and total number of pods, pods weight per plant and test weight. Similar finding were also reported by Sardana (2009), Ravisankar *et al.* (2010), Mane *et al.* (2010) and Parmar *et al.* (2011). Different dates of sowing did not showed significant effect on number of nodules per plant, weight of nodules per plant, shelling per cent, oil and protein content (Table 2). These finding are in agreement with those obtained by Patel *et al.* (1998).

The number of filled pods per plants (16.37), total pods per plants (20.01) and pods weight per plant (9.41 g) was significantly higher when crop was sown with 22.5 cm (S₁) spacing (Table 1). The increase in row spacing significantly decreases the pods yield of summer groundnut. Among the treatments, S₁ (22.5 cm) recorded higher pods yield (2482 kg/ha), which accounted 10.53 and 16.52 per cent higher over treatments S₂ (30 cm) and S₃ (45 cm), respectively (Table 1). The increase in pods yield might be due to increased sink capacity and better

Table 1 Growth, yield attributes and yield of summer groundnut as influenced by sowing dates and spacings.

Treatments	Plant height (cm)	Number of branches per plant	No. of filled pods per plant	No. of unfilled pods per plant	Total pods per plant	Pods weight per plant (g)	Days to maturity	Pods yield (kg/ha)	Haulm yield (kg/ha)
Dates of sowing									
31 st January	35.12	3.73	15.49	3.53	19.02	8.75	118	2268	2733
10 th February	38.63	3.76	16.36	3.42	19.78	8.89	115	2351	2950
20 th February	39.83	3.90	16.74	3.41	20.15	9.48	112	2431	3006
1 st March	35.98	3.64	14.32	3.95	18.27	8.30	110	2095	2628
S. Em. ±	1.08	0.11	0.40	0.07	0.41	0.22	1.4	65	83
C.D. at 5%	3.47	NS	1.29	0.22	1.30	0.69	4.4	209	267
C.V. %	10.05	9.70	8.86	6.73	7.29	8.43	4.2	9.88	10.0
Spacings									
22.5 cm	38.14	3.86	16.37	3.64	20.01	9.41	115	2482	3061
30.0 cm	37.58	3.79	15.84	3.56	19.40	8.83	113	2246	2789
45.0 cm	36.45	3.63	14.98	3.54	18.52	8.33	113	2130	2638
S. Em. ±	0.76	0.08	0.24	0.05	0.25	0.13	0.8	51.7	51.8
C.D. at 5%	NS	NS	0.69	NS	0.73	0.39	NS	139	151
Intreccion(DxS)	NS	NS	NS	NS	NS	NS	NS	NS	NS
C.V. %	8.16	8.16	5.99	5.33	5.17	6.05	2.9	8.34	7.32

Table 2 Biological study, Quality and Economics of summer groundnut as influenced by sowing dates and spacings.

Treatments	No. of nodules per plant	Weight of nodules per plant (g)	Shelling (%)	Oil content (%)	Protein content (%)	Net realization (₹/ha)	BCR
Dates of sowing							
31 st January	85.67	0.16	65.08	43.57	24.43	75544	3.37
10 th February	87.83	0.17	65.25	43.59	24.47	79703	3.49
20 th February	86.67	0.17	66.33	44.49	23.93	83440	3.61
1 st March	86.42	0.16	65.00	43.91	23.83	67577	3.11
S. Em. ±	2.04	0.005	1.12	0.33	0.30	-	-
C.D. at 5%	NS	NS	NS	NS	NS	-	-
C.V. %	8.15	11.30	5.96	2.61	4.34	-	-
Spacings							
22.5 cm	83.75	0.16	65.55	43.86	23.75	-	-
30.0 cm	86.69	0.17	65.44	44.17	24.23	75252	3.40
45.0 cm	89.50	0.17	65.26	43.64	24.52	71131	3.37
S. Em. ±	1.72	0.003	0.74	0.19	0.21	-	-
C.D. at 5%	NS	NS	NS	NS	NS	-	-
Intreccion (D×S)	NS	NS	NS	NS	NS	-	-
C.V. %	7.95	8.02	4.53	1.76	3.54	-	-



availability of growth factors viz., space, light, moisture and nutrient per plant under narrow row spacing as compare to the wider row to row spacing. Significantly the lowest pods yield (2130 kg/ha) was recorded with treatment S_3 (45 cm). Higher pod yield was associated with filled pods per plant, total pods per plant and pods weight per plant. This might be due to more number of plant per unit area. Das *et al.* (1996) was obtained higher pod yield with row spacing of 20 cm than 30 cm spacing. These finding are in line with the results reported by Gunri *et al.* (2010) and Meena *et al.* (2011). Like pod yield, haulm yield also higher with S_1 (3061 kg/ha). The magnitude of increase in haulm yield under S_1 was to the tune of 9.75 and 16.01 per cent over S_2 and S_3 , respectively. Similarly higher haulm yield was associated with higher plant height and more number of branches per plant. These results are in confirmed with those reported by Das *et al.* (1996). Different spacings did not showed significant effect on number of nodules per plant, weight of nodules per plant, shelling per cent, oil and protein content (Table 2). These finding are in agreement with those obtained by Kavimani *et al.* (2002).

The economics of different factor indicated that groundnut crop when sown at 20th February (D_3)

recorded maximum net realization (Rs. 83440/ha) and BCR of 3.61 followed by 10th February (D_2). Among the different row spacing sowing at 22.5 cm (S_1) recorded maximum net realization (₹ 83315/ha) with BCR of 3.41 followed by 30 cm (S_2) with (Rs. 75252/ha) and BCR of 3.40 (Table 2).

Thus, from the present study, for securing higher pod and haulm yield, net realization and cost benefit ratio from summer groundnut GG 2 raised on loamy sand soils of North Gujarat conditions, it is advisable to sow the crop on 20th February by maintaining 22.5 cm row spacing.

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