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EFFECT OF NITROGEN AND TIME OF PLANTING ON THE YIELD AND QUALITY OF SAFFLOWER

Karamullah H. Agha, Mohammad Iqbal and Ghulam Yasin Solangi*

Studies were conducted at the Sind Agriculture College, Tandojam, during 1969 and 1970, to see the effect of Nitrogen doses: 0.20.40 and 60 lbs. per acre, and the planting dates, November 25, and December 10, on the growth and yield of Safflower. It was found that the November-sown crop with N dose of 60 lbs. per acre, gave the highest grain yield per acre. The yield increased due to an increase in the number of capsules number of branches per plant, number of seeds per capsule and seed weight.

INTRODUCTION

Safflower is grown in Pakistan mainly for its oil. As it is a hardy crop, it can be cultivated on all types of soils. It is cultivated both as a rainfed and irrigated crop. Being a drought resistant crop, it can be grown even on poor sandy soils. There is a great industrial value of its oil as it has a water proofing and cementing importance. The Safflower oil is also used for sealing glasses, where its performance is better than the plaster of paris. The oil of Safflower is also used for edible purposes, cooking and for the manufacture of vegetable ghee. Pakistan is importing huge quantity of edible oils to meet their demand in the country. The major rabi oilseed crops are Turia and Mustard, but on account of disease hazards faced by the Brassica crops, their cultivation has gone down. Safflower, a hardy, short-lived crop could serve as a good substitute for them. Of the many factors which affect the yield of Safflower, proper fertilization and time of planting are most important. Therefore, the present study was undertaken to investigate the effect of time of planting and various doses of fertilizers on the yield and quality of Safflower.

REVIEW OF LITERATURE

Agrikar (1958) reported that the plant characters such as the number of branches, plant height, total plant spread, date of maturity and yield were correlated with each other. Dhote and Ballal (1964) found that nitrogen increased the seed yield and consequently the oil yield of Safflower Cv. N 630. They further observed that P_2O_5 had a similar effect on the increase of yield,

*Sind Agriculture College, Tandojam.

while K had no effect on yield also reported while Norris *et. al.* (1967) that concluded safflower plants gave more yield when fertilized and the results pertaining to yield components followed the same trend as for per plot yield.

MATERIALS AND METHODS

In order to study the effect of nitrogen and time of planting on the yield and quality of safflower, an experiment was conducted using split plot design of layout at the students farm, Department of Agronomy, Sind Agriculture College Tando Jam during the years 1969 and 1970. Size of the plot was 20′ × 12′. Two dates of sowing viz November 25 and December 10 were tried while the plot size was kept at 20′x12′. A dwarf safflower variety GILA served as experimental material. The details of treatments are as under :

1. Doses of Nitrogen (4) :

a) Control
b) 20 lbs. N per acre.
c) 40 lbs. N per acre.
d) 60 lbs. N per acre.

Nitrogen was applied in two equal doses, half at the time of first irrigation and remaining just before flowering. The following observations were recorded :-

Height of the plant.
Number of branches per plant.
Number of capsules per plant.
Number of seeds per capsule.
Weight of 100 seeds.
Yield per plot.

RESULTS AND DISCUSSION

Data regarding various morphological character, are reported in tables 1—3.

Table 1. *Plant height, number of branches, number of capsules per plant, number of seeds per capsule, weight of* 100 *seeds and grain yield as affected by various doses of nitrogen (Two years average).*

Observation	N dose per acre				Significance	
	Control	20 lbs.N per acre	40 lbs.N per acre	60 lbs.N per acre	L.S.D. at 5%	L.S.D. at 1%
Plant ht. in inches	51.7	55.4	59.9	66.7	2.16	3.11
No. of branches per plant	3.7	4.7	5.8	8.0	0.68	0.97
No. of capsules per plant	8.4	10.6	14.2	19.1	1.79	2.57
No. of seeds per capsule	28.0	32.6	37.5	38.6	3.14	4.50
Wt. of 100 seeds	3.20	4.16	4.49	5.57	0.29	0.42
Yield per plot in ounces	48.0	47.5	55.0	57.3	5.52	7.92

Table 2. *Plant height, number of branches and capsules per plants, weight of 100 seeds and grain yield as affected by various planting dates (Two years average).*

Observations	Planting dates		Significance	
	Nov. 25	Dec. 10	L.S.D. at 5%	L.S.D. at 1 %
Plant height in inches	66.7	50.2	1.76	2.46
No. of branches per plant	6.2	4.9	0.47	0.66
No. of capsules per plant	14.8	11.8	1.25	1.75
No. of seeds per capsule	36.6	31.8	1.65	2.31
Wt. of 100 seeds in gm.	4.54	4.17	0.14	0.19
Yield per plot in ounces	59.8	44.1	3.85	5.40

Table 3. *Plant height, number of branches and number of capsules per plant, number of seeds per capsule, weight of 100 seeds and grain yield as affected by the combined effect of planting dates and fertilizer doses (Two year average).*

Treatments (Planting dates Nitrogen doses)	*Observations*					
	Plant height in inches	No. of branches per plant	No. of capsules per plant	No. of seeds per capsule	Wt. of 100 seeds (in gms)	Yield of grain per plot in oz.
Nov. 25 sowing						
0 lbs. N per acre	59.5	3.9	9.5	29.8	3.23	53.5
20 lbs. N per acre	63.2	5.3	12.1	35.8	4.33	55.0
40 lbs. N per acre	67.4	6.4	16.1	40.3	4.71	63.5
60 lbs. N per acre	76.6	9.1	21.1	40.5	5.88	57.0
Dec. 10 sowing						
0 lbs. N per acre	44.0	3.5	7.3	26.3	3.16	42.5
20 lbs. N per acre	47.6	4.2	9.2	29.5	3.99	40.0
40 lbs. N per acre	52.5	5.1	12.4	34.8	4.26	46.5
60 lbs. N per acre	56.8	6.9	16.8	36.8	5.26	47.0
L.S.D. at 5%	4.32	N.S.	N.S.	N.S.	N.S.	N.S.
L.S.D. at 1%	6.04	N.S.	N.S.	N.S.	N.S.	N.S.

From the data reported in table 1, it would be seen that the plant height, number of branches and capsules per plant, and the seed weight increased with the use of nitrogenous fertilizer and as the dose increased, there was as increase in the above plant characters. The differences were highly

significant. The yield results follow the same trend except that 20 lbs. nitrogen dose did not enhance grain yield but when the dose was increased, the grain yield also increased significantly. Although the highest grain yield was recorded with the highest dose of nitrogen (i.e. with 60 lbs. N/acre) but it did not differ significantly from the yield obtained with 40 lbs. nitrogen. The results are in line with those reported by Norris *et al.* (1967). Enhanced grain yields from the higher doses of nitrogen seem to be due to greater number of branches and capsules per plant and higher seed weight.

The results reported in table 2 reveal that November sown crop produced tall plants with more branches and capsules per plant than the December sown crop. The number of seeds per capsule and the seed weight were also higher in November than in December sown crop. All these factors seem to contribute for more yield from November sown crop than the one planted in December. The effects of planting dates were thus highly significant. Higher yields from the early sown crop may be due to longer period of growth availed by the crop. Norris *et al.* (1967) also reported similar findings.

It is obvious from the results reported in table 3 that the November sown crop given 60 lbs. Nitrogen dose per acre, produced taller plants with higher number of capsules, more seeds per capsule and increased 100 seed weight, and ultimately the highest seed yield.

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