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Response of Sowing Dates and Nitrogen Levels on Growth Yield and Quality of Linseed (*Linum usitatissmum* L.)

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ABSTRACT

A field experiment was conducted at JNKVV-Regional Agricultural Research Station, Sarkanda, Bilaspur (MP) during winter seasons of 1982-83 and 1983-84, five date of sowing (10, 25 October; 10, 25 Nevember and 10 December) each at four nitrogen levels (0, 30, 60 and 90 kg N/ha) in a split plot design. Among five dates of sowing 10 Nevember was found to be the most suitable date of sowing during both the years. However, suitable sowing period ranged from 10 to 25 November. The oil content increased due to planting on 10 October but protein content decreased. The seed yield, oil and protein content of Linseed increased with the increasing levels of nitrogen during both the years.

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INTRODUCTION

Linseed is an important oilseed crop of South eastern Madhya Pradesh. It was gown there as main crop in winter season in large area. It is also a common practice in Chhatisgarh tract to grow it after paddy under utera condition. Linseed is of unique significance for use of its oil in industries. Being a remunerative and low input requirement crop it is very much liked by farmers but due to its low productivity, the crop gets setback. Under double cropped area, specially after rice, sowing of linseed is also generally delayed. In view of above, the present investigation was taken up to find out suitable sowing period and response to different levels of nitrogen for getting maximum yield and economic return.

MATERIALS AND METHODS

A field experiment was conducted on clay loam soil (pH 7.1; organic carbon 0.42%, available nitrogen 230-260 kg/ha; phosphorus 20-22 kg/ha and potassium 170-180 kg/ha) during the winter seasons of 1982-83 and 1983-84 at JNKVV-Regional Agricultural Research Station, Bilaspur. The treatments consisting of various combination of five sowing dates (10 and 25 October, 10 and 25 November and 10 December), Four nitrogen levels (0, 30, 60 and 90 kg N/ha) were replicated four times in a split plot design, allocating sowing dates to main plots nitrogen levels to sub plots. Full dose of nitrogen (as per treatments), 30 kg P_2O_5/ha and 20 kg K_2O/ha were applied at sowing. The crop was sown in lines at 30 cm apart. The variety was J-552. The crop was irrigated once before flowering.

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TABLE 1

Growth and yield attributing characters as influenced by sowing dates and nitrogen levels during 1982-83 and 1984.

Treatments	Plant height (cm)		Branches/plant		Capsules/plant		1,000 seed weight (g)	
	1982-83	1983-84	1982-83	1983-84	1982-83	1983-84	1982-83	1983-84
Sowing dates								
10 October	47.4	38.2	9.9	7.1	27.4	22.8	6.3	6.2
25 October	49.7	39.1	10.9	7.6	28.1	26.4	6.4	6.3
10 November	52.0	42.3	11.8	8.3	31.1	29.6	6.5	6.4
25 November	44.6	35.9	7.8	6.1	23.4	21.6	6.2	6.1
10 December	41.0	32.9	6.3	4.9	19.5	19.0	6.1	6.1
CD at 5%	0.44	0.44	0.14	0.10	0.49	0.74	0.01	0.01
Nitrogen levels kg/ha								
0	43.7	34.6	7.9	5.9	23.4	21.4	6.2	6.1
30	45.5	36.8	8.8	6.5	25.1	22.8	6.2	6.2
60	48.1	38.0	9.8	6.9	26.7	24.5	6.4	6.3
90	50.5	40.7	10.7	7.9	28.4	26.5	6.5	6.3
CD at 5%	0.35	0.03	0.09	0.09	0.34	0.36	0.01	0.01

TABLE 2

Grain yield, oil and protein content as influenced by sowing dates and nitrogen levels.

Treatments	Grain yield (kg/ha)		Oil content (%)		Protein content (%)		Net profit Rs/ha	
	1982-83	1983-84	1982-83	1983-84	1982-83	1983-84	1982-83	1983-84
Sowing dates								
10 October	860	670	40.9	39.2	21.5	18.2	2500	1550
25 October	1060	750	40.1	38.4	22.0	19.8	3500	1950
10 November	1150	870	39.4	37.2	22.3	20.1	3950	2550
25 November	1040	850	38.9	36.9	22.9	20.8	3400	2450
10 December	670	540	38.2	36.1	23.2	21.1	1550	900
CD at 5%	195	76	0.05	0.03	0.04	0.04	—	—
Nitrogen levels kg/ha								
0	820	560	38.6	36.2	21.4	18.7	2300	1000
30	930	710	39.3	37.6	22.2	19.6	2700	1600
60	1010	790	39.9	38.2	22.8	19.9	2950	1850
90	1090	870	40.2	39.1	23.2	20.8	32.00	2100
CD at 5%	100	80	0.06	0.04	0.05	0.04	—	—

RESULTS AND DISCUSSION

Sowing dates

The effects of sowing dates on plant height, branches, capsules per plant, 1000 seed weight, grain yield, oil and protein content were significant during both the seasons (Table 1 & 2). Early sown crop (10 November) recorded 58.4 and 62.1 per cent higher grain yield over late sown crop (10 December) during first and second years, respectively. The highest grain yield of (1150 kg/ha) was recorded on 10 November sown crop but it was at par with 25 October (1060 kg/ha) and 25 November (1040 kg/ha) sown crop during first year. Similarly 10 November (870 kg/ha) also out yielded significantly over 10, 25 October and 10 December sowing dates in second year. Thus, it was concluded that November 10 was the most suitable date of sowing for this crop but suitable period of sowing ranged from October 25 to November 25. The increase in yield was mainly due to increase in various plant characters contributing towards yield. The late sowing reduced the grain yield as in 10 December sowing, it was only 800 kg/ha. The yield reduction in late sowing, dates is mainly attributable to shorter growth period at the disposal of the late sown crop as the time taken by the crop to mature to decreased with delay in sowing. The present findings are in agreement with the findings of Maliwal (1985).

The oil content in seed was higher in early sowing. It may be attributed to the fact that seeds in late sown crop did not develop fully and also contained more protein (Table 2) which in negatively correlated with the oil content (Norton and Haris, 1975). Further, the higher temperature that prevailed at the vegetative and reproductive phases of the crop planted earlier might have decreased the protein content.

Nitrogen levels

Significantly higher grain yield and net profit was recorded under 90 kg N/ha which was better than that due to control and 30 kg N/ha. The differences between 30 to 60 and 60 to 90 kg N/ha were not significant during both the years. However, the increase in yield was in linear order with the increasing levels of nitrogen. The effect of nitrogen on growth and development of linseed on various characters like plant height, branches, capsules per plant and 1000 seed weight was in positive direction (Table 1). The results showed significant increase in yield attribute characters due to increasing levels of nitrogen from (0 to 90 kg N/ha). Kosta and Battawar (1981) also recorded similar results in linseed. Oil and protein content was also significantly increased with the increasing levels of nitrogen during both the years.

The interaction effect between sowing dates and nitrogen levels revealed that application of 90 kg N/ha significantly increased the grain yield when linseed was planted on 25 October, 10 and 25 November (1982-83) as compared to 10 October and 10 December, whereas 10 November planting date produced significantly higher grain yield (1370 kg/ha) over 25 October and 25 November (Table 3). However, application of 60 kg N/ha also produced significantly higher grain yield (1220 kg/ha)

TABLE 3

Grain yield as affected by sowing dates and nitrogen levels.

Nitrogen levels kg/ha

Sowing dates	*1982-83*				*1983-84*			
	0	*30*	*60*	*90*	*0*	*30*	*60*	*90*
10 October	760	890	870	920	560	660	720	750
25 October	920	1050	1120	1160	670	730	740	940
10 November	910	1090	1220	1370	580	670	1080	1150
25 November	910	990	1070	1190	610	880	890	1000
10 December	590	540	760	800	480	630	530	530
CD at 5%		82.0				179		

when planted on 10 November during 1982-83 than other planting dates. More or less the similar trend was observed in grain production under 60 and 90 kg N/ha during 1983-84, but the differences between treatment combinations remained nonsignificant.

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