



E-ISSN: 2278-4136

P-ISSN: 2349-8234

JPP 2018; 7(3): 1127-1130

Received: 11-03-2018

Accepted: 15-04-2018

Jyothi Veerayya Hosamath
Department of Horticulture,
College of Agriculture, Dharwad
University of Agricultural
Sciences, Dharwad, Karnataka,
India

Hegde RV
Department of Horticulture,
College of Agriculture, Dharwad
University of Agricultural
Sciences, Dharwad, Karnataka,
India

Performance of fenugreek (*Trigonella foenum-graecum* L.) genotypes for growth and herbage yield

Jyothi Veerayya Hosamath and Hedge RV

Abstract

The study was conducted in *Rabi* 2014-15 to evaluate the performance of different genotypes of fenugreek at University of Agricultural Sciences, Dharwad. Among the 35 genotypes evaluated, the highest plant height was recorded in DFC 4 and DFC 14 at 30 and 60 days after sowing respectively. Pusa Early Bunching recorded maximum number of branches per plant at 30 and 60 days after sowing. Maximum number of leaves per plant were observed in DFC 5 and DFC 6 at 30 and 60 days after sowing respectively. DFC 6 (0.76 kg/sq.m) showed highest herbage yield. Pusa Early Bunching (0.74 kg/sq.m.), Ajmer Methi 1 (0.69 kg/sq.m) and DFC 5 (0.68 kg/sq.m.) also produced significantly higher herbage yield than the check Gujarat Methi 2 (0.60 kg/sq.m.).

Keywords: fenugreek, genotypes, herbage yield, plant height

Introduction

Fenugreek (*Trigonella foenum-graecum* L.) is the third largest seed spice in India after coriander and cumin. In India, fenugreek is grown in about 93,090 ha with an annual production of about 1,12,845 tonnes (Anon., 2014) [1]. Major producing states are Rajasthan, Madhya Pradesh, Gujarat, Uttar Pradesh and Tamil Nadu. Fenugreek is a multipurpose crop being used as a spice, leafy vegetables, fodder and as a medicinal plant.

The performance in terms of growth, yield and quality parameters in any crop species are known to be influenced by various factors like variety/hybrid used, season of planting, cultural practices adopted, environment, incidence of pest and diseases etc. Among various factors, selection of suitable variety/hybrid is most important and vital aspect which contributes much to the performance of any crop. However, the performance of cultivars of any crop species differs from one region to another region under a given set of agro-climatic conditions. Keeping all these aspects in view, the present investigation was carried out with the objective to evaluate the performance of fenugreek genotypes for growth and herbage yield.

Materials and Methods

The present investigation on fenugreek was undertaken during *Rabi* 2014-15 at Spice Unit, Main Agricultural Research Station, University of Agricultural Sciences, Dharwad to study the performance of fenugreek genotypes. Thirty five genotypes of fenugreek including check Gujarat Methi 2 obtained from different research stations and local collections were evaluated in randomized block design with two replications. The fertilizer applications and other cultural practices were followed as per the recommendations. Observations were recorded on important growth parameters. The data was analysed statistically as per the methods suggested by (Panse and Sukhatme, 1978) [5].

Results and Discussion

The data on different growth parameters of different fenugreek germplasm have been presented in Table 1.

Significant differences in plant height at 30 and 60 days after sowing (DAS) were recorded among the genotypes evaluated. At 30 DAS, DFC 4 recorded significantly the highest plant height (22.90 cm) which was on par with DFC 5, DFC 24, DFC 6 and Ajmer Methi 1 which might be due to vigorous growth of these genotypes in initial stage showing their vegetable purpose. At 60 DAS, the highest plant height was recorded with DFC 14 (76.30 cm) which was on par with DFC 5, DFC 22 and Ajmer Methi 1. These genotypes were significantly taller than check Gujarat Methi 2. Pusa Early Bunching was found to be the dwarf genotype recording a minimum plant height at 30 and 60 DAS. Variation observed in the plant height

Correspondence

Jyothi Veerayya Hosamath
Department of Horticulture,
College of Agriculture, Dharwad
University of Agricultural
Sciences, Dharwad, Karnataka,
India

was due to their genetic character and also environmental factors. (Bhojanagouda, 2011; Sarada and Giridhar, 2011)^[2, 6]. Number of branches at 30 DAS varied among the genotypes evaluated. Pusa Early Bunching recorded the highest number of branches per plant (4.20) and all remaining genotypes were on par with Pusa Early Bunching. At 60 DAS, Pusa Early Bunching (14.70) was found to produce significantly the highest number of branches and was on par with DFC 7 and check Gujarat Methi 2 and the lowest number of branches was recorded in DFC 25. The variation may be due to their genetic makeup and environmental factors (Bhojanagouda, 2011; Kakani, 2013)^[2, 3].

All the genotypes studied significantly differed with respect to number of leaves per plant at 30 and 60 DAS. DFC 5 (24.50) recorded maximum number of leaves as against the lowest (12.60) in DFC 12. DFC 5 was on par with Pusa Early Bunching, DFC 6, Pant Ragini, Ajmer Methi 1, DFC 11 and DFC 22 and these genotypes possessed significantly maximum number of leaves than check Gujarat Methi 2 (14.50) at 30 DAS. This might be due to genetic build up. At 60 DAS, DFC 6 (104.90) produced maximum number of leaves followed by DFC 28 and these were on par with check Gujarat Methi 2 (92.20) whereas, DFC 21 (53.30) recorded significantly the lowest number of leaves. The difference in number of leaves is a varietal trait as it is governed by the genetic makeup and also due to environmental conditions (Malik and Tehlan, 2009; Bhojanagouda, 2011)^[4, 2].

Genotypes Gujarat Methi 2, DFC 4, Ajmer Methi 2 and DFC 25 had the maximum leaf area (9.24 cm², 8.96 cm², 8.90 cm² and 8.54 cm² respectively) which were found to be statistically on par and lowest was found in genotypes DFC 21 (5.23 cm²). DFC 16 gave significantly the highest chlorophyll content (60.91) as against the lowest in DFC 24 (46.75). The rest of the genotypes were next to DFC 16 and were on par among themselves.

The data on herbage yield and dry matter content of different fenugreek germplasm have been presented in Table 2.

The highest herbage yield was recorded with DFC 6 (0.76 kg/sq.m.) followed by Pusa Early Bunching (0.74 kg/sq.m.) as compared to other genotypes (fig.1). Ajmer Methi 1 (0.69 kg/sq.m) and DFC 5 (0.68 kg/sq.m.) also produced significantly higher herbage yield than the check Gujarat Methi 2 (0.60 kg/sq.m.). The lowest herbage yield was recorded in DFC 12 (0.33 kg/sq.m.). The higher herbage yield in these genotypes may be due to the maximum number of branches per plant and maximum number of leaves.

DFC 24 (5.16 g) recorded the highest dry matter per plant which was on par with DFC 6 (4.83 g), Pusa Early Bunching, DFC 4 and DFC 27. The above genotypes were also on par with check Gujarat Methi 2 (3.25 g). The lowest dry matter per plant was recorded in DFC 12 (1.23 g).

From the study it can be concluded that the cultivation of genotypes DFC 6, Pusa Early Bunching, Ajmer Methi 1 and DFC 5 were found to be superior with respect to herbage yield.

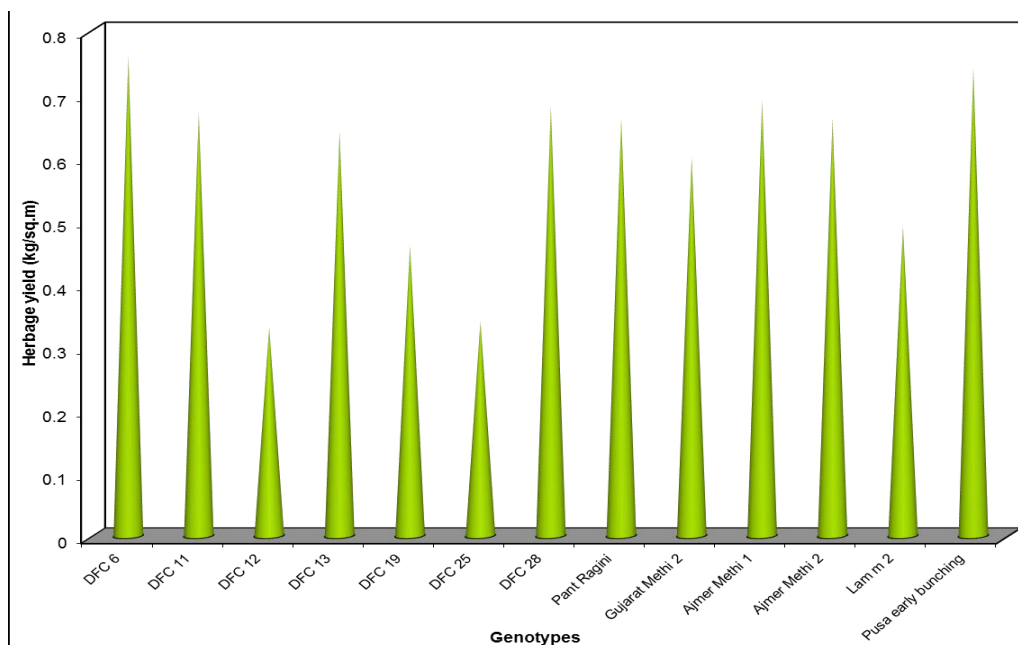
Table 1: *Per se* performance of fenugreek genotypes for growth parameters

Sl. No	Genotypes	Plant height (cm)		Number of branches		Number of leaves		Leaf area (cm ²)	Chlorophyll content (SPAD unit)
		30 DAS	60 DAS	30 DAS	60 DAS	30 DAS	60 DAS		
1	DFC 1	14.00	54.10	3.10	8.10	19.50	68.95	5.86	57.46
2	DFC 2	16.60	59.60	3.50	6.20	21.50	61.50	6.85	56.53
3	DFC 3	17.80	56.90	3.00	8.10	13.90	67.20	6.01	56.85
4	DFC 4	22.90	70.10	3.70	7.10	20.20	57.80	8.96	54.30
5	DFC 5	21.30	71.30	3.50	12.00	24.50	82.40	7.83	56.32
6	DFC 6	20.50	65.80	4.00	11.50	23.20	104.90	7.22	57.68
7	DFC 7	19.10	56.40	3.60	13.70	20.30	85.00	7.93	55.76
8	DFC 8	18.90	64.70	3.10	11.70	19.60	94.40	7.52	56.05
9	DFC 9	14.00	43.00	2.60	11.40	17.40	86.50	7.90	56.03
10	DFC 10	18.10	66.50	3.00	11.80	15.90	89.10	6.68	54.93
11	DFC 11	16.60	46.90	3.60	8.50	22.05	73.50	7.01	53.25
12	DFC 12	9.60	48.30	2.90	11.30	12.60	80.80	7.20	53.36
13	DFC 13	17.10	61.20	3.00	8.50	16.70	67.70	7.42	58.95
14	DFC 14	18.40	76.30	3.30	6.50	18.80	61.15	8.43	56.36
15	DFC 15	16.90	66.30	3.50	7.10	18.40	74.00	7.90	52.26
16	DFC 16	13.70	61.80	3.20	6.50	16.71	77.90	7.43	60.91
17	DFC 17	17.70	37.60	3.60	8.00	20.40	65.50	6.04	58.86
18	DFC 18	15.80	62.60	3.70	5.90	17.55	61.90	6.59	53.87
19	DFC 19	13.20	42.30	3.30	9.00	17.80	57.10	7.55	57.92
20	DFC 20	15.40	61.00	2.90	7.60	16.30	75.60	7.43	52.09
21	DFC 21	13.80	50.10	3.00	10.60	15.60	53.30	5.23	50.75
22	DFC 22	17.20	70.90	3.40	7.10	20.90	85.70	7.52	55.50
23	DFC 23	19.00	53.40	3.75	9.20	14.20	95.10	7.06	55.16
24	DFC 24	21.30	58.60	3.50	7.60	21.10	61.80	7.26	46.75
25	DFC 25	16.60	59.30	3.30	4.80	20.50	53.95	8.54	58.04
26	DFC 26	17.40	66.10	2.90	7.40	14.10	73.30	8.57	56.59
27	DFC 27	18.80	49.70	3.20	9.20	19.90	78.20	6.86	55.11
28	DFC 28	15.40	58.50	2.70	12.20	17.50	97.80	6.72	54.82
29	DFC 29	15.10	53.50	2.30	11.50	21.70	90.50	7.50	57.32
30	Pant Ragini	11.70	65.65	3.70	8.10	22.60	95.30	8.34	54.34
31	Ajmer Methi 1	20.10	70.80	3.90	9.00	22.50	88.50	6.86	54.89
32	Ajmer Methi 2	18.90	52.60	3.30	6.70	17.30	84.00	8.90	53.80
33	Lam M 2	17.50	37.90	3.20	8.20	19.25	69.30	7.69	52.06
34	Pusa Early Bunching	1.80	24.40	4.20	14.70	23.50	65.50	6.20	49.56
35	Gujarat Methi 2 (check)	12.80	54.90	2.60	12.90	14.50	92.20	9.24	55.62

	Mean	16.43	57.12	3.29	9.13	18.81	76.50	7.38	55.14
	SEm \pm	0.99	2.34	0.34	0.81	1.38	6.97	0.24	2.05
	C.D. at 5%	2.85	6.73	NS	2.33	3.73	20.02	0.70	5.90

Table 2: *Per se* performance of fenugreek genotypes for herbage yield and dry matter content

Sl. No	Genotypes	Herbage yield (kg/sq.m)	Dry matter content(g/plant)
1	DFC 1	0.44	1.89
2	DFC 2	0.42	1.92
3	DFC 3	0.58	2.18
4	DFC 4	0.65	4.33
5	DFC 5	0.68	3.00
6	DFC 6	0.76	4.83
7	DFC 7	0.55	3.61
8	DFC 8	0.58	3.59
9	DFC 9	0.66	3.83
10	DFC 10	0.54	3.20
11	DFC 11	0.67	3.71
12	DFC 12	0.33	1.23
13	DFC 13	0.64	3.28
14	DFC 14	0.57	3.71
15	DFC 15	0.59	3.18
16	DFC 16	0.63	3.53
17	DFC 17	0.57	2.44
18	DFC 18	0.51	2.64
19	DFC 19	0.46	3.12
20	DFC 20	0.47	2.70
21	DFC 21	0.62	3.41
22	DFC 22	0.49	3.58
23	DFC 23	0.52	3.19
24	DFC 24	0.66	5.16
25	DFC 25	0.34	2.98
26	DFC 26	0.57	3.14
27	DFC 27	0.62	4.31
28	DFC 28	0.68	3.25
29	DFC 29	0.61	3.71
30	Pant Ragini	0.66	3.29
31	Ajmer Methi 1	0.69	3.87
32	Ajmer Methi 2	0.66	3.26
33	Lam M 2	0.49	1.77
34	Pusa Early Bunching	0.74	4.79
35	Gujarat Methi 2 (check)	0.60	3.25
	Mean	0.58	3.30
	SEm \pm	0.08	0.60
	C.D. at 5%	0.22	1.73

**Fig 1:** Performance of selected fenugreek genotypes for herbage yield

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