Available online at www.ijpab.com

DOI: http://dx.doi.org/10.18782/2320-7051.3010

ISSN: 2320 – 7051

Int. J. Pure App. Biosci. **5 (3):** 1097-1102 (2017)

Research Article

International Journal of Pure & Applied Bioscience

OPEN ACCESS

Mean Performance of 150 Fenugreek (*Trigonella foenum-graecum* L.) Genotypes for Yield and Yield Contributing Traits

Mamatha, N. C.[1*], Tehlan, S. K.[1], Srikanth, M.[1], Ravikumar, T.[1], Batra, V. K.[1], Karthik Reddy, P.[1] and Manoj Kumar Nalla[2]

[1]Department of Vegetable Science, CCS Haryana Agricultural University, Hisar-125 004

[2]Department of Vegetable Science, IARI, New Delhi-110 012

*Corresponding Author E-mail: mamatha.hortico@gmail.com

Received: 23.05.2017 | Revised: 4.06.2017 | Accepted: 5.06.2017

ABSTRACT

The study of 150 fenugreek genotypes which were collected from five different agro-climatic zones for their yield and yield attributing traits revealed that there is a wide range of variability for the traits under study. The maximum plant height was recorded in HM-242 (121.23 cm), whereas the minimum plant height was recorded in HM-281-7-2 (67.07 cm). The highest number of primary branches per plant and secondary branches per plant was recorded in genotypes HM-242 (6.07) and HM-242 and HM-307 (12.53) respectively. The genotype HM- HM-300 (14.43 cm) recorded maximum pod length. And the maximum number of pods per plant and seeds per pod was recorded in HM-555 (164.40) and HM-509 (12.60). Highest yield per plant (26.2 g) and test weight (14.53 g) were observed in the genotype HM-242.

Key words: *Fenugreek, Variability, yield, Yield attributing traits, Genotype.*

INTRODUCTION

Fenugreek (*Trigonella foenum-graecum* L.) is an annual diploid species with chromosomal number 2n=16. Fenugreek is commonly known as '*methi*' or '*mentha*' which belongs to the family 'Fabaceae'. It is originated in the countries bordering to the Eastern shores of Mediterranean region, extending to Central Asia. Fenugreek is an important seed spice and is also used as leafy vegetable. It is rich in minerals, proteins, vitamin A and C. In Ayurvedic and Unani system of medicine, fenugreek is known to treat many chronic diseases. It is also having hypoglycemic and hypocholesterolaemic properties. Fenugreek contains several phytochemicals like steroids, alkaloids and flavonoids[1].

For any crop improvement program presence of genetic variability in the population is very important as it provide chance to pick the genotype having desirable trait for improvement and it also gives wide range of options to improve trait of interest. So, the evaluation of genotypes is important for further crop improvement program.

Cite this article: Mamatha, N.C., Tehlan, S. K., Srikanth, M., Ravikumar, T., Batra, V.K., Reddy, K.P. and Nalla, M.K., Mean Performance of 150 Fenugreek (*Trigonella foenum-graecum* L.) Genotypes for Yield and Yield Contributing Traits, *Int. J. Pure App. Biosci.* **5(3):** 1097-1102 (2017). doi: http://dx.doi.org/10.18782/2320-7051.3010

MATERIALS AND METHODS

The study was conducted at Research Farm of the Department of Vegetable Science, Chaudhary Charan Singh Haryana Agricultural University, Hisar during the winter season of 2014-15. The experimental material consisted of 150 fenugreek genotypes (Table 1.). These are planted in a Randomized block design which replicated thrice. Each genotype is planted at a spacing of 50 cm x 10 cm (two rows of 3.0 m length for each genotype). The data on eight morphological and yield attributing traits was taken in five plants which were tagged at random in all three replications to record the data, and analyzed by the standard statistical methods.

RESULTS AND DISCUSSION

The results of the present investigation are presented in the **Table 1**. The plant height ranged from 67.07 cm to 121.23 cm with an overall mean of 88.70 cm. The maximum plant height was recorded in the genotype HM-242 (121.23 cm) followed by HM-258-1 (118.27 cm), HM-208 (118.2 cm), HM-507 (117 cm), HM-239 (116.87 cm), HM-307 (116.53 cm), HM-370 (116.03 cm), RM-194 (115.47 cm), JFg-266 (115.13 cm) and LFC-93 (115.13 cm). And minimum plant height was recorded in the genotype.

Primary branches per plant varied from 1.06 to 6.067 with overall mean 2.90. The genotype HM-242 (6.07) recorded maximum number of primary branches per plant followed by HM-239 (5.57), HM-307 (5.57), HM-258-1 (5.5), JFg-266 (5.17), HM-208 (5.17), HM-246 (5.1), HM-370 (5.03), HM-257 (5), GM-2 (4.93) and HM-273-1 (4.93). And minimum number of primary branches per plant was recorded in HM-535.

Secondary branches per plant varied from 6.23(HM-549 and HM-514) to 12.53 (HM-307 and HM-242) with overall mean 8.80. The maximum number of secondary branches per plant was noted in the genotype HM-307 and HM-242 (12.53) followed by HM-258-1 (12.47), HM-507 (12.40), HM-239, JFg-266 and HM-208 (12.37), HM-65 and HM-526 (12.10) and HM-221, HM-257 and HM-57 (12.07), while the minimum number of secondary branches was recorded in genotype HM-549 and HM-514 (6.23).

Pod length ranged from 7.34 to 14.42 cm with overall mean of 9.79 cm. The genotype HM-300 (14.43 cm) recorded maximum pod length followed by HM-348 (13.08 cm), HM-542 (11.87 cm), HM-226 (11.62 cm), HM-332 (11.45 cm), HM-543 (11.37 cm), HM-534 (11.33 cm), HM-103 (11.30 cm), HM-513 (11.28 cm) and HM-528 (11.21 cm), while the minimum pod length was recorded in HM-271.

The data pertaining to number of pods per plant ranged from 40.7 to 164.4 with mean value 101.14. Highest number of pods per plant was recorded in the genotype HM-555 (164.4) followed by HM-507 (147.4), HM-332 (146.67), HM-114 (146.13), GM-1 (145.27), LFC-93 (144.13), HM-559 (141.33), RMT-361 (140.13), FGK-45 (138.93) and HM-526 (138.8), while the lowest number of pods per plant was recorded in the genotype HM-501.

There was a significant difference among the genotypes for number of seeds per pod, which ranged from 7.06 to 12.60 with mean value 8.99. The genotype HM-509 recorded maximum number of seeds per pod followed by HM-510 (11.8), HM-242 (11.73), HM-281-7-2 and HM-502 (11.47), HM-504 and HM-239 (11.27), HM-258-1 (11.2), HM-208 (11.13) and HM-281-6-1 (10.93). And the minimum number of seeds per pod was recorded in HM-514.

The yield per plant ranged from 8.49 to 26.20 g with overall mean of 15.21 g. Highest yield per plant was recorded in the genotype HM-242 (26.2 g) followed by HM-307 (25.24 g), HM-239 (24.58 g), HM-258-1 (24.38 g), HM-507 (24.32 g), HM-208 (24.11 g), JFg-266 (24 g), RM-194 (23.57 g), HM-526 and HM-65 (23.52 g), while the minimum yield was recorded in the genotype HM-514.

There was a significant difference among the genotypes for test weight, which ranged from 4.86 g to 14.53 g with overall mean of 8.75 g. The maximum test weight was recorded in the genotype HM-242 (14.53 g) followed by HM-291 (14.52 g), HM-307

(14.24 g), HM-239 (13.92 g), RM-194 (13.91 g), HM-507 (13.65 g), HM-65 (13.52 g), HM-208 (13.45 g), HM-258-1 (13.38 g) and RM-188 (13.35 g).

From the study we can draw conclusion that the mean performance of all eight characters under study revealed a great range of mean values, which concludes that there is a wide genetic variability among the genotypes for the traits like plant height. Primary branches per plant, secondary branches per plant, pod length, pods per plant, seeds per pod, yield per plant and test weight. Therefore there is a scope for selection of genotypes with desirable trait to evolve variety and for combining desirable component characters in cross-breeding program. Similar results were reported by earlier studies of Saha and Kole[6], Verma *et al*[8]., Banerjee and Kole[3], Gangopadhyay *et al*[4]., Prajapati *et al*[5]., Ahari *et al*[2]., and Singh *et al*[7].

Table 1: Mean values for different plant growth parameters of fenugreek genotypes

Sr. No.	Genotype	Plant height (cm)	Primary branches / plant	Secondary branches / plant	Pod Length (cm)	Pods per plant	Seeds per pod	Yield/ plant (g)	Test weight (g)
1.	HM-501	70.13	1.40	6.27	10.56	40.70	7.73	8.87	4.87
2.	HM-502	104.23	4.23	11.60	10.11	106.07	11.47	20.99	10.99
3.	HM-503	81.63	2.67	8.27	9.71	97.20	10.80	13.47	7.80
4.	HM-504	83.37	3.10	9.00	8.89	86.07	11.27	15.99	8.32
5.	HM-505	82.30	2.83	8.67	8.18	77.47	10.60	14.10	8.10
6.	HM-506	77.30	2.00	7.03	8.92	85.87	9.80	10.89	6.55
7.	HM-507	117.00	4.90	12.40	8.83	147.40	9.47	24.32	13.65
8.	HM-508	79.67	2.17	7.73	10.06	94.13	8.47	12.49	7.49
9.	HM-509	110.60	4.70	11.53	9.50	126.67	12.60	22.62	11.95
10.	HM-510	81.03	2.43	7.87	8.46	95.20	11.80	12.68	7.68
11.	HM-511	75.47	1.70	6.67	8.76	78.07	7.53	10.28	6.28
12.	HM-512	70.57	1.50	6.63	9.63	108.40	7.33	9.76	5.76
13.	HM-513	78.03	1.80	7.40	11.28	85.27	7.80	11.47	6.80
14.	HM-514	70.27	1.27	6.23	9.71	63.33	7.07	8.49	5.83
15.	HM-515	78.43	1.83	7.50	10.42	93.07	7.87	11.64	6.97
16.	HM-517	104.60	4.60	11.63	10.09	99.20	10.53	22.44	12.11
17.	HM-518	81.73	2.17	7.47	10.14	75.87	7.93	11.67	7.00
18.	HM-519	106.57	4.20	11.45	10.20	109.93	10.40	21.49	11.15
19.	HM-520	77.93	1.83	7.00	10.89	76.33	7.73	10.74	6.41
20.	HM-521	81.57	2.60	8.43	10.47	82.93	8.47	13.76	7.76
21.	HM-522	81.90	2.33	8.13	11.15	114.20	8.33	13.21	7.54
22.	HM-523	73.93	1.60	6.63	10.44	98.07	7.47	9.72	5.72
23.	HM-524	87.70	3.17	9.37	9.71	102.07	8.93	15.96	8.96
24.	HM-525	76.23	1.83	6.97	10.80	59.20	7.73	11.00	6.66
25.	HM-526	113.27	4.80	12.10	10.44	138.80	10.60	23.52	13.19
26.	HM-527	84.93	2.43	8.57	10.37	119.13	8.40	13.73	8.07
27.	HM-528	107.47	4.27	11.23	11.21	122.33	10.33	21.50	11.17
28.	HM-529	76.93	1.97	7.03	11.19	70.33	7.87	11.17	6.51
29.	HM-531	81.27	2.27	8.17	9.98	112.07	8.20	12.89	7.56
30.	HM-533	81.27	2.20	8.13	10.67	88.13	8.13	12.20	7.20
31.	HM-532	84.93	2.67	8.63	11.10	93.80	8.47	14.32	8.32
32.	HM-534	80.60	2.10	7.63	11.33	88.13	8.13	12.04	7.04
33.	HM-535	71.67	1.07	8.30	9.04	56.40	7.20	8.96	4.96
34.	HM-536	97.90	4.17	10.87	8.60	138.67	10.27	20.67	10.34
35.	HM-537	83.03	2.13	7.90	8.89	108.53	8.07	12.34	7.01
36.	HM-539	79.80	2.20	7.70	10.17	92.27	7.87	11.89	7.22
37.	HM-540	86.07	2.90	8.47	10.15	95.00	8.67	14.32	8.32
38.	HM-541	86.93	2.40	8.27	10.69	117.07	8.33	13.06	7.40
39.	HM-542	82.80	2.67	8.70	11.87	87.27	8.40	13.61	7.61
40.	HM-543	75.93	1.80	7.10	11.37	61.13	7.67	10.99	6.66
41.	HM-544	74.07	1.83	6.73	9.83	86.07	7.53	10.43	6.09
42.	HM-545	75.73	1.87	7.03	9.39	98.53	7.80	11.10	6.43
43.	HM-546	82.33	1.87	7.03	9.33	81.00	7.67	10.66	6.32

44.	HM-547	76.53	1.50	6.63	10.01	57.80	7.47	9.71	5.71
45.	HM-548	101.87	4.07	10.93	11.08	129.53	10.27	20.92	10.59
46.	HM-549	75.60	1.47	6.23	10.63	97.47	7.33	9.57	5.57
47.	HM-550	73.77	2.03	7.17	9.80	81.20	7.80	11.21	6.54
48.	HM-551	71.00	1.87	6.73	10.01	67.93	7.40	9.92	5.92
49.	HM-552	74.47	1.90	6.77	9.66	102.13	7.67	10.56	6.56
50.	HM-553	76.80	1.90	6.70	10.01	76.47	7.60	10.41	6.41
51.	HM-554	75.30	2.00	7.17	9.87	123.93	7.80	11.33	6.66
52.	HM-555	113.30	4.73	11.97	10.57	164.40	10.80	23.04	12.37
53.	HM-556	84.27	2.13	7.70	9.93	97.13	8.13	12.16	7.16
54.	HM-558	80.37	2.20	7.30	9.39	107.67	7.87	11.89	6.89
55.	HM-559	82.60	2.63	8.63	9.21	141.33	8.40	13.87	7.87
56.	HM-346	105.27	4.63	11.90	10.59	123.93	10.47	21.88	11.54
57.	HM-57	114.30	4.90	12.07	9.26	109.73	10.80	23.29	13.29
58.	HM-103	114.27	4.63	11.87	11.30	98.07	10.67	22.83	12.16
59.	HM-257	114.20	5.00	12.07	8.37	119.53	10.87	23.14	12.47
60.	HM-273	109.07	4.47	11.40	9.51	132.87	10.40	21.55	10.89
61.	HM-291	107.60	4.20	11.13	8.02	114.47	10.33	21.19	14.52
62.	HM-293-1	82.57	2.47	8.00	8.91	95.87	8.20	12.71	7.38
63.	HM-346-1	78.07	2.10	7.77	10.43	78.33	7.87	11.60	6.60
64.	HM-355	106.53	4.23	11.33	9.61	111.93	10.47	21.81	11.14
65.	HM-444	112.60	4.87	11.90	10.32	137.80	10.80	23.13	13.13
66.	RMT-361	87.27	3.03	8.97	10.00	140.13	8.80	15.44	8.77
67.	GM-2	111.80	4.93	11.77	9.47	131.60	10.73	22.98	12.98
68.	GM-1	111.20	4.57	11.47	9.74	145.27	10.60	22.27	11.94
69.	JFG-245	75.87	1.83	6.67	10.21	101.13	7.53	10.51	6.18
70.	JFG-266	115.13	5.17	12.37	10.29	122.20	10.87	24.00	13.00
71.	AFG-5	85.40	2.40	7.97	10.23	107.33	8.27	12.98	7.65
72.	AFG-6	112.27	4.40	11.33	10.75	113.07	10.53	22.27	11.94
73.	LFC-93	115.13	4.80	11.60	10.85	144.13	10.80	23.13	13.13
74.	FGK-45	79.27	2.20	8.03	10.81	138.93	8.20	12.51	7.18
75.	UM-202	110.73	4.17	11.47	10.73	113.73	10.60	22.29	11.96
76.	UM-354	102.27	4.00	10.83	9.45	88.27	10.13	20.42	9.75
77.	NDM-69	112.73	4.67	11.57	10.34	101.13	10.87	22.88	12.88
78.	NDM-72	109.87	4.63	11.67	9.86	127.93	10.60	22.58	12.25
79.	RM-188	113.87	4.70	11.73	11.00	85.40	10.73	23.35	13.35
80.	RM-194	115.47	4.70	12.00	10.75	124.60	10.80	23.57	13.91
81.	NC-1	78.93	2.13	7.93	10.35	93.93	7.87	11.73	6.73
82.	NC-2	82.60	2.43	8.47	9.51	91.67	8.40	13.51	7.84
83.	PEB-1	111.33	4.23	11.33	10.09	103.73	10.53	22.43	12.10
84.	R.KRANTI	109.30	4.07	11.20	10.95	98.87	10.33	21.23	10.56
85.	JFG-235	112.27	4.53	11.50	10.85	105.47	10.67	22.34	12.68
86.	HM-65	114.60	4.87	12.10	9.73	120.27	10.80	23.52	13.52
87.	HM-114	113.03	4.63	11.60	10.53	146.13	10.53	22.44	12.44
88.	HM-202	76.10	2.07	6.53	10.49	98.00	7.73	10.66	6.33
89.	HM-202-2	76.67	2.03	7.37	9.62	79.33	7.93	11.40	6.73
90.	HM-204	73.60	1.93	6.60	9.55	123.07	7.60	10.48	6.14
91.	HM-204-1	71.77	1.87	6.40	9.47	101.00	7.53	10.25	6.25
92.	HM-205	113.20	4.63	11.30	9.79	98.27	10.73	22.69	12.69
93.	HM-208	118.20	5.17	12.37	9.93	126.13	11.13	24.11	13.45
94.	HM-208-1	70.90	1.47	6.33	8.43	87.07	7.40	9.72	5.72
95.	HM-211	71.90	1.60	6.27	10.97	98.20	7.53	10.03	6.03
96.	HM-211-1	70.77	1.57	6.33	8.97	77.33	7.47	9.59	5.59
97.	HM-214	78.53	1.87	7.40	8.99	85.00	7.93	11.50	6.84
98.	HM-219	75.07	1.73	6.80	8.50	93.53	7.67	10.23	6.23
99.	HM-221	113.40	4.73	12.07	9.01	101.27	10.80	23.13	13.13
100.	HM-226	71.50	1.57	6.33	11.62	55.33	7.53	10.03	7.36
101.	HM-232	76.20	1.77	6.87	8.92	86.40	7.73	10.90	6.56
102.	HM-232-1	79.23	2.17	7.13	9.43	83.13	7.93	11.63	6.63
103.	HM-232-2	81.90	2.20	8.10	9.40	125.27	8.13	12.17	8.84
104.	HM-232-3	74.50	1.90	6.93	8.95	59.80	7.80	11.22	6.88
105.	HM-232-4	75.27	2.07	7.30	9.12	85.13	7.87	11.36	8.36
106.	HM-233	74.60	1.80	6.83	9.47	82.73	7.53	10.61	7.94
107.	HM-236	75.53	1.77	6.97	9.06	95.60	7.53	10.36	6.03

108.	HM-239	116.87	5.57	12.37	8.89	136.93	11.27	24.58	13.92
109.	HM-240	74.57	1.77	6.67	9.38	68.00	7.67	10.75	6.42
110.	HM-241	79.47	1.97	7.60	9.44	108.07	7.87	11.99	6.99
111.	HM-242	121.23	6.07	12.53	9.93	128.33	11.73	26.20	14.53
112.	HM-242-1	75.23	1.87	6.83	8.23	86.67	7.73	10.69	6.35
113.	HM-246	113.93	5.10	11.93	9.05	90.73	10.73	22.85	12.85
114.	HM-246-1	76.87	2.03	7.27	8.67	107.00	7.80	11.52	6.85
115.	HM-247	80.53	2.03	7.77	8.32	105.27	7.93	11.90	6.90
116.	HM-253	76.27	1.90	6.97	9.12	113.53	7.73	10.84	6.18
117.	HM-253-1	70.83	1.70	6.53	9.21	97.67	7.40	9.91	5.91
118.	HM-254	74.83	1.83	6.83	8.35	85.00	7.73	10.66	6.32
119.	HM-257-1	71.73	1.60	6.63	8.57	55.73	7.40	9.96	6.96
120.	HM-258	71.83	1.83	6.77	9.03	131.67	7.60	10.07	6.07
121.	HM-258-1	118.27	5.50	12.47	9.27	104.13	11.20	24.38	13.38
122.	HM-259	76.90	1.80	6.73	10.16	107.20	7.73	10.59	6.26
123.	HM-259-1	73.17	1.73	6.77	8.73	59.47	7.53	10.34	6.34
124.	HM-267	77.80	1.90	7.37	8.69	109.13	7.87	11.37	8.04
125.	HM-267-8	77.87	2.00	7.30	8.27	89.00	7.93	11.57	6.91
126.	HM-271	75.97	1.90	7.03	7.35	116.33	7.80	11.06	8.40
127.	HM-271-2	80.40	2.10	7.97	8.11	123.93	8.13	12.36	7.03
128.	HM-273-1	112.50	4.93	11.70	9.51	102.67	10.80	23.01	13.01
129.	HM-277	70.27	1.47	6.60	10.11	78.53	7.40	9.70	5.70
130.	HM-277-1	72.50	1.67	6.87	8.71	127.47	7.60	10.13	7.47
131.	HM-278-1	80.83	2.63	7.60	7.89	88.80	8.53	14.15	8.15
132.	HM-278-2	71.50	1.80	6.73	9.01	65.27	7.60	10.43	6.43
133.	HM-346-2	70.30	1.60	6.60	9.17	107.33	7.47	9.51	6.84
134.	HM-280	82.50	2.70	8.70	10.97	86.20	8.53	14.20	7.87
135.	HM-280-1	82.50	3.07	9.00	10.19	88.73	8.87	15.44	8.77
136.	HM-281	113.17	4.70	11.73	8.82	84.40	10.60	22.69	12.69
137.	HM-281-6	75.27	1.77	6.77	7.46	113.80	10.80	10.68	6.35
138.	HM-281-6-1	72.50	1.90	6.60	9.47	71.87	10.93	10.22	6.22
139.	HM-281-7-2	67.07	1.17	6.27	10.85	47.20	11.47	9.04	6.04
140.	HM-300	76.20	1.87	7.33	14.43	124.07	10.87	11.39	6.73
141.	HM-305	81.53	2.97	8.97	10.46	116.93	10.33	14.78	10.12
142.	HM-307	116.53	5.57	12.53	9.11	126.67	10.73	25.24	14.24
143.	HM-307-1	85.77	2.87	9.10	10.79	107.00	10.33	14.96	8.62
144.	HM-320-7	82.37	2.30	8.17	9.71	113.20	9.80	12.96	8.96
145.	HM-332	113.67	4.77	11.87	11.45	146.67	10.07	23.01	13.01
146.	HM-343	111.27	4.43	11.60	8.86	131.07	9.47	22.37	11.73
147.	HM-348	113.93	4.83	11.90	13.08	120.13	9.40	23.09	12.43
148.	HM-355-1	73.23	1.83	7.10	8.24	83.93	9.07	10.45	6.12
149.	HM-359	111.67	4.67	11.63	10.70	80.87	9.33	21.81	11.81
150.	HM-370	116.03	5.03	12.03	8.11	121.27	9.73	23.37	13.04
	SEd	2.31	0.21	0.40	0.40	0.57	0.80	3.52	1.29
	CD 5%	2.09	1.46	0.61	0.80	1.12	1.58	1.56	1.74
	CV (%)	5.14	8.57	4.54	5.09	0.69	6.66	6.41	12.36

REFERENCES

1. Acharya, S.N., Thomas, J.E. and Basu, S.K., Fenugreek, an alternative crop for semiarid regions of North America. *Crop Sci.*, **48(3):** 841-853 (2008).
2. Ahari, D.S., Hassandokht, M.R., Kashi, A.K., Amri, A. and Alizadeh, K.H., Genetic variability of some agronomic traits in the Iranian fenugreek landraces under drought stress and non-stress conditions. *Afr. J. Plant Sci*., **4(2):** 12-20 (2011).
3. Banerjee, Ananya, and Kole, P.C., Genetic variability, correlation and path analy-sis in fenugreek (*Trigonella foenum-graecum* L.). *J. Spices Aromatic Crops*, **13:** 44-48 (2004).
4. Gangopadhyay, K.K., Yadav, S.K., Kumar, G., Meena, B.L., Mahajan, R.K., Mishra, S.K. and Sharma, S.K., Correlation, path-coefficient and genetic diversity pattern in fenugreek (*Trigonella foenum-graecum*). *Indian J. Agric. Sci*., **79:** 521-526 (2009).

5. Prajapati, D.B., Ravindrababu, Y. and Prajapati, B.H., Genetic variability and char-acter association in fenugreek (*Trigonella foenum-graecum* L.). *J. Spices Aromatic Crops*, **19:** 61-64 (2010).
6. Saha, A. and Kole, P.C., Genetic variability in fenugreek grown in sub-humid lateritic belt of West Bengal. *Madras Agric. J.*, **88:** 345-348 (2001).
7. Singh, K.P., Singh, B., Tomar, B.S. and Naidu, A.K., Trait variation in Fenugreek. *SABRAO Journal of Breeding and Genetics*., **47(4):** 413-423 (2015).
8. Verma Rakesh, Korla, B.N. and Verma, R., Genetic variability in fenugreek (*Trigonella foenum-graecum* L.) grown under mid-hills of Himachal Pradesh. *J. Spices Aromatic Crops*, **12:** 60-62 (2003).