https://doi.org/10.29321/MAJ.10.A03429

Madras agric. J. 61 (8): 477–482, August, 1974

Spacing of Irrigated Bunch Groundnut in the Lower Bhavani Project Region of Tamil Nadu

BY

S. VARISAI MUHAMMAD[1] and M. STEPHEN DORAIRAJ[2]

ABSTRACT

Study of spacing for irrigated bunch groundnut conducted during August to December seasons of 1965 to 1967 at Bhavanisagar showed that varying the plant-space under a constant row space decreased the height of main stem and length of primary branches and increased the number of secondary branches, flower production and number of mature and immature pods per plant. The closer spacing of 15 x 15 cm recorded 34.1 per cent increased yield over 22.5 x 15 cm (standard) while all the other spacing treatments produced lower yield. A spacing of 15 x 15 cm with a seed rate of 150 kg/ha yielded 1,569 kg of pod and resulted in a net income of Rs. 1231/ ha which was Rs. 548/- more than that recorded under 22.5 x 15 cm.

INTRODUCTION

Establishment of an optimum plant population per unit area of the soil is the chief contributory factor to the yield of groundnut crop. However, beyond a certain limit, yield cannot be increased with increase in plant population on account of competition for growth, nutrients and moisture

Based on experiments conducted at the Agricultural Research Station, Tindivanam, a spacing of 22.5 cm between rows and 15 cm within rows is recommended and extensively adopted for irrigated bunch groundnut in Tamil Nadu (Bhavanishankar Rao and Srinivasalu, 1957). A similar trial conducted at the Agricultural Research Station, Bhavanisagar during the second season (January to April) has also proved the suitability of a spacing of 22.5 × 15 cm for irrigated bunch groundnut (Kumaraswamy *etal.*, 1963). In order to ascertain whether the above spacing can be adopted for the irrigated groundnut crop from August to December and to determine the optimum spacing for groundnut, an experiment was conducted at the Agricultural Research Station, Bhavanisagar.

MATERIALS AND METHODS

Bunch groundnut strain TMV 2 was raised in randomised blocks during August to December seasons of 1965

1. Director of Research, 2. Associate Professor of Agricultural Botany, Tamil Nadu Agricultural University, Coimbatore 641003.

1966 and 1967. The field received 12.6 tonnes of cattle manure, 16.7 kg N, 33.4 kg P_2O_5 and 50.1 kg K_2O/ha. The spacing treatments adopted were the following:

Between rows	Between plants
15.0 cm	15.0 cm
22.5 cm	15.0 cm
	22.5 cm
30.0 cm	15.0 cm
	22.5 cm
	30.0 cm
37.5 cm	15.0 cm
	22.5 cm
	30.0 cm
	37.5 cm
45.0 cm	15.0 cm
	22.5 cm
	30.0 cm
	37.5 cm

Detailed observations on the vegetative and productive attributes were recorded on 30 plants in each of the treatments. The yield of pods/ha in each year and their mean values are presented in Table 1. The economics of the different spacing treatments are given in Table 2.

RESULTS AND DISCUSSION

The height of main stem and length of primary branches were the highest, while the number of secondary branches was the least in 15 × 15 cm spacing. Increase in the plant space under a constant row-space produced a regular trend of decrease in the former two characters and increase in the latter. There was increase in the height of main stem and length of primary branches as the row-spacing became closer. Increase in the number of secondary branches due to progressive increase of plant space was gradual under closer row-space and steeper under wider row-space.

Flower production was the least under 15 × 15 cm while it was maximum under 15 × 37.5 cm. Increase in plant-space under the same row-space produced increased number of flowers per plant. The trend of increase was gradual under closer row-space and progressively steep with wider row-space

Number of mature pods per plant was less under closer spacing, while in wider spacings, the number was more. Number of mature pods increased with wider plant-space and the trend of increase was more or less similar under different row-spaces. The number of immature pods was the least under 22.5 × 22.5 cm spacing, while it was maximum under 45 × 37.5 cm.

Effect of spacing on the yield of pods in groundnut

Yield differences between spacings were significant in two out of three seasons (Table 1). During all the three seasons, 15 × 15 cm recorded 85.2 per cent increased yield over the control. Combined analysis showed

TABLE Yield of pods in the spacing treatments during first season [August - December (kg/ha)]

Spacing (cm)	1965-66 season	1966-67 season	1967-68 season	Mean for three seasons
15.0 × 15.0	1672.94	1789.32	1243.20	1568.49
22.5 × 15.0	903.10	1629.95	1072.70	1168.58
30.0 × 15.0	1062.74	1032.41	964.33	1019.83
25.5 × 22.5	925.79	955.94	1047.45	976.39
37.5 × 15.0	797.74	942.80	1021.45	920.66
45.0 × 15.0	623.13	730.33	1008.00	787.15
30.0 × 22.5	664.64	736.97	667.98	689.86
37.5 × 22.5	524.32	574.30	1186.08	761.57
30.0 × 30.0	527.52	647.38	940.80	705.23
45.0 × 22.5	516.68	594.30	798.83	686.78
37.5 × 30.0	482.82	424.91	1135.68	681.14
45.0 × 30.0	322.65	328.66	863.53	504.35
37.5 × 37.5	358.79	385.07	698.89	480.92
45.0 × 37.5	389.88	365.17	742.55	499.20
'F' test - Significant or not (P = 0.01)	Significant	Significant	Not significant	Significant
S. E.	105.95	96.27	...	118.85
C. D.	294.31	275.53	...	354.52

that 15 × 15 cm was superior to 22.5 × 15 cm recording 34.1 percent increased yield over the latter. There was an appreciable downward trend in the yield of pods as spacing increased, 37.5 × 37.5 and 45 × 37.5 cm recording 58.8 and 57.3 per cent less yield than the standard spacing.

TABLE 2. Economics of different spacings in irrigated bunch groundnut (Average of three seasons)

Area/ plant (sq. cm.)	No of plant/ ha.	Seed rate (kg/ha)	Cost of cultivation Excluding seed cost	Seed cost*	Total	Yield of pods (kg/ha)	Yield of haulms (100kg/ha)	Value of pod and haulms **	Net income per ha.
225.00	4,30,373	150.0	725	282	907	1569	149	2138	1231
337.50	2,86,916	100.0	705	188	893	1169	100	1576	683
450.00	2,15,187	76.0	699	141	840	1020	86	1373	533
506.25	1,91,277	66.7	679	185	804	976	73	1301	497
562.75	1,72,149	60.0	691	113	804	921	70	1219	415
675.00	1,43,458	50.0	683	94	777	787	65	1058	128
675.00	1,43,458	50.0	633	89	777	690	70	947	170
843.25	1,14,766	40.0	683	94	748	762	56	1014	266
900.00	1,07,564	37.5	676	71	745	705	65	958	212
1012.50	95,633	33.3	673	63	736	637	53	857	121
1125.00	86,075	30.0	669	56	725	681	40	891	166
1350.00	71,729	25.0	663	47	710	505	46	685	25
1406.25	61,861	24.0	665	45	710	481	43	652	58
1687.50	57,383	20.0	665	38	703	499	40	569	134

* Cost of seed calculated at Rs. 1.88 per kg (rounded to the nearest rupee)

** Value of pods calculated at Rs. 1.22 per kg and value of haulms at Rs. 1.50 kg (rounded to the nearest rupee)

Economics of different spacings

The seed rate for 15 × 15 cm spacing was one and a half times that for 22.5 × 15 cm, half of it for 45 × 15 cm and 30 × 22.5 cm and one-fourth for 45 × 30 cm (Table 2). The cost of seed was more in closer spacings reaching the maximum of Rs. 282 / ha under 15 × 15 cm. Deducting the cost of cultivation from the gross value of pods and haulms, a

net income of Rs 682 / ha was estimated under the 22.5 × 15 cm spacing. A net income of Rs. 1231/ ha was estimated from a closer spacing of 15 × 15 cm, accounting for an increase of Rs. 548/-. There was a gradual decline in the net income as spacing increased and became negative under 45 × 30 cm, 37.5 × 37.5 and 45 × 37.5 cm spacings.

The effect of intensity of plant population per unit area through varied spacings on the vegetative and productive plant characters including yield of groundnut has been markedly different. Closer spacing increased the height of main stem and length of primary branches with longer internodes, while the number of secondary branches was reduced. Wider spacing produced more number of flowers, mature and immature pods per plant. However, the yield of pods and haulms was progressively reduced with increase in spacing.

In countries where mechanised cultivation is in vogue, groundnut is sown adopting wider spacing between rows and reduced spacing within rows. Spacing experiments conducted with the Spanish variety in the U. S. A. revealed that maximum yields could be obtained in rows 18 to 24 inches apart (45.7 to 61.0 cm) with plants 4 to 6 inches (13.2 to 15.3 cm) in the row (Sturkie and Williamson, 1951). In India where groundnut is extensively cultivated under rainfed conditions, spacings varying from 6" × 6" (15.3 × 15.3 cm) (Tamil Nadu) to 24" × 6" (61.0 × 15.3) (West Bengal) are recommended for bunch groundnut (Anon. 1965). Experiments to determine the optimum spacing for irrigated bunch groundnut in Tamil Nadu were but few and a spacing of 9" × 6" (22.9 × 15.3 cm) was found to be economical both at Tindivanam (Bhavanisankar Rao and Srinivasalu, 1957) and for the first season of irrigated cropping at Bhavanisagar (Kumaraswamy *et al.*, 1963).

In general, the superiority of closer spacing over wider spacing has been shown in a number of experiments conducted in India and abroad (Tippamarvar, 1950; York, 1952; Negi and Dalal, 1957; Singh and Lala Amarnath, 1958). The present experiment is in conformity with the findings of earlier workers and a spacing of 15 × 15 cm has been determined to be the optimum for obtaining the maximum yield and highest net income in irrigated bunch groundnut raised during the August to December season in the Lower Bhavani Project region.

The agroclimatic conditions prevailing in the Lower Bhavani Project tract are peculiar and distinct and during the first season, an average monthly rainfall of 90.6 mm is received. During normal years, groundnut is raised as a rainfed crop during this season supplemented by irrigation. A spacing of 15 × 15 cm for the groundnut crop raised during this season gives a net income of Rs 1231 and hence it is recommended for the adoption by the cultivators.

ACKNOWLEDGEMENT

Thanks are due to the Superintendent, Agricultural Research Station,

Bhavanisagar for providing the required facilities for conducting the experiment. The financial assistance of the Indian Council of Agricultural Research, New Delhi and the Government of Tamil Nadu are gratefully acknowledged.

REFERENCES

ANONYMOUS. 1965. *Oilseeds in India Fifteen Years of Progress* Indian. Central Oilseeds Committee, Hyderabad.

BHAVANISANKAR RAO, M. and N. SRINIVASALU 1957. Economic spacing for irrigated bunch groundnut. *Madras agric. J.* **44**: 43—7.

KUMARASWAMY, R., SUBRAMANIAM, B. KARUNAKARA SHETTY and LILY DHANARAJ. 1963. Studies on groundnut in the Lower Bhavani Project area. *Ibid.* **50** : 115—9.

NEGI, L. S. and J. L. DALAL. 1957. Farmers can grow more groundnut per acre. *Field Crop absir.* **10** : 170

PATEL, J. S. 1935. Increasing the yield of groundnut. *Madras agric. J.* **23** : 325 - 56.

SINGH, M. P. and LALA AMARNATH, 1958. Cultural and manurial studies in groundnut and castor. *Indian Oilseeds J.* **2** : 82—8.

STURKIE, D. G. and J. T. WILLIAMSON. 1951. Cultural practices.Chapter VI in the *Peanut, the Unpredictable Legume.* pp. 178—187. The National Fertilizer Association, Washington, D. C.

TIPPAMARVAR, M. S. 1960. Agronomic improvements in the cultivation of groundnut crop in Karnataka. *Poona Agric. Coll. Mag.* **41** : 206 - 10.

YORK, E. J. 1952. Research points the way to higher levels of peanut production. *Better crops with plant food.* **36** : 6 - 12