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Studies on Effect of Dates of Sowing and Spacing on Two Varieties of Sunflower

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ABSTRACT

A field experiment on two varieties of sunflower was conducted for two crop seasons during the year 1972-73 and 1973-74 on sandy loam soil of middle Gujarat. The varieties used under the experiment were EC-68413 and EC-68414. The crop was sown on November 1, November 15, November 30 and December 15, during the year 1972-73 and 1973-74 with two spacing viz. 40 cm × 10 cm and 60 cm × 20 cm. It was found that the varietal performance was at par during both years, while the spacing of 60 cm × 20 cm was found superior during the year 1973-74. Sowing on November 30 was found to be appropriate for obtaining increased production of seed and soil. *(Received on April 14, 1975)*

INTRODUCTION

Among the newly introduced crops, sunflower has drawn the attention of planners, research workers and consumers on account of its high quality of oil. As such the crop has very wide spectrum of adoptability. However, the exact agronomical practices for optimum crop production need to be specified. Among the various factors affecting the crop yield, spacing and date of sowing for a suitable variety play an important role in deciding the yield potential of any crop. When individual plant productivity potential is to be increased, the crop must be planted in such a way that it may lead to increased production through each of the yield attributing plant character. Massy (1971) reported decrease in seed yield but increase in the [illegible] and head diameter with [illegible]ing in observed that 72,000 plants per hectare responded well to fertility as compared to 55,000 plants per hectare. Varieties of a crop may also respond differently to sowing dates. Delay in sowing many a time hampers crop yield. Information on the performance of the promising varieties of sunflower sown on different dates and with varying spacing is scant. Mehta, Patel and Maheswary (1972) indicated that the varieties 'EC-68413' and 'EC-68414' of sunflower are suitable for the sandy loam soil of middle Gujarat. Therefore, it was deemed essential to ascertain suitable spacing and date of sowing of the varieties of sunflower under irrigated condition of middle Gujarat, during the rabi season of 1972-73 and 1973-74 at the Agronomy Farm of the Gujarat Agricultural University, Anand Campus, Anand.

MATERIALS AND METHODS

This experiment was conducted on

sandy loam soil popularly known as 'Goradu soil'. The soil had a pH value of 7·2. It contained 0·47% organic matter, 0·030% total nitrogen, 50 kg/ha 3M $NaHCO_3$ soluble phosphorus and 350 kg/ha exchangeable potash. Split plot design was employed with main plots allotted to two varieties (EC-68413 and EC-68414) and combinations of four sowing dates and two spacings were assigned to the subplots. The crop was sown on November 1, November 15, November 30 and December 15 in both the years of the experiment. The two spacings adopted in both the years of the study were 40 cm × 10 cm and 60 cm × 20 cm. The crop was harvested on February 20, March 6, March 27 and April 14, respectively, in the first year and on February 11, March 1, March 15, and March 27 in the second year of study.

A pre-sowing irrigation was [illegible] to provide an ideal soil moisture condition for uniform germination. Fertilizers were applied at the common rate of 60 kg N, 120 kg P_2O_5 and 60 kg K_2O/ha to all the experimental plots. The entire quantities of phosphorus and potash and half the quantity of nitrogen (30 kg N/ha) in the form of single super phosphate, muriate of potash and urea, respectively were applied in plough furrows before sowing. The remaining quantity of nitrogen i.e. 50 per cent was top dressed at the time of flowering.

For the oil analysis soxhlet ether extraction process as described in AOAC was employed for estimation of oil content in the samples which were drawn at random from the produce of each plot and a composite sample was prepared. The meteorological data recorded for both the crop seasons are given in Table 1

TABLE 1

Fortnightly record of mean maximum and minimum temperatures [°C] during the crop seasons of 1972-73 and 1973-74.

Period	1972-73		1973-74	
	Maximum	Minimum	Maximum	Minimum
1972-73				
November 1—15	68·3	54·2	68·2	49·3
November 16—30	66·6	50·1	66·4	45·8
December 1—15	63·5	48·6	63·3	47·5
December 16—31	63·5	48·1	61·7	48·0
1973-74				
January 1—15	62·5	48·5	63·3	48·2
January 16—31	61·1	44·1	62·5	44·5
February 1—15	66·7	47·5	63·3	42·5
February 16—28	69·3	51·1	66·8	47·1
March 1—15	68·8	50·1	70·5	49·7
March 16—31	73·5	54·7	72·2	53·3
	75·8	57·0	74·1	54·1
		56·9	74·7	57·6

TABLE 2

Effect of date of sowing and spacing on the yield and yield attributes of two varieties of sunflower.

Treatments	Seed yield (kg/ha)			Maximum diameter of stem (cm)		Test weight of 500 seed (g)		Plant height (cm)		Diameter of flower disc (cm)		Number of seeds per flower		
	1972-73	1973-74	Mean	1972-73	1973-74	1972-73	1973-74	1972-73	1973-74	1972-73	1973-74	1972-73	1973-74	197
Varieties:														
'EC—68413'	1233	949	1091	1·8	1·8	25·56	18·73	209	223	13·4	10·8	630	518	5
'EC—68414'	1152	977	1065	1·8	1·9	24·81	18·90	205	216	12·3	11·1	606	524	5
'F' test	N.S.	N.S.	—	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	
S.Em. ±	52·06	34·44	—	0·03	0·04	0·69	0·49	1·13	5·59	0·18	0·24	12·13	14·93	
C.D. (0·05)	—	—	—	—	—	—	—	—	—	—	—	—	—	
Spacing:														
40 × 10 cm	1171	906	1039	1·7	1·6	22·73	17·20	206·4	217·3	11·3	10·0	571	456	
60 × 20 cm	1273	1019	1146	1·9	2·1	27·63	20·40	205·3	221·90	13·4	11·9	634	587	
'F' test	N.S.	Sig.	—	Sig.	N.S.	Sig.	Sig.	N.S.	N.S.	Sig.	Sig.	Sig.	Sig.	
S.Em. ±	41·37	26·11	—	0·02	0·04	0·16	0·31	1·99	2·34	0·13	0·16	13·70	13·60	
C.D. (0·05)	—	74·23	—	0·01	—	1·31	0·85	—	—	0·12	0·46	38·97	38·69	
Sowing date:														
1st November	1248	1022	1135	1·8	1·7	25·06	22·25	217·5	236·5	14·6	12·4	533	534	
15th November	1128	1006	1067	1·8	1·8	25·30	20·49	204·9	230·7	12·3	11·3	622	568	
30th November	1347	1098	1223	1·8	1·8	25·55	18·02	202·0	222·0	12·4	10·7	702	521	
15th December	1045	725	885	1·7	1·8	21·82	14·40	204·9	207·4	9·9	9·6	552	462	
'F' test	Sig.	Sig.	—	Sig.	Sig.	Sig.	Sig.	N.S.	Sig.	Sig.	Sig.	Sig.	Sig.	
S.Em. ±	58·5	36·9	—	0·02	0·06	0·65	0·5	63·93	3·30	0·21	0·23	19·40	19·20	
C.D. (0·05)	166·38	104·94	—	0·06	0·16	1·86	1·42	—	9·38	0·59	0·65	55·16	54·60	

RESULTS AND DISCUSSION

Varieties:

The data given in the Table 2 indicated that the differences due to varieties for any of the characters studied were not significant in both the years under study.

Spacing:

The data on the effect of spacing revealed that the differences in yield of seed due to spacing were significant in the second year only. Though the differences were not statistically significant in the first year, the trend was in favour of wider spacing. The differences in test weight, diameter of flower disc, number of seeds per flower were significant but the height of the plant and dry matter weight were not affected by spacing in both the years of study. The stem diameter was significantly thicker and in favour of wider spacing during the first year but was not significant during the second year.

The increase in the yield of seed was probably due to significant increase in the test weight, number of seeds per flower and weight of seeds per flower in favour of wider spacing. There was marked increase in oil production in favour of wider spacing.

Date of sowing:

The differences due to date of sowing were significant in both the years. Among the four sowing dates, November 30 was ideal giving increased yield in favour of planting done on November 30, both the years, while sowing on December 15 produced the lowest yield. All the characters except plant height under study differed significantly in both the years. The plant height differed significantly only during the second year. The significant increase in seed yield in favour of planting done on November 30, was probably due to significant increase in the test weight, diameter of flower disc, number of seeds per flower and weight, diameter of flower disc, number of seeds per flower and weight of seeds per flower. The significant increase in straw yield was probably due to increased diameter of the stem and the plant height. The production of oil was maximum for November 30, sowing treatment, while it was the lowest when crop was sown on December 15.

From the data on maximum and minimum temperature, it seems that maximum temperature was more or less equal during both the seasons. However, the minimum temperature was reduced in second crop season as compared to first year during crop growth. It was also noted that the spell of the minimum temperature was much longer during the second season as compared to the previous season and hence the differences between maximum and minimum temperature were larger for the second crop season. This might have played the role in reducing the yield of the drop during the second year as compared to the first year crop.

It was also observed that for the first date of sowing (viz., November 1), the temperature was high as compared to

later dates. The spell of temperature then gradually increased which not only affected the growth but may also reduced the yield.

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REFERENCES

Massy, J. H. 1971. Effect of nitrogen rates ... spacings on sunflower seed yield ... characteristics. *Agron. J.* **63** (1): 137.

Mehta, H. M., D. P. Patel and T. G. M... 1972. Performance of certain varieties ... flower (*Helianthus annuus* L.) in middle ... *B.A. Coll. Agril. E. Mag.* **25**: 13-16.

*Saurez, J. J., A. D. Herrera 1969. Effect ... population and fertilizer rate on yield ... flower. *Revista cubana de ciencia Agricol.* ... 2(3):270.

* Original not consulted.