

Response of Fenugreek to Sowing Date and In-row Spacing in the River Nile State

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Abstract

Field experiments were conducted at Shendi Agricultural Research Station in the northern region of the Sudan for four consecutive seasons (1989-90, 190-91, 91-92 and 92-93) to investigate the response of fenugreek to differential sowing time and in-row spacing. The factorial treatments consisted of four sowing dates (15 Oct., 30 Oct., 15 Nov. and 30 Nov.) and four in-row spacings (15, 20, 25 and 30 cm). The results showed significant to highly significant ($P \geq 0.05$) differences in seed yield and seed yield components due to the different sowing dates in all seasons. Optimum sowing was between 30 October and 15 November. In-row spacing treatments had no significant differences on seed yield and seed yield components in all seasons of study. No significant interaction was obtained between sowing date and in-row spacing treatments.

Introduction

Fenugreek, *Trigonella foenum graecum* L., known locally as “hilba” is a winter leguminous crop grown mainly along the banks of the Nile river in northern Sudan. The crop has several uses in different countries (Choudbury 1979, El Ridi *et al* 1951, Dixit and Srivastava 1977 and Ruwina 1981 ... etc: in Khashmelmus 1997). The seeds were used for decades as a condiment, as a flavourant and as a curative medical substance. Its use as a hot or a cold beverage or as a pudding with flour and milk is well known in the Sudan. The crop fetches good prices in the local and regional markets, following its wide use in public medicine as well as pharmaceutical industries.

Important as it is in the northern Sudan and with great potentials in other regions of the country, little work on crop management practices was reported. El Hakim (1992) reported seed yields of 1100 - 1800 kg/ha when the crop was planted at a seed rate of 80 – 150 kg/ha during September - October. Khashmelmus (1997) reported that the period from mid-October to the end of November, was optimum for fenugreek production in central Sudan and also reported a positive response to nitrogen application at the levels tested and a positive response to an increased seed rate.

In view of the importance of the commodity and lack of available literature locally, this study was carried out to generate information pertinent to fenugreek production in the northern Sudan as affected by sowing date and in-row spacing.

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Materials and Methods

This study was conducted at Shendi Agricultural Research Station (16°42' N, 33°26' E and 360 m above sea level) in the southern region of the Nile River State in northern Sudan in the seasons 1989-90 to 1992-93. The soil is a heavy textured cracking clay with pH of 7–8, EC =0.38 mm oh/cm, CEC = 55 me/100g, ESP =10, Ca Co₃ =1 %, N = 740 ppm, C = 56 %, sand = 15%, silt = 41 % and clay = 44%.

Seeds from the local market were grown on four sowing dates, at 15 days interval starting from 15 October and four in-row spacings of 15, 20, 25 and 30 cm (equivalent to 5.7, 4.3, 3.4 and 2.9 kg/ha, respectively). The treatments were combined factorially in a randomized complete block experimental design with four replications. Three seeds per hole were sown on both sides of 70 cm ridges. Plot size was 21 m². Irrigation water was applied every 10 days at the start of the trial and extended to 15 days in the cooler periods, hand weeding and pests control were done as necessary.

At 90 % maturity of each sowing date ten plants were selected randomly from each plot to determine the number of pods per plant and number of seeds per pod. The crop was cut manually above the soil surface, windrowed to dry and threshed manually by hand sticks.

Results and Discussion

The results in Tables 1 to 4, indicated that seed yield and yield components were significantly affected by sowing date and was not affected by in-row spacing in all seasons of study. Plants sown on 30 October, constantly produced the highest yield (Table 1). A delay of sowing to 15 or 30 November caused mean yield reductions of 7 % and 50% respectively. Forwarding the sowing date to 15 October caused yield reduction of 26%.

The number of pods per plant was highly affected by sowing date (P=0.01). It was higher in the early two sowing dates and lowest in the last sowing date (Table 2). The same trend was observed in the number of seeds per pod (Table 3) and in the weight of 1000 seeds (Table 4). These results were in agreement with those of Khashmelmus (1997) who reported that early sowing of fenugreek between 21 October and 20 November in central Sudan produced significant (P=0.05) variation in yield parameters measured. The pronounced increase in yield during 1991-92 and 1992-93 seasons might be due to the long and cool winter seasons together with good management.

Being a winter crop with a crop life of 90 – 100 days, and when sown late in October and early November, the crop would have the full measure of 3 – 4 winter months which allowed the plant to make strong vegetative growth and hence a maximum economic yield. With delayed sowing, there was a reduction of the cool period for optimum growth, hence a concomitant reduction in seed yield and yield components.

The data on the effect of in-row spacing on yield and yield components of fenugreek were statistically non-significant (Tables 1 – 4). These results were disagreeable with those of Khashmelmus (1997) who reported a significant increase in seed yield with higher seed rates. Guth (1987) and El Hakim (1992) also reported increased seed yield in response to higher seed rate.

The results clearly indicated that fenugreek responded significantly in statistical terms to sowing date, with the superiority of the period from the end of October to the first half of November as optimum for higher seed yield and yield components. The non-significant responses to the in-row spacing (different seed rates) levels used in this trial was unexpected. Obviously the question of in-row spacing needs further investigation.

Recommendations

Based on the results obtained, it is recommended that, fenugreek should be sown during the period 31 October to 15 November in the southern region of the River Nile (Nahr El Neil) State.

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Table 1. Response of fenugreek seed yield (kg/ha) to sowing date and in-row spacing (1989-90 to 1991-92)

Treatments	Season				Treatment mean
	1989-90	1990-91	1991-92	1991-92	
<u>Sowing dates:</u>					
15 Oct.	552	356	1477	1753	1035
30 Oct.	1011	489	1508	2583	1398
15 Nov.	772	339	739	3361	1303
30 Nov.	147	152	272	2225	699
Significance level	**	**	***	**	
<u>In-row spacings:</u>					
15 cm	683	425	1082	2539	1182
20 „	651	285	1045	2390	1093
25 „	656	324	882	2589	1113
30 „	611	302	986	2404	1076
Significance level	N.S.	N.S.	N.S.	N.S.	
S. E. \pm	120.87	69.4	112.1	213.3	1108
Season mean	650	334	999	2480	1116

N.S. : Not significant at 5 % level

*, **, ***: significant at 5 %, 1 % and 0.1 % levels, respectively.

Table 2. Response of fenugreek to sowing date and in-row spacing number of pods per plant (1989-90 to 1991-92)

Treatments	Season				Treatment mean
	1989-90	1990-91	1991-92	1991/92	
<u>Sowing dates:</u>					
15 Oct.	102.9	27.0	94.3	—	73.9
30 Oct.	76.3	29.1	86.6	—	73.8
15 Nov.	59.0	21.9	83.9	—	65.0
30 Nov.	25.8	19.8	52.7	—	50.5
Significance level	***		*	—	***
<u>In-row spacings:</u>					
15 cm	65.3	21.9	77.7	—	61.8
20 „	68.3	24.8	77.2	—	68.0
25 „	63.4	23.4	81.1	—	66.9
30 „	66.9	27.7	81.3	—	66.6
Significance level	N.S.	N.S.	N.S.	—	N.S.
S. E. \pm	5.6	2.0	5.4		4.3
Season mean	65.9	24.5	79.3		65.8

N.S. : Not significant at 5 % level

*, **, ***: significant at 5 %, 1 % and 0.1 % levels, respectively.

Table 3. Response of fenugreek to sowing date and in-row spacing number of seeds per pod (1989-90 and 1990-91)

Treatments	Season				Treatment mean
	1989-90	1990-91	1991-92	1991-92	
<u>Sowing dates:</u>					
15 Oct.	16.6	12.0	—	—	14.3
30 Oct.	16.3	12.8	—	—	14.5
15 Nov.	17.8	11.8	—	—	14.8
30 Nov.	17.1	12.0	—	—	14.5
Significance level	*	*	—	—	
<u>In-row spacings:</u>					
15 cm	17.0	11.9	—	—	14.5
20 „	17.6	12.6	—	—	15.2
25 „	16.5	12.0	—	—	14.2
30 „	17.3	12.3	—	—	14.8
Significance level	N.S.	N.S.	—	—	
S. E. ±	0.6	0.4			
Season mean	17.1	12.2			14.65

N.S. : Not significant at 5 % level.

*, **, ***: significant at 5 %, 1 % and 0.1 % levels, respectively.

Table 4. Response of fenugreek to sowing date and in-row spacing weight of 1000 seeds (1991-92 and 1991-92).

Treatments	Season				Treatment mean
	1989-90	1990-91	1991-92	1991-92	
<u>Sowing dates:</u>					
15 Oct.	—	—	10.8	12.0	11.2
30 Oct.	—	—	10.6	13.5	12.1
15 Nov.	—	—	7.9	12.0	9.9
30 Nov.	—	—	6.9	8.7	7.8
Significance level	—	—	***	***	
<u>In-row spacings:</u>					
15 cm	—	—	8.7	11.7	10.2
20 „	—	—	8.8	11.8	10.3
25 „	—	—	8.9	11.5	10.2
30 „	—	—	8.8	11.6	10.2
Significance level	—	—	N.S.	***	
S. E. ±			0.37	0.54	
Season mean			8.9	11.6	10.3

N.S. : Not significant at 5 % level.

*, **, ***: significant at 5 %, 1 % and 0.1 % levels, respectively.