

Research
Paper

Effect of sowing dates and nutrient management on growth and seed yield fenugreek

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ABSTRACT

A field experiment entitled, effect of sowing dates and nutrient management on growth, and seed yield of fenugreek was conducted at the Main Garden, University Department of Horticulture, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola during *Rabi* season of the years 2004-05 and 2005-06. The experiment was laid out in split plot design with four replications and twenty-four treatment combinations. The result of present investigation indicated that, the vegetative growth in terms of plant height, number of branches and number of leaves, were increased due to an early sowing (1st November) supplied with the nutrients as 37.50 kg N + 18.75 kg P₂O₅ ha⁻¹ + FYM @ 10 t ha⁻¹. While, number of pods, number of seeds per pod, weight of seeds per pod, seed yield per plot and seed yield per hectare were found to be the maximum with an early sowing (1st November) supplied with the nutrient as 37.50 kg N + 18.75 kg P₂O₅ ha⁻¹ + FYM @ 10 t ha⁻¹.

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KEY WORDS : Fenugreek, Sowing dates, INM, Growth, Seed yield, Nutrient management

Fenugreek (*Trigonella foenum-graecum* L.) is an important seed spice popularly known by its vernacular name *methi* belongs to a leguminous vegetable crops. Fenugreek is considered to be a native of eastern Europe and Ethiopia. It is also found growing wild in north-western India. It is an important condiment crop grown in southern India during the *Kharif* and *Rabi* seasons. The common *methi* is quick growing and produces erect shoot to a height of 40-70 cm. It has a light to dark green leaves with or without pink margin and produces 2-3 small white flowers at the base of each leaf. The pods are slender and of straw colour when ripened, beak shaped and are about 8-10 cm long with 8-15 yellowish brown colour smooth surface seeds. The seed is about 0.3-0.5 cm long. There are two species of the genus *trigonella* viz., *Trigonella foenum-graecum* the common *methi* and *Trigonella corniculata* the *kasuri methi*. Fenugreek is the third largest seed spice in India after coriander and cumin (Thangaraj and Vijaykumar, 2001).

Generally, the seed production of *methi* is taken after 2-3 cuttings, but, the seed yield obtained without cuttings are better than the seed yield obtained after 2-3 cuttings. It is therefore, recommended to take the seed production of *methi* without any cuttings.

In Maharashtra, though *methi* is cultivated as an important leafy vegetable and is also grown as a spice, but less attention is being paid on its commercial seed production. Fenugreek seed production is highly specialized job and it requires intimate knowledge of crop production particularly, the floral biology, mode of pollination, isolation distance, climatic and nutritional requirements, etc.

To increase the productivity of improved varieties of fenugreek by adoption of recommended package of practices for cultivation is very high step today. Among the various cultural practices, proper time of sowing and optimum quantity of manure and fertilizers to a given area are prerequisites to achieve a uniform crop stand which ultimately reflects on the seed yield and quality of crop.

RESEARCH PROCEDURE

A field experiment entitled, effect of sowing dates and nutrient management on growth, seed yield and quality of fenugreek was conducted at the Main Garden, University Department of Horticulture, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola during *Rabi* season of the years 2004-05 and 2005-06. The experiment was

laid out in Split Plot Design with four replications and twenty-four treatment combinations. The treatment comprised of the three sowing dates *i.e.* 1st November, 15th November and 1st December and eight treatments of nutrient management *viz.*, F₁ – control, F₂ – 50 kg N + 25 kg P₂O₅ ha⁻¹, F₃ – 75 per cent F₂ + *Azotobacter* @ 20 g kg⁻¹ of seed, F₄ – 50 per cent F₂ + *Azotobacter* @ 20 g kg⁻¹ of seed, F₅ – 75 per cent F₂ + FYM @ 10 t ha⁻¹, F₆ – 50 per cent F₂ + FYM @ 10 t ha⁻¹, F₇ – 75 per cent F₂ + vermicompost @ 6 t ha⁻¹ and F₈ – 50 per cent F₂ + vermicompost @ 6 t ha⁻¹. The seed was sown in flat beds at 20 cm apart in lines to a depth of 2 cm and was covered with thin layer of fine soil. Sowing was done as per the treatments during both the years of experimentation 2004-05 and 2005-06. The treatment plots were irrigated lightly immediately after sowing of seed. The seed treatment with *Azotobacter* was done half hour before the sowing @ 20 g kg⁻¹ of seed and it was kept in shade for drying. An application of FYM and vermicompost were done at the time of plot preparation as per the treatments prior to apply of the fertilizer. Treatment wise requirement of nitrogen and phosphorus was worked out. The nitrogen and phosphorus were applied through urea and single super phosphate, respectively. While, applying the fertilizers, half dose of nitrogen and full dose of phosphorus were applied at the time of seed sowing and remaining half dose of nitrogen was applied thirty days after sowing. Randomly ten plants were selected from each plot for recording the biometric observations. The selected plants were labeled and the observations were recorded on these plants at harvesting stage of the crop in terms of growth and yield attributes.

RESEARCH ANALYSIS AND REASONING

The results obtained from the present investigation have been discussed below:

Plant height (cm):

During both the years of experimentation the plant height of fenugreek at all the stages of plant growth was significantly influenced due to the sowing dates. At every fifteen days interval from 15th to 90th day of crop growth, the maximum plant height was noticed in the treatment of 1st November (S₁) seed sowing. While, the minimum plant height was recorded with 1st December (S₃) sowing date in both the years. In the year 2004-05, at the harvesting stage, significantly the maximum plant height (80.00 cm) was noticed under 1st November (S₁) sowing date and it was recorded significantly minimum (71.94 cm) with 1st December (S₃) sowing date. Similarly, in the year 2005-

06, fenugreek seeds sown on 1st November (S₁) sowing date recorded significantly the maximum plant height (82.13 cm). While, 1st December (S₃) sown crop had shown significantly minimum plant height (74.95 cm) at the harvesting stage. This might be due to the fact that, an early sowing of crop prevailed favourable temperature and climate and more sunshine reaching to the crop during its growth period which would have resulted into the maximum growth. The results obtained above are in conformity with the findings of various research workers. Gill *et al.* (2001) in fenugreek.

It is evident from the data that, among the nutrient management treatments, an application of 37.50:18.75:00 kg NPK ha⁻¹ + FYM @ 10 t ha⁻¹ (F₅) significantly promoted the maximum plant height at the harvesting stage during both the years *i.e.* 2004-05 (81.52 cm) and 2005-06 (84.11 cm). While, it was registered significantly minimum (67.15 cm and 70.50 cm) under control (F₁) treatment. This might be due to the fact that, an application of nitrogen and phosphorus might have accelerated the cell division as well as root elongation. Similarly an application of FYM had improved the soil moisture holding capacity, and due to the porous soil structure the micronutrients would have been made available to the crop easily and sufficiently which would have resulted into the vigorous growth of fenugreek crop. Similar results were recorded by Selvarajan and Chezhiyan (2001) in fenugreek.

An interaction effects of sowing dates and nutrient management treatments were found to be non-significant at all the stages of observation.

Branches per plant:

In the years 2004-05 and 2005-06, the treatment S₁ of sowing date of 1st November produced significantly the maximum branches per plant at harvesting stage (14.11 and 15.05, respectively). While, 1st December (S₃) sowing date produced significantly minimum branches per plant (12.16 and 13.11, respectively) at the harvesting stage. This might be due to the better vegetative growth produced due to early sowing and favourable congenial climatic conditions availed to the crop during growth period. Similar results were noticed by the earlier workers like Korla and Saini (2003) in fenugreek.

An application of 75 per cent inorganic fertilizers of 37.50:18.75:00 kg NPK ha⁻¹ + FYM @ 10 t ha⁻¹ (F₅) produced significantly the maximum branches per plant during the years 2004-05 and 2005-06 (14.00 and 15.10, respectively) at the harvesting stage and were found to be significantly minimum (11.68 and 11.82, respectively) in control (F₁) treatment. The branching of the plant is an important character which indicates the vegetative growth.

This might be due to the fact that, availability of nutrients through inorganic fertilizers and FYM might have enhanced meristematic activities and size of cells, and formation and functioning of protoplasm which consequently improved the number of branches per plant. Similarly, the maximum height of plant might have also produced the maximum number of branches per plant. Similar results were obtained by Selvarajan and Chezhiyan (2001) in fenugreek.

The interaction effects of sowing dates and nutrient management treatments on branches per plant were found to be non-significant at all the observation stages.

Leaves per plant:

Fenugreek seeds sown on 1st November (S₁) registered significantly the maximum per plant leaf count during the years 2004-2005 and 2005-06 (44.99 and 46.96, respectively). However, significantly minimum leaves per plant for both the years were noted under the treatment of 1st December (S₃) (37.08 and 39.17, respectively). This might be due to the fact that, an early sown fenugreek crop received conducive climatic conditions throughout

the growth period which would have resulted into luxurious growth and production of the maximum leaves per plant.

It is revealed that, during the years 2004-05 and 2005-06, leaves per plant were found to be significantly the maximum at the harvesting stage (45.47 and 47.93, respectively) in those plants which were supplied with 37.50:18.75:00 kg NPK ha⁻¹ + FYM @ 10 t ha⁻¹ (F₅) and significantly minimum leaves per plant (36.43 and 37.40, respectively) were produced under the control (F₁) treatment. Probably, this might be due to the fact that, an increase in number of branches per plant might have increased the leaves per plant. Similar results were recorded by Ram and Verma (2000) in fenugreek.

The interaction effects of sowing dates and nutrient management treatments on leaves per plant were found to be non-significant at all the growth stages.

Days required for flowering:

In the years 2004-05 and 2005-06 the fenugreek plants which were sown on 1st November (S₁) took significantly minimum period (45.08 and 45.41 days, respectively) for flowering and delayed flowering was

Table 1 : Effect of sowing dates and nutrient management on plant height (cm), branches per plant, leaves per plant and days required for flowering of fenugreek

Treatments	Plant height (cm)		Branches per plant		Leaves per plant		Days required for flowering	
	2004-05	2005-06	2004-05	2005-06	2004-05	2005-06	2004-05	2005-06
Main factor – Sowing date (S)								
S ₁ – 1 st November	80.00	82.13	14.11	15.05	44.99	46.96	45.08	45.41
S ₂ – 15 th November	75.49	76.91	12.79	13.84	41.23	43.80	46.89	47.26
S ₃ – 1 st December	71.94	74.95	12.16	13.11	37.08	39.17	49.24	49.51
`F' Test	Sig.	Sig.	Sig.	Sig.	Sig.	Sig.	Sig.	Sig.
S.E. ±	0.39	0.43	0.14	0.21	0.82	0.41	0.32	0.23
C.D. (P=0.05)	1.34	1.46	0.49	0.70	2.83	1.41	1.09	0.80
Sub factor – Nutrient management (F)								
F ₁ – Control	67.15	70.50	11.68	11.82	36.43	37.40	42.70	42.73
F ₂ – 50 kg N + 25 kg P ₂ O ₅ ha ⁻¹	78.03	80.72	13.80	14.86	44.40	46.63	50.67	50.83
F ₃ – 75% F ₂ +Azotobacter @ 20 g seed kg ⁻¹	76.23	78.85	13.30	14.57	41.70	44.00	49.20	49.63
F ₄ – 50% F ₂ +Azotobacter @ 20 g seed kg ⁻¹	74.01	76.24	12.62	13.85	38.40	40.87	45.63	46.23
F ₅ – 75% F ₂ + FYM @ 10 t ha ⁻¹	81.52	84.11	14.00	15.10	45.47	47.93	49.53	49.43
F ₆ – 50% F ₂ + FYM @ 10 t ha ⁻¹	75.52	77.72	12.90	14.02	40.37	42.77	45.57	46.37
F ₇ – 75% F ₂ + Vermicompost @ 6 t ha ⁻¹	76.95	79.83	13.22	14.27	43.00	45.20	48.60	49.03
F ₈ – 50 % F ₂ + Vermicompost @ 6 t ha ⁻¹	74.42	76.48	12.63	13.55	39.03	41.80	44.63	44.80
`F' Test	Sig.	Sig.	Sig.	Sig.	Sig.	Sig.	Sig.	Sig.
S.E. ±	0.75	0.65	0.18	0.24	0.73	0.61	0.63	0.41
C.D. (P=0.05)	2.50	1.84	0.52	0.70	2.06	1.72	1.80	1.16
Interaction effect (S x F)								
`F' Test	NS	NS	NS	NS	NS	NS	NS	NS
S.E. ±	1.30	1.13	0.32	0.42	1.30	1.06	1.10	0.72
C.D. (P=0.05)	--	--	--	--	--	--	--	--

NS=Non-significant

Sig. = Significant

noticed under the treatment of 1st December (S₃) (49.24 and 49.51 days, respectively). Thus, it is apparent that, sowing of fenugreek seeds on 1st November hasten the flowering by about 4 days as compared to 1st December (S₃) sowing. These wide variations in occurrence of flowering might be ascribed due to the weather variations particularly temperature within the different dates of sowing. The results of present investigation are also supported by the findings of Lal *et al.* (2003) in fenugreek.

Significantly minimum days for flowering (42.70 and 42.73 days, respectively) were required in the control treatment (F₁) during both the years of experimentation *i.e.* 2005-05 and 2005-06. However, the maximum period was needed for flowering (50.67 days and 50.83 days, respectively) to the plants which were fertilized with the treatment of 50:25:00 kg NPK ha⁻¹ (F₂). Thus, it is evident that the flowering was delayed by about 8 days due to an application of 50:25:00 kg NPK ha⁻¹ (F₂) as compared to the control (F₁) treatment. This might be due to the fact that, an application of higher dose of nitrogen and phosphorus might have extended the vegetative growth phase of the fenugreek crop and this would have resulted in delayed flower initiation. The results obtained in this

investigation are in close agreement with the findings of Ram and Verma (2000) in fenugreek.

An interaction effects of sowing dates and nutrient management treatments were found to be non-significant during both the years of experimentation.

Pods per plant:

It is evident from the pooled data (Table 2) that, fenugreek seeds sown on 1st November (S₁) produced significantly the maximum (34.82) pods per plant. Whereas, significantly minimum (31.93) pods per plant were harvested from the 1st December sown crop (S₃). This might be due to the better vegetative growth in early sown crop and the crop get sufficient time for it's growth under favourable condition which would have resulted into the maximum pods per plant. The results obtained in this investigation are in close agreement with the findings of Yadav *et al.* (2000), Gill *et al.* (2001) and Korla and Saini (2003) in fenugreek.

The pooled mean indicated that, significantly the maximum (41.60) pods per plant were produced due to an application of 37.50:18.75:00 kg NPK/ha + FYM 10 t ha⁻¹ (F₅). Whereas, the control treatment (F₁) produced

Table 2 : Effect of sowing dates and nutrient management on pods per plant, seeds per pod and weight of seed per pod (g) of fenugreek

Treatments	Pods per plant			Seeds per pod			Weight of seed per pod (g)		
	2004-05	2005-06	Pooled	2004-05	2005-06	Pooled	2004-05	2005-06	Pooled
Main factor – Sowing date (S)									
S ₁ – 1 st November	34.86	34.78	34.82	14.71	15.58	15.14	0.296	0.312	0.304
S ₂ – 15 th November	32.75	34.11	33.43	13.52	14.36	13.94	0.256	0.276	0.266
S ₃ – 1 st December	31.20	32.67	31.93	12.74	13.68	13.21	0.225	0.242	0.234
`F' test	Sig.	Sig.	Sig.	Sig.	Sig.	Sig.	Sig.	Sig.	Sig.
S.E. ±	0.35	0.38	0.36	0.11	0.20	.10	0.007	0.004	0.004
C.D. (P=0.05)	1.22	1.31	1.24	0.39	0.63	0.34	0.02	0.014	0.014
Sub factor – Nutrient management (F)									
F ₁ – Control	22.40	23.06	22.73	11.43	12.07	11.75	0.166	0.183	0.175
F ₂ – 50 kg N + 25 kg P ₂ O ₅ ha ⁻¹	38.80	40.17	39.48	15.27	16.17	15.72	0.350	0.370	0.360
F ₃ – 75% F ₂ + <i>Azotobacter</i> @ 20 g seed kg ⁻¹	34.47	35.57	35.02	13.77	14.77	14.27	0.256	0.273	0.265
F ₄ – 50% F ₂ + <i>Azotobacter</i> @ 20 g seed kg ⁻¹	27.17	28.43	27.80	12.23	13.37	12.80	0.190	0.206	0.198
F ₅ – 75% F ₂ + FYM @ 10 t ha ⁻¹	41.10	42.10	41.60	16.10	17.03	16.56	0.380	0.396	0.388
F ₆ – 50% F ₂ + FYM @ 10 t ha ⁻¹	32.16	33.30	32.73	13.17	14.07	13.62	0.223	0.240	0.232
F ₇ – 75% F ₂ + Vermicompost @ 6 t ha ⁻¹	36.86	36.66	36.76	14.57	15.47	15.02	0.300	0.320	0.310
F ₈ – 50 % F ₂ + Vermicompost @ 6 t ha ⁻¹	30.53	31.57	31.05	12.73	13.37	13.05	0.206	0.227	0.217
`F' test	Sig.	Sig.	Sig.	Sig.	Sig.	Sig.	Sig.	Sig.	Sig.
S.E. ±	0.61	0.59	0.58	0.15	0.20	0.18	0.01	0.005	0.007
C.D. (P=0.05)	1.72	1.68	1.64	0.44	0.58	0.54	0.03	0.016	0.014
Interaction (S x F)									
`F' test	NS	NS	NS	NS	NS	NS	NS	NS	NS
S.E. ±	0.65	6.41	1.01	0.28	0.36	0.28	0.018	0.011	0.013
C.D. (P=0.05)	-	-	-	-	-	-	-	-	-

NS=Non-significant

Sig. = Significant

significantly minimum (22.73) pods per plant. The increase in pods per plant was owing to improvement in physico-chemical properties of the soil and more availability of essential nutrients through organic and inorganic fertilizers to the plants which supported the vegetative growth (plant height and branches per plant) and finally increased the pods per plant. Similar results were reported by earlier research workers *viz*, Shelvarjan and Chezhiyan (2001) and Yadav and Kumawat (2003) in fenugreek.

An interaction effects of sowing dates and nutrient management treatments on pods per plant were found to be non-significant during both the years of experimentation.

Seeds per pod:

The pooled results indicated that, the 1st November (S_1) sowing crop had produced significantly the maximum (15.14) seeds per pod. While, significantly minimum (13.21) seeds per pod were produced under the treatment 1st December sowing date (S_3). This might be owing to the favourable climatic conditions. Delay in sowing coincided with the higher temperature at maturity stage which resulted into forced maturity and ultimately resulted into minimum number of seeds per pod. Similar results have been recorded by the earlier workers like Yadav *et al.* (2000) and Lal *et al.* (2003) in fenugreek.

The pooled mean indicated that, an application of 37.50:18.75:00 kg NPK ha⁻¹ + FYM 10 t ha⁻¹ (F_5) produced

significantly the maximum (16.56) seeds per pod. Whereas, the control (F_1) treatment produced significantly minimum (11.75) seeds per pod. This might be due to the fact that, the nutrient supply through inorganic and organic sources mostly nitrogen increases the concentration of carbohydrates and as the seeds could be served as a reservoir for the carbohydrates, the number might have been increased. The results of these findings are in close agreement with the findings of Lal *et al.* (2003) in fenugreek.

An interaction effects due to sowing dates and nutrient management treatments on seeds per pod were found to be non-significant during both the years of experimentation.

Weight of seeds per pod:

The pooled data had shown that, significantly the maximum weight of seeds (0.304 g) per pod was produced with the 1st November sowing date (S_1). While, the sowing date of 1st December (S_3) produced significantly minimum (0.234 g) weight of seeds per pod. This might be due to more number of seeds per pod which have recorded the maximum weight of seeds per pod. Similar results were recorded by the earlier workers like Lal *et al.* (2003) in fenugreek

The pooled mean indicated that, an application of 37.50:18.75:00 kg NPK ha⁻¹ + FYM @ 10 t ha⁻¹ (F_5) had

Table 3 : Effect of sowing dates and nutrient management on seed yield per plot (kg) and per hectare (q) of fenugreek

Treatments	Seed yield kg plot ⁻¹			Seed yield q ha ⁻¹		
	2004	2005	Pooled	2004	2005	Pooled
Main factor–sowing date (S)						
S_1 – 1 st November	0.563	0.591	0.577	14.09	14.80	14.44
S_2 – 15 th November	0.522	0.552	0.537	13.07	13.80	13.44
S_3 – 1 st December	0.497	0.533	0.515	12.43	13.32	12.88
`F' test	Sig.	Sig.	Sig.	Sig.	Sig.	Sig.
S.E. \pm	0.007	0.009	0.008	0.18	0.22	0.19
C.D. (P=0.05)	0.024	0.029	0.026	0.63	0.78	0.65
Sub factor–nutrient management (F)						
F_1 – Control	0.372	0.402	0.387	9.31	10.06	9.69
F_2 – 50 kg N+ 25 kg P ₂ O ₅ ha ⁻¹	0.643	0.673	0.658	16.08	16.82	16.46
F_3 – 75% F_2 +Azotobacter@20g seed kg ⁻¹	0.535	0.576	0.556	13.39	14.40	13.89
F_4 – 50% F_2 +Azotobacter@20g seed kg ⁻¹	0.436	0.466	0.451	10.92	11.66	11.29
F_5 – 75% F_2 + FYM @ 10 t ha ⁻¹	0.677	0.703	0.690	16.93	17.51	17.22
F_6 – 50% F_2 + FYM @ 10 t ha ⁻¹	0.496	0.515	0.506	12.41	12.87	12.64
F_7 – 75% F_2 + Vermicompost @ 6 t ha ⁻¹	0.596	0.635	0.615	14.90	15.86	15.39
F_8 – 50 % F_2 + Vermicompost @ 6 t ha ⁻¹	0.466	0.503	0.485	11.66	12.58	12.12
`F' test	Sig.	Sig.	Sig.	Sig.	Sig.	Sig.
S.E. \pm	0.011	0.009	0.010	0.28	0.22	0.25
C.D. (P=0.05)	0.032	0.024	0.029	0.80	0.64	0.70

Sig. = Significant

produced significantly the maximum weight of seeds (0.388 g) per pod. Whereas, the control (F_1) treatment recorded significantly minimum weight of seeds (0.175 g) per pod. This might be also due to more number of seeds per pod which have probably produced the maximum weight of seeds per pod. The results of these findings are in close agreement with the findings of Lal *et al.* (2003) in fenugreek.

An interaction effects due to sowing dates and nutrient management treatments on weight of seeds per pod found to be non-significant.

Seed yield per plot (kg) and per hectare (q):

The pooled mean (Table 3) indicated that, the fenugreek seeds of 1st November (S_1) sowing date produced significantly the maximum seed yield per plot (0.577 kg) and per hectare (14.44 q). Whereas, minimum seed yield per plot (0.515 kg) and per hectare (12.88 q) was harvested from the treatment of 1st December (S_3) and was found to be at par with the 15th November sown crop (0.537 kg and 13.44 q, respectively). This might be due to the fact that, there is a direct relationship between number of leaves per plant, number of pods per plant, weight of seeds per pod and the treatments having the maximum these attributes which would have produced the maximum per plot and per hectare seed yield. Similar results were recorded by the earlier workers like Yadav *et al.* (2000) and Lal *et al.* (2003) in fenugreek.

The pooled results indicated that, significantly the maximum seed yield per plot (0.690 kg) and per hectare (17.22 q) was produced in the treatment of an application of 37.50:18.75:00 kg NPK ha⁻¹ + FYM @ 10 t ha⁻¹ (F_5) and these yields were recorded significantly minimum (0.387 kg per plot and 9.69 q per hectare) with the control (F_1) treatment. This might be due to the fact that, due to an application of required nutrient through different sources might have produced more number of branches, more pods per plant and more weight of seeds per pod which would have resulted into the maximum per plot and per hectare seed yield. The results of these findings are in close agreement with the findings of Lal *et al.* (2003) in fenugreek.

An interaction effects due to the sowing dates and nutrient management treatments on per plot and per hectare seed yield were found to be non-significant.

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LITERATURE CITED

- Gill, B.S., Randhawa, G.S. and Saini, S.S. (2001). Effect of sowing dates and herb cutting management on growth and yield of fenugreek (*Trigonella foenum-graecum* L.). *Indian J. Agron.*, **46**(2): 364-367.
- Korla, B.N. and Saini, Amit (2003). Effect of dates of sowing and cutting on seed yield of fenugreek. *Haryana J. Hort. Sci.*, **32**(1/2): 120-122.
- Lal, Sant, Rana, M.K. and Pratap, P.S. (2003). Effect of date of sowing and green cuttings on quality of different fenugreek genotypes. *Haryana J. Hort. Sci.*, **32**(3/4): 262-265.
- Ram, D. and Verma, J.P. (2000). Effect of level of phosphorus and potash on the performance of seed yield of Pusa Early Bunching fenugreek (*Trigonella foenum-graecum* L.). *Indian J. Agric. Sci.*, **70**(12): 866-868.
- Selvarajan, M. and Chezhiyan, N. (2001): Effect of Azospirillum in combination with different levels of nitrogen on growth and yield of fenugreek (*Trigonella foenum-graecum* L.). *South Indian J. Hort.*, **49**(special): 173-174.
- Thangaraj, T. and Vijaykumaran, M. (2001): Fenugreek. In : *Vegetables, tuber crops and spices*, Ed. S. Thamburaj and N. Singh. New Delhi, Indian Council of Agriculture Research: pp. 364-365.
- Yadav, G.L. and Kumawat, P.P. (2003). Effect of organic, inorganic fertilizer and *Rhizobium* inoculation on the yield and yield attributes of fenugreek (*Trigonella foenum-graecum* L.). *Haryana J. Hort. Sci.*, **32**(1-2): 147-148.
- Yadav, J.S., Singh, Jagdev, Kumar, Virendra and Yadav, B.D. (2000). Effect of sowing time, spacing and seed rate on seed yield of fenugreek (*Trigonella foenum-graecum* L.) on light textured soil. *H.A.U. J. Res.*, **30**: 107-111.
