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Effect of time of sowing and seed rate on seed production potentiality of fenugreek

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Abstract

The field research experiment on fenugreek was conducted at Horticulture Research and Extension Station, Devihosur, Haveri, Karnataka for four years (2017, 2018, 2019, and 2020) in medium deep black soil during *rabi* season. The sowing time and seeds rate has significant influence on growth and yield levels of fenugreek. The interaction of time of sowing and seed rate differed significantly for seed yield. The interaction effect of November I fortnight sowing with seed rate 15 kg per ha recorded significantly higher seed yield. The increased fenugreek seed yield with interaction of November I fortnight was mainly due to the congenial weather conditions favourable for the growth and development of the crop the optimum seed rate favoured the optimum plant population per unit area with a sufficient space for crop establishment and growth.

Keywords: Fenugreek, seed rate and time of sowing

Introduction

In India, fenugreek (*Trigonella foenum-graecum* L.) is a winter crop that serves a variety of purposes. This is one of the most significant green vegetables in India, and it's also used for condiments, spices and fodder. Due to its recent high market price, farmers have been drawn to add this crop in their cropping strategy. Its seed has therapeutic and feed benefits, especially for stomach issues. On the other hand, its leaves are a great source of vitamin C, minerals, and protein. The root nodules of this leguminous crop add atmospheric nitrogen to the soil. Because fenugreek seed contains the alkaloids "diosgenin" and "trigonelline," which have medicinal applications, its significance has increased recently (Sharma and Sastry, 2008) [5]. Thus, in the truest sense, it is a crop with several uses and great significance. The crop performs well in the cropping system in rain-fed and semi-arid areas because of its low water requirement. Even though it is economically significant, the productivity is still quite low because it is grown on marginal lands with low fertility (Deora *et al.*, 2009) [2]. The primary cause is the absence of advanced production technologies. As a result, an experiment was carried out to determine the ideal seeding time and quantity of seed rate needed to provide the highest yield during Karnataka's winter season.

Materials and Methods

During the *rabi* season, a field research experiment was carried out on medium deep black soil at the Horticulture Research and Extension Station, Devihosur, Haveri, Karnataka for four years (2017, 2018, 2019, and 2020). Haveri local variety was the used. The experiment was laid out in split plot design with three main and four subplot treatments were replicated thrice. The main plot treatments were time of sowing *viz.*, T₁: II fortnight of October, T₂: I fortnight of November and T₃: II fortnight of November and subplot treatments comprises of the seed rate *viz.*, S₁: 10.0 kg/ha, S₂: 15.0 kg/ha, S₃: 20 kg/ha and S₄: 25 kg/ha. All other necessary crop husbandry practices were taken up to raise the crop.

Results and Discussion

The experiment's four-year pooled data (2017, 2018, 2019 and 2020) showed that (Table 2) there were substantial differences in fenugreek seed yield depending on when the seed was sown. Fenugreek seed sown in the first fortnight of November yielded a significantly greater seed yield of 1368 kg/ha and the second fortnight's sowing yield was 1283 kg/ha. With October II fortnight sowing, the significantly lowest seed yield (981 kg/ha) was recorded. The seed rate of 15.0 kg per ha produced a fenugreek seed yield of 1305 kg per ha, which was significantly greater than the other seed rates. A seed rate of 10.0 kg per ha resulted in a noticeably reduced seed yield (1056 kg/ha). The interaction of time of sowing and seed rate differed significantly for seed yield. The interaction effect of November I fortnight sowing with seed rate 15 kg per ha recorded significantly higher seed yield. The next best interaction was noticed with the sowing in November II fortnight seed rate of 12.5 kg per ha has recorded the seed yield of 1450 kg per ha. The significantly lower seed yield (785 kg/ha) was recorded with October II fortnight sowing with rate 10.0 kg per ha. Similar findings were also noticed by Arora *et al.* (1971) ^[1], Kurubetta *et al.* (2008) ^[4] and Kurubetta *et al.* (2009) ^[3] in cowpea.

The increased fenugreek seed yield with interaction of November I fortnight was mainly due to the congenial weather conditions favourable for the growth and development of the crop and the seed rate of 15.0 kg per ha favoured the optimum plant population per unit area with a sufficient space for crop establishment and growth. The optimum population per unit area contributed for the increased seed yield per hectare as compare to the other times of sowing and seed rate. imilar results were also noticed in cowpea by Yadav (2003) ^[6].

The haulm yield was found significantly higher (2080 kg/ha) with the interaction of November II fortnight sowing with 15.0 kg per ha seed rate. The increased haulm yield was mainly due to the increased growth parameters *viz.*, plant height (46.7 cm), number of secondary branches (1.2) per plant. The number of pods per plant (26.6) were also found to higher but the pod filling and seed yield per plant (2.9 g) was less, as a result more haulm yield was recorded.

The harvest index was differed significantly for the interaction effects. The interaction of November II fortnight sowing with 15.0 kg per ha seed rate recorded significantly higher harvest index and found an far with the other treatment combination except T₂S₂, T₁S₃, T₂S₄ and T₂S₁.

Table 1: Effect of time of sowing and seed rate on plant height, number of primary and secondary branches of fenugreek

Time of Sowing (T)	Plant Height (cm)					Number of Primary Branches per plant					Number. of Secondary Branches per plant				
	Seed rate (S) (kg/ha)														
	S ₁ -10.0	S ₂ -12.5	S ₃ -15.0	S ₄ -17.5	Mean	S ₁ -10.0	S ₂ -12.5	S ₃ -15.0	S ₄ -17.5	Mean	S ₁ -10.0	S ₂ -12.5	S ₃ -15.0	S ₄ -17.5	Mean
T ₁ : October II Fortnight	47.1	44.5	45.1	43.9	45.2	5.5	6.0	5.5	5.4	5.6	1.0	2.0	1.0	1.1	1.3
T ₂ :November I Fortnight	46.1	45.7	46.6	44.1	45.6	5.6	6.0	5.8	5.0	5.6	1.3	1.0	1.2	0.9	1.1
T ₃ :November II Fortnight	47.7	46.5	46.7	43.6	46.1	5.5	5.4	5.0	5.0	5.2	1.0	1.0	1.8	1.6	1.4
Mean	47.0	45.5	46.2	43.9	45.6	5.5	5.8	5.4	5.1	5.5	1.1	1.3	1.3	1.2	1.3
	S.Em ±		C.D @ 5%			S.Em ±		C.D @ 5%			S.Em ±		C.D @ 5%		
Main (T)	0.33		NS			0.24		NS			0.23		NS		
Sub (S)	0.24		NS			0.16		0.6			0.17		NS		
Interaction (TXS) at same levels	0.50		NS			0.37		NS			0.35		NS		
Interaction (TXS) at diff. levels	0.54		NS			0.39		1.1			0.38		NS		

Table 2: Influence of time of sowing and seed rate on number of pods per plant and seed yield (g/plant and kg/ha) of fenugreek

Time of Sowing (T)	Number of pods per plant					Seed Yield (g/plant)					Seed Yield (kg/ha)				
	Seed rate (S) (kg/ha)														
	S ₁ -10.0	S ₂ -12.5	S ₃ -15.0	S ₄ -17.5	Mean	S ₁ -10.0	S ₂ -12.5	S ₃ -15.0	S ₄ -17.5	Mean	S ₁ -10.0	S ₂ -12.5	S ₃ -15.0	S ₄ -17.5	Mean
T ₁ : October II Fortnight	26.4	26.7	25.4	21.6	25.0	3.6	2.7	2.9	2.3	2.9	785	873	1067	1199	981
T ₂ :November I Fortnight	24.0	27.2	24.2	27.1	25.6	3.5	5.1	3.7	3.5	4.0	1265	1409	1476	1322	1368
T ₃ :November II Fortnight	22.2	25.8	26.6	18.8	23.3	3.5	4.7	2.9	1.9	3.2	1118	1450	1371	1193	1283
Mean	24.2	26.6	25.4	22.5	24.7	3.5	4.2	3.2	2.6	3.4	1056	1244	1305	1238	1211
	S.Em ±		C.D @ 5%			S.Em ±		C.D @ 5%			S.Em ±		C.D @ 5%		
Main (T)	0.14		0.6			0.23		0.9			17.3		70.0		
Sub (S)	0.09		0.2			0.17		0.4			12.51		33.0		
Interaction (TXS) at same levels	0.19		NS			0.35		NS			26.23		58.0		
Interaction (TXS) at diff. levels	0.20		0.5			0.38		1.0			28.48		105.0		

Table 2: Influence of time of sowing and seed rate on husk yield and harvest index of fenugreek

Time of Sowing (T)	Haulm Yield (kg/ha)					Harvest Index				
	Seed rate (S) (kg/ha)									
	S ₁ -10.0	S ₂ -12.5	S ₃ -15.0	S ₄ -17.5	Mean	S ₁ -10.0	S ₂ -12.5	S ₃ -15.0	S ₄ -17.5	Mean
T ₁ : October II Fortnight	1014	1321	1385	1620	1335	0.8	0.7	0.6	0.8	0.7
T ₂ :November I Fortnight	1457	1845	1639	1792	1683	0.9	0.8	0.9	0.7	0.8
T ₃ :November II Fortnight	970	1232	2080	1515	1449	0.9	0.9	0.8	0.8	0.9
Mean	1147	1466	1701	1642	1489	0.9	0.8	0.8	0.8	0.8
	S.Em ±		C.D @ 5%			S.Em ±		C.D @ 5%		
Main (T)	62.2		245			0.06		NS		
Sub (S)	45.06		120			0.05		NS		
Interaction (TXS) at same levels	94.5		208			0.10		NS		
Interaction (TXS) at diff. levels	102.6		258			0.11		0.2		

Conclusion

In conclusion, this four-year study on fenugreek cultivation has provided critical insights into the optimal sowing time and seed rate for maximizing seed yield. The data consistently showed that sowing fenugreek seeds in the first fortnight of November, particularly at a seed rate of 15.0 kg per ha, resulted in the highest seed yields, affirming the significance of selecting the appropriate sowing window and seed density. This optimal combination leverages favorable weather conditions and ensures an adequate plant population and spacing, which are crucial for the crop's growth and development. Furthermore, the interaction between sowing time and seed rate significantly affects both seed and haulm yield, with the latter also peaking under similar conditions due to improved growth parameters. The findings echo previous research on cowpea, underscoring the broader applicability of these agricultural practices. The study's implications for fenugreek production are clear: strategic planning of sowing time and careful selection of seed rate are key to enhancing yield outcomes. These insights could guide farmers in improving their fenugreek cultivation practices, ultimately contributing to increased productivity and sustainability in agricultural operations.

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