



ISSN (E): 2277-7695
ISSN (P): 2349-8242
NAAS Rating: 5.23
TPI 2022; 11(12): 4186-4189
© 2022 TPI
www.thepharmajournal.com
Received: 21-10-2022
Accepted: 28-11-2022

MS Jadhav
M.Sc. Scholar,
Department of Horticulture,
College of Agriculture, VNMKV,
Parbhani, Maharashtra, India

VV Bhagat
Assistant Professor,
College of Horticulture,
VNMKV, Parbhani,
Maharashtra, India

VU Bansod
M.Sc. Scholar,
Department of Horticulture,
College of Agriculture, VNMKV,
Parbhani, Maharashtra, India

Studies on effect of plant densities and pinching levels on growth and herbage yield of fenugreek (*Trigonella foenum-graecum* L.) cv. Phule Kasturi

MS Jadhav, VV Bhagat and VU Bansod

Abstract

The present investigation entitled “Studies on effect plant densities and pinching levels on herbage yield of fenugreek (*Trigonella foenum-graecum* L.) cv. Phule Kasturi.” was carried out in the year 2021-2022, at Department of Horticulture, Vasantnao Naik Marathwada Krishi Vidyapeeth, Parbhani. Results of the present investigation revealed that, the vegetative growth observation in terms of plant height (67.67 cm) and herbage yield per plot (308.11 g) and per hectare (13.56 q/ha) were highest with closer spacing S₁ (10 x 5 cm), number of branches per plant (13.56) and number of leaves per plant (74.77) was recorded with wider spacing treatment S₆ (30 x 10 cm) and number of branches and number of leaves per plant was increased with increase in spacing. Among the pinching treatments highest plant height (64.28 cm) were noticed with P₀ (no pinching) treatment and maximum number of branches per plant (10.55) was recorded with P₁ (pinching at 25 DAS) and highest number of leaves per plant (69.32) was recorded with P₂ (pinching at 35 DAS). As regard to the interaction effect of spacing and pinching, the treatment combination S₁P₂ viz., fenugreek sown at 10 x 5 cm with pinching at 35 DAS produced significantly maximum herbage yield per plot (606.67 g) and per hectare (26.73 q/ha).

Keywords: Plant density, pinching, herbage yield, fenugreek, Phule Kasturi

Introduction

Fenugreek (*Trigonella foenum-graecum* L.) often known as methi is cultivated throughout the country. Fenugreek belongs to the family Fabaceae and sub family Papilionacea is widely used as spice and condiment to add flavor in various foods. There are two species of the genus i.e., *Trigonella foenum-graecum* L. the common methi and *Trigonella corniculata* (Kasuri methi). Each 100 g fresh weight of fenugreek leaves contains moisture (86.1 g), fat (0.9 g), protein (4.4 g), minerals (1.5 g), carbohydrates (6.0 g), phosphorus (51 mg), calcium (360 mg), magnesium (67 g), sulphur (167 mg), iron (17.2 mg), vitamin A (6450 I.U.) and vitamin C (54 mg). The amount of vitamin C lost by the leaves after boiling in water, steaming, and frying is 10.8 and 7.4%, respectively. (Pruthi 1979)^[8].

Controlling the ideal plant density in the field is one of the key factors in enhancing productivity and quality. The cultivar, soil's yield potential, irrigation conditions, and cultivation goals all affect plant density (Tuncturk, 2011)^[13]. The ideal plant density creates circumstances for maximum light absorption from the beginning of crop growth until harvest. In order to produce quality green leaves for vegetables and dried seeds for spices, it is crucial to use the right cutting management practices. The aforementioned explanation demonstrates that a growers' subsidiary income will increase profitability. Both of these factors are having vital importance in fenugreek production. In this study the main emphasis was given on appropriate cultural practices such as plant densities and pinching in order to enhance the production per unit area by utilizing the available space and utilization of the resources with an objective to find out optimum plant spacing and suitable pinching stage for the cultivation of fenugreek and to study the influence of plant densities and pinching levels on herbage yield of fenugreek.

Materials and Methods

The present investigation was carried out during *rabi* season of 2021-2022, at Department of Horticulture, Vasantnao Naik Marathwada Krishi Vidyapeeth, Parbhani. The experiment was designed in a factorial randomized block design (FRBD). There were eighteen treatments combinations and each treatment was replicated thrice with a plot size 1.5 x 1.5 m per treatment.

Corresponding Author:
MS Jadhav
M.Sc. Scholar,
Department of Horticulture,
College of Agriculture, VNMKV,
Parbhani, Maharashtra, India

There were two factors in that, first factor spacing comprised with six levels i.e., 10 x 5 cm, 10 x 10 cm, 20 x 5 cm, 20 x 10 cm, 30 x 5 cm, 30 x 10 cm and another factor pinching with three levels of pinching i.e., no pinching, pinching at 25 DAS, pinching at 35 DAS. The plots were kept free from weeds by hand weeding at 15 and 30 days after sowing. The irrigations were given at an interval of 4-5 days during the whole cropping period depending on soil moisture condition.

In order to evaluate the effect of different treatments on growth and yield of crop, necessary periodical observations were recorded and the recorded data was statistically analyzed by ANOVA method given by Panse and Sukhatme (1995) [7].

Results and Discussion

Effect of plant densities

It was observed from the data pertaining to Table No. 1 and 2 that, spacing significantly influenced different growth parameters viz., plant height, number of branches per plant, number of leaves per plant, herbage yield per plot and herbage yield per hectare. The highest plant height (16.96 cm, 32.20 cm, 67.67 cm) was recorded with closer spacing treatment S₁ (10 x 5 cm) whereas, minimum plant height (13.54 cm, 22.69 cm, 55.46 cm) was recorded with wider spacing treatment S₆ (30 x 10 cm) at 30, 45 and 60 DAS respectively. This might be due to the fact that, in closer spacing there is competition between plant for sunlight, nutrient, water etc. as compared to the wider spacing treatment which might be resulted into better growth and development of plant at closer spacing treatment. These findings are conformity with the results reported by Rana *et al.* 2015 and Kumar *et al.* 2018 [6]. Maximum herbage yield per plot (308.11 g) and maximum herbage yield per hectare (13.56 q/ha) was recorded with closer spacing treatment S₁ (10 x 5 cm) and minimum herbage yield per plot (53.78 g) and minimum herbage yield per hectare (2.30 q/ha) was noticed with wider spacing treatment S₆ (30 x 10 cm). This is because of closer spacing accommodates more number of plants per unit area. These results are in close conformity with the Bhapkar *et al.* (2019) [2] and Anjukrishna *et al.* (2021) [1] in coriander. Maximum number of branches per plant (4.12, 8.06, 13.56) and maximum number of leaves per plant (16.17, 46.84, 74.77) was observed with wider spacing treatment S₆ (30 x 10 cm) although, minimum number of branches per plant (2.84, 5.08, 6.44) and minimum number of leaves per plant (13.71, 34.62, 59.93) was observed with closer spacing treatment S₁ (10 x 5 cm) at 30, 45 and 60 DAS respectively. This might due to reason that, every plant with wider spacing might get adequate area to spread in all the direction. Wider spacing would be responsible for less competition towards air,

light, moisture, etc. amongst the plants, which results in maximum number of branches per plant and number of leaves per plant. These findings are in conformity with the results reported by Tiwari (2016) [12] in fenugreek and Jawarkar *et al.* (2018) [4] in Kasturi methi.

Table 1: Studies on plant densities and pinching levels on plant height and number of branches per plant

Treatment	Plant height (cm)			Number of branches		
	30 DAS	45 DAS	60 DAS	30 DAS	45 DAS	60 DAS
Spacing (S)						
S ₁ (10 x 5 cm)	16.96	32.20	67.67	2.84	5.08	6.44
S ₂ (10 x 10 cm)	15.54	28.13	63.17	3.00	6.12	6.78
S ₃ (20 x 5 cm)	15.38	26.96	60.31	3.24	6.46	7.64
S ₄ (20 x 10 cm)	15.00	25.96	57.96	3.61	7.26	12.22
S ₅ (30 x 5 cm)	14.56	24.67	57.37	3.80	7.86	12.62
S ₆ (30 x 10 cm)	13.54	22.69	55.46	4.12	8.06	13.56
SE±	0.36	0.95	1.41	0.86	0.16	0.23
CD @ 5 %	1.03	2.73	4.08	0.25	0.46	0.67
Pinching (P)						
P ₀ (no pinching)	16.84	32.13	64.28	3.23	6.32	9.16
P ₁ (pinching at 25 DAS)	12.11	24.79	56.19	3.68	7.35	10.55
P ₂ (pinching at 35 DAS)	16.54	23.38	60.51	3.40	6.74	9.92
SE±	0.25	0.67	0.99	0.06	0.11	0.16
CD @ 5 %	0.73	1.93	2.88	0.18	0.33	0.47
Interaction effect (S x P)						
S ₁ P ₀	18.83	40.40	70.99	2.67	4.40	6.20
S ₁ P ₁	13.30	27.47	63.41	3.00	5.80	6.73
S ₁ P ₂	18.73	28.73	68.63	2.87	5.03	6.40
S ₂ P ₀	17.17	35.40	69.87	2.80	5.60	6.27
S ₂ P ₁	12.40	25.47	57.95	3.20	6.77	7.27
S ₂ P ₂	17.07	23.53	61.70	3.00	6.00	6.80
S ₃ P ₀	17.00	32.60	63.95	3.13	5.90	6.67
S ₃ P ₁	12.23	24.87	55.66	3.40	6.80	9.07
S ₃ P ₂	16.90	23.40	61.32	3.20	6.67	7.20
S ₄ P ₀	16.67	31.67	60.49	3.47	6.90	11.00
S ₄ P ₁	12.07	24.40	55.59	3.87	7.57	13.00
S ₄ P ₂	16.27	21.80	57.81	3.50	7.30	12.67
S ₅ P ₀	16.37	28.53	60.27	3.60	7.40	11.60
S ₅ P ₁	11.80	24.00	54.22	4.00	8.50	13.40
S ₅ P ₂	15.50	21.47	57.63	3.80	7.67	12.87
S ₆ P ₀	15.00	24.20	60.09	3.70	7.70	13.23
S ₆ P ₁	10.83	22.53	50.31	4.63	8.67	13.83
S ₆ P ₂	14.80	21.33	55.99	4.03	7.80	13.60
S.E(m) ±	0.62	1.64	2.45	0.15	0.28	0.40
CD @ 5 %	NS	NS	NS	NS	NS	NS

* Note: DAS means days after sowing.

*NS- non significant

Table 2: Studies on plant densities and pinching on number of leaves per plant, herbage yield per plot and herbage yield per hectare

Treatments	Number of leaves per plant			Herbage yield per plot (g)	Herbage yield q/ha
	30 DAS	45 DAS	60 DAS		
Spacing (S)					
S ₁ (10 x 5 cm)	13.71	34.62	59.93	308.11	13.56
S ₂ (10 x 10 cm)	14.82	35.60	63.99	168.78	7.32
S ₃ (20 x 5 cm)	15.12	39.73	67.05	135.33	5.86
S ₄ (20 x 10 cm)	15.54	41.11	69.22	131.56	5.55
S ₅ (30 x 5 cm)	15.87	43.84	71.99	97.11	4.13
S ₆ (30 x 10 cm)	16.17	46.84	74.77	53.78	2.30
SE±	0.40	1.04	1.81	5.28	0.26
CD @ 5 %	1.17	2.99	5.20	15.18	0.74
Pinching (P)					

P ₀ (no pinching)	17.34	50.36	66.25	0.00	0.00
P ₁ (pinching at 25 DAS)	11.42	38.72	69.32	114.17	4.92
P ₂ (pinching at 35 DAS)	16.86	31.74	67.90	333.17	14.44
SE _±	0.29	0.74	1.28	3.73	0.18
CD @ 5 %	0.83	2.12	3.68	10.73	0.52
Interaction effect (S x P)					
S ₁ P ₀	15.20	42.47	58.27	0.00	0.00
S ₁ P ₁	10.80	32.33	61.27	317.67	13.93
S ₁ P ₂	15.13	29.07	60.27	606.67	26.73
S ₂ P ₀	17.00	44.00	62.27	0.00	0.00
S ₂ P ₁	11.13	33.53	65.27	126.67	5.46
S ₂ P ₂	16.33	29.27	63.93	379.67	16.50
S ₃ P ₀	17.40	52.00	65.50	0.00	0.00
S ₃ P ₁	11.27	36.87	68.23	88.33	3.76
S ₃ P ₂	16.70	30.33	67.43	317.33	13.83
S ₄ P ₀	17.93	53.20	67.20	0.00	0.00
S ₄ P ₁	11.40	38.20	71.10	82.33	3.27
S ₄ P ₂	17.30	31.93	69.37	312.33	13.38
S ₅ P ₀	18.00	54.13	70.20	0.00	0.00
S ₅ P ₁	11.87	43.73	73.47	45.00	1.97
S ₅ P ₂	17.73	33.67	72.30	246.33	10.42
S ₆ P ₀	18.50	56.33	73.60	0.00	0.00
S ₆ P ₁	12.07	47.66	76.60	25.00	1.11
S ₆ P ₂	17.93	36.20	74.10	136.33	5.80
S.E(m) ±	0.70	1.80	3.13	9.14	0.44
CD @ 5 %	NS	NS	NS	26.29	1.28

Effect of pinching levels

It is evident from the data presented in Table No. 1 and 2 that, plant height, number of branches, number of leaves per plant at 30, 45 and 60 DAS showed significant variation in respect of time of pinching. The maximum plant height (16.84 cm, 32.13 cm and 64.28 cm) was recorded respectively at 30, 45 and 60 DAS with P₀ (no pinching) treatment whereas, minimum plant height (12.11 cm and 56.19 cm) was recorded with P₁ (pinching at 25 DAS) at 30 and 60 DAS respectively and at 45 DAS minimum plant height (23.38 cm) was recorded with P₂ (pinching at 35 DAS) because pinching at 35 DAS was undertaken just before ten days from the day of observations recorded. The similar results were recorded by Vasudevan *et al.* (2008) [14]. Maximum number of branches per plant (3.68, 7.35, 10.55) was recorded with pinching P₁ (pinching at 25 DAS) and minimum number of branches per plant (3.23, 6.32, 9.16) was recorded with pinching P₀ (no pinching) treatment at 30, 45 and 60 DAS respectively. Activating the lateral dormant buds by arresting the terminal growth through pinching would have facilitated the

significant increase in number of branches. The present study is in conformity with the findings of Vasudevan *et al.* (2008) [14] and krishnaveni *et al.* (2016) [5] in fenugreek. Number of leaves per plant varies with different pinching stages with different time. At 30 and 45 DAS maximum number of leaves was noticed with no pinching treatment (17.34 and 50.36) respectively. At 60 DAS maximum number of leaves (69.32) was observed with P₁ (pinching at 25 DAS) and minimum number of leaves per plant (11.42) was recorded at 30 DAS and at 45 DAS minimum number of leaves per plant (31.74) was found with P₂ (pinching at 35 DAS) and at 60 DAS minimum number of leaves per plant (66.25) was observed with P₀ (no pinching treatment). This might due to fact that, more the number of branches per plant were produced at wider spacing and the pinching of growing tips would helpful in regeneration of new flush and probably encourages development of sides shoots which might results in increase in number of leaves per plant. These results are in closer conformity with the findings of Gill *et al.* (2001) [3] in fenugreek, Singh (2015) [10] in spinach beet.

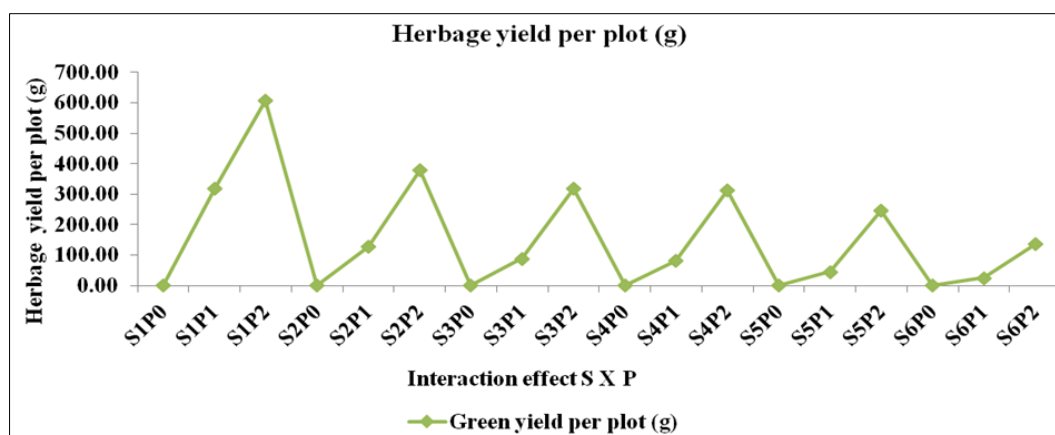


Fig 1: Herbage yield per plot (g)

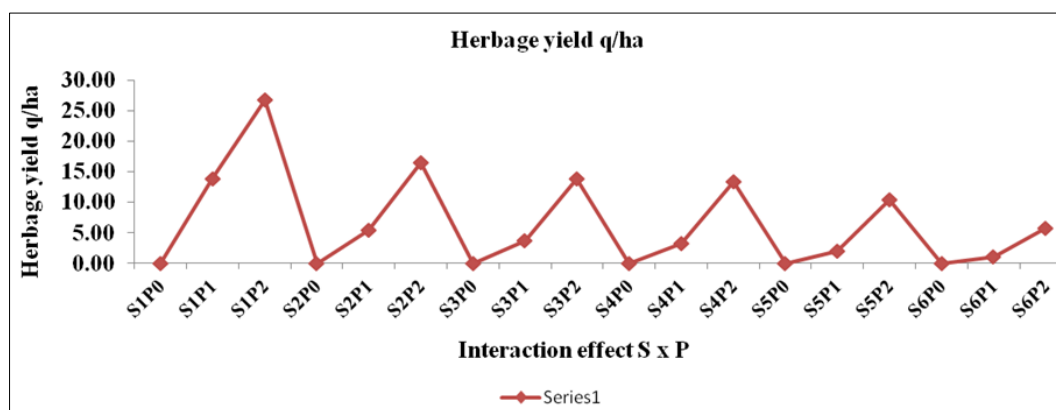


Fig 2: Herbage yield q/ha

Maximum herbage yield per plot (333.17 g) and maximum herbage yield per hectare (14.44 qt/ha) was observed with P₂ (pinching at 35 DAS) and minimum herbage yield per plot (114.17 g) and minimum herbage yield per hectare (4.92 q/ha) was recorded with P₁ (pinching at 25 DAS) treatment. This might be due to the fact that, second pinching at 35 DAS would provide the sufficient time for regeneration of vegetative parts and enhance growth of other plant parts by maintaining source sink relationship of nutrients. These results are in close conformity with the findings of Vasudevan *et al.* (2008)^[14] and Krishnaveni *et al.* (2014)^[5] Jawarkar *et al.* (2018)^[4], Singh *et al.* (2018)^[11] in fenugreek.

Interaction effect of spacing and pinching

Interaction effect of spacing and pinching was found to be non significant for plant height, number of branches per plant and number of leaves per plant. Among the interactions, the treatment combination S₁P₂ (10 x 5 cm with pinching at 35 DAS) recorded highest herbage yield per plot (606.67 g) and highest herbage yield per hectare (26.73 q/ha) whereas, minimum herbage yield per plot (25.00 g) and minimum herbage yield per hectare (1.11 q/ha) were recorded with the treatment combination S₆P₁ (30 x 10 cm with pinching at 25 DAS).

Conclusion

From the one year experiment, it could be concluded that, for getting maximum herbage yield fenugreek must be sown at closer spacing 10 x 5 cm and pinched at 35 days after sowing. There is scope to undertake this study for more years for confirmation of the results obtained in present study.

References

- Anjukrishna VU, Raj N, Anitha P, Aneesha AK. Effect of seed treatments, spacing and season of sowing on yield and quality of coriander (*Coriandrum sativum* L.) under rain shelter. *Journal of Spices and Aromatic Crops*. 2021;30(1).
- Bhaskar, Pradip Balaso Sharma, Dev H, Negi Sudhaker, Pundir Diksha, Sharma Vipin, et al. Effect of Cutting and Intra Row Spacing on Yield and Phenotypical Attributes of Coriander (*Coriandrum sativum* L.) *International Journal of Current Microbiology and Applied Sciences*. 2019;8(09).
- Gill BS, Randhawa RS, Saini SS. Effect of sowing dates and herb cutting management on growth and yield of fenugreek (*Trigonella foenum-graecum*). *Indian Journal of Agronomy*. 2001;46(2):364-367.
- Jawarkar AK, Ghawade SM, Bhavar SV, Tayade VD. Influence of spacing and pinching on leaf yield of kasuri methi (*Trigonella corniculata* L.) under Akola (M.S.) conditions. *International Journal of Chemical Studies*. 2018;6(2):1023-1025.
- Krishnaveni V, Padmalatha T, Padma SSV, Prasad ALN. Influence of pinching and plant growth regulators on flowering, yield and economics of fenugreek (*Trigonella foenum-graecum* L.). *Journal of Spices and Aromatic Crops*. 2016;25(1):41-48.
- Kumar Pawan, Phor SK, Tehlan SK, Mathur Amit Kumar. Effect of seed rate and row spacing on growth and yield of fenugreek (*Trigonella foenum-graecum*). *Journal of Pharmacognosy and Phytochemistry*. 2018;7(4):93-96.
- Panse VG, Sukhatme PV. *Statistical Methods for Agricultural Workers*. Indian Council of Agricultural Research, New Delhi. 1985;108.
- Pruthi JS. *Spice and condiments*, National Book Trust, New Delhi (India), 1979, 118-123.
- Rana SC, Pandita VK, Sirohi Sanjai. Influence of spacing and number of leaf cuttings on seed yield in fenugreek. *Legume Research*. 2015;38(6):858-860.
- Singh Gyanendra Pratap, Meena ML, Jay Prakash. Effect of different levels of nitrogen and cuttings on growth, leaf yield and quality of spinach beet (*Beta vulgaris* var. *bengalensis*) cv. All Green. *European Journal of Biotechnology and Bioscience*. 2015;3:38-42.
- Singh Satybhyan, Dhangra VK, Singh Virendra, Thenua OVS, Pal Krishan, Shukla RD. Nitrogen rate and cutting management for fenugreek green leaf and seed production. *International Journal of Bio-resource and Stress Management*. 2018;9(4):523-526.
- Tiwari Dinesh, Upadhyay Sandeep, Paliwal Ajaya. Plant spacing response on growth and yield of fenugreek in high altitude of Uttarakhand. *International Journal of New Technology and Research (IJNTR)*. 2016;2:33-35.
- Tunçturk Ruveyde. The effects of varying row spacing and phosphorus doses on the yield and quality of fenugreek (*Trigonella foenum-graecum* L.) *Turkish Journal of Field Crops*. 2011;16(2):142-148.
- Vasudevan SN, Sudarshan JS, Kurdikeri MB, Dharmatti PR. Influence of pinching of apical bud and chemical sprays on seed yield and quality of fenugreek. *Karnataka J Agric. Sci*. 2008;21(1):26-29.