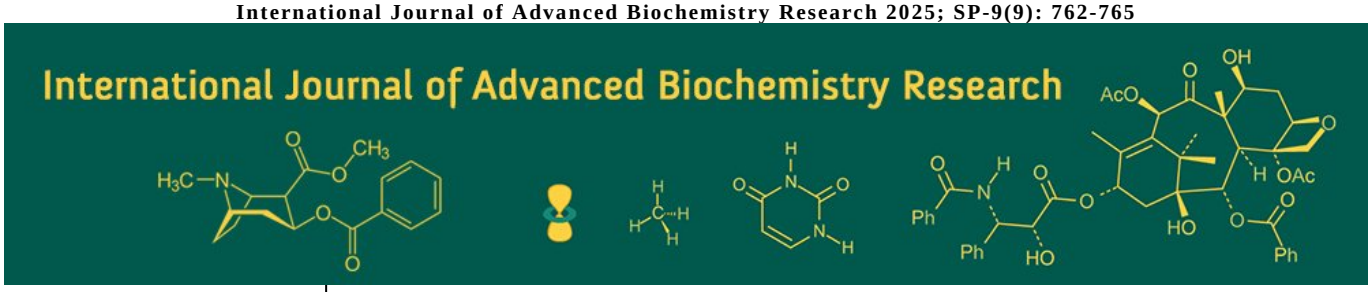

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Performance of fenugreek genotypes for leaf yield and yield-contributing traits

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Abstract
The experiment was conducted during the *rabi* season of 2024-25 at Dr. YSRHU, College of Horticulture, Anantharajupeta, Andhra Pradesh, with 40 genotypes of fenugreek in augmented block design with 6 check varieties, the objective is to estimate the mean performances of morphological traits namely., plant height, number of branches, number of leaves, leaf area and leaf yield were assessed at 30 days after sowing (DAS). The plant height ranged from 6.53 to 20.08 cm, with twenty-one genotypes above the check LM-3. The number of branches per plant ranged from 2.24 to 5.61, with 14 genotypes outperforming the control GM-2. The number of leaves per plant varied from 7.29 to 18.19, with 10 genotypes producing more leaves than the reference PEB. The leaf area ranged from 13.04 to 31.59 cm², with 26 genotypes above the check GM-2 threshold. The total leaf yield ranged from 3.13 to 9.20 q ha⁻¹, with six genotypes (Afg-5, IC-266803, UM-262, Afg-3, UM-68, and RMt-354) outperforming the control Hisar Sonali variety. Notably, genotype Afg-5 consistently ranked highest across all parameters, indicating its strong potential for yield improvement and commercial cultivation. The observed diversity offers valuable insights for fenugreek breeding programs aimed at enhancing leaf productivity and agronomic performance.

Keywords: Fenugreek genotypes, leaf yield, morphological traits, plant height, number of branches, number of leaves, leaf area

Introduction
Fenugreek is also known as methi. The genus *Trigonella* is one of the largest genera of the tribe *Trifoliate* in the family Fabaceae of subfamily Papilionaceae (Balodi and Rao, 1991). It is an annual self-pollinated diploid species with chromosome number 2n=16. It is used as both a leafy vegetable and a seed spice and is popularly grown in India for its seed spice. The origin of fenugreek is supposed to be between Iran and North India. India is the largest producer and exporter of seed spice in the world. India exports to Saudi Arabia, Sri Lanka, Malaysia, UK and USA. Major producing states in India are Madhya Pradesh, Gujarat, Rajasthan, Haryana and Uttaranchal. Rajasthan is considered as “fenugreek bowl” of the country. Fenugreek is extensively used in both Indian ayurvedic medicines and traditional Chinese medicines. Its seeds or leaves are used for human consumption, fodder for the animal and green manure to enrich the soil fertility through nitrogen fixation *i.e.*, about 283kg N/ha. The leaves and shoots are rich in protein, carbohydrate, minerals and vit A and C. Powder of dried leaves is also used for garnishing and flavouring variety of foods. It is one of the principle constituents of curry powder. There are two species of the genus *Trigonella* which are of economic importance, viz. *T. foenum graecum* L., the common methi and *T. corniculata*, the Kasthuri methi. It is an annual herb reaching to a height of approximately 90.0 cm. Leaves are light-green and are pinnately trifoliate. The flowers are papilionaceous in nature and white or yellow in colour. Pods are (10-15cm) long, narrow, legumes, tapering and curved and with a slender point which contain (10-20) small extremely furrowed yellowish brown seeds. Anthesis takes place with a peak at 11.30AM and normally between 9AM and 6PM.

Materials and methods
Experiment was conducted during *rabi* season 2024-25 at Dr. YSRHU- College of horticulture, Anantharajupeta, Andhra Pradesh. The experimental materials comprised of 40 genotypes with 6 check varieties and experiment was carried out in augmented block design.

Each genotype is planted in a plot having 3x1.5 m^2 area with a spacing of 30x10 cm. All the standard package of practices and plant protection measures were timely carried out to raise the crop successfully. Observations were recorded at 30 days after sowing for five characters of fenugreek. *i.e.* plant height (cm). The height of the plant was measured with the help of scale of at 30 DAS from the base to tip of the plant from five randomly tagged plants in each genotype and their mean was calculated and expressed in centimetres. Number of branches per plant were counted from five randomly tagged plants at 30 DAS and their mean was expressed as number of branches per plant, number of leaves per plant: the number of leaves were counted from five randomly selected plants, leaf area (cm^2): randomly selected five plants were uprooted and leaves were collected at 30 DAS. Leaf area was measured with the help of leaf area meter (LA-310) and the average was expressed in cm^2 and leaf yield per hectare: the leaf yield was recorded in each plot and was expressed in quintals.

Results and discussion

The results obtained during the investigation in respect to morphological parameters namely. plant height, number of branches per plant, number of leaves per plant, leaf area and total leaf yield per hectare are presented in table 1. Wide range of variation in mean performance of genotypes was observed for the characters under study.

Significant variation in plant height was observed among the genotypes, ranging from 6.53 cm (RMt-365) to 20.08 cm (Afg-5), with a mean of 14.19 cm. Twenty-one genotypes recorded highest plant height than the check LM-3 (14.06 cm). The highest plant height genotypes suggest enhanced vegetative vigour and biomass accumulation. These results are in similar line with Latye *et al.* (2016) [14] and Aggarwal *et al.* (2013) [1] in fenugreek.

Number of branches per plant varied significantly, ranging from 2.24 (LFC-9) to 5.61 (IC-255596) with an average of 4.07. Fourteen genotypes produced more number of branches than the check variety GM-2 (4.60), while eight genotypes recorded fewer branches than GM-3 and LM-3 (3.30). These genotypes are likely to support greater leaf production due to increased shoot proliferation. Similar findings were reported by Latye *et al.* (2016) [14] and Aggarwal *et al.* (2013) [1] in fenugreek.

Significant variation was also recorded for number of leaves per plant, which ranged from 7.29 (Local) to 18.19 (Afg-5), with a mean of 11.56. Ten genotypes exceeded the check PEB (13.80), whereas ten genotypes recorded lowest number of leaves than the checks Hisar Sonali and GM-3 (9.85) Leaf number is a key determinant of photosynthetic capacity and genotypes with higher leaf counts are expected to produce more biomass. Similar findings were reported by Singh and Naula (2017) [11] in fenugreek.

Significant variability was recorded in leaf area among the evaluated genotypes, ranging from 13.04 to 31.59 cm^2 with a mean of 20.21 cm^2. Twenty-six genotypes exhibited higher leaf area compared to the check GM-2 (18.64 cm^2), with the maximum observed in Afg-5 (31.59 cm^2), followed by IC-332188 (29.04 cm^2) and Afg-3 (28.19 cm^2). Minimum leaf area was recorded in LFC-7 (13.04 cm^2), which was lower than the check Hisar Sonali (16.41 cm^2). Larger leaf area enhances light interception and photosynthesis. Similar results were reported by Layte *et al.* (2016) [14] in fenugreek.

Significant variability was observed for total leaf yield, which ranged from 3.13 to 9.20 q ha^{-1} with a mean of 5.42 q ha^{-1}. Six genotypes recorded highest leaf yield compared to the check Hisar Sonali (6.43 q ha^{-1}), with the maximum in Afg-5 (9.20 q ha^{-1}), followed by IC-266803 (7.79 q ha^{-1}) and UM-262 (7.66 q ha^{-1}). The lowest yield was recorded in IC-279168 (3.13 q ha^{-1}), which was below the check PEB (5.07 q ha^{-1}).These high-yielding genotypes are promising candidates for commercial cultivation. Similar results under different set of climatic conditions by cultivars of fenugreek were recorded by Latye *et al.* (2016) [14] and Mandal *et al.* (2013) [15]

Table 1: Mean performances of fenugreek leaf yield attributes

Sl. No.	Genotypes	Plant height (cm)	Number of branches per plant	Number of leaves per plant	Leaf area (cm^2)	Total leaf yield (q ha^{-1})
1	Afg-3	19.24	3.24	17.19	28.19	6.95
2	Afg-4	17.28	4.24	14.59	23.51	4.53
3	Afg-5	20.08	5.24	18.19	31.59	9.2
4	LFC-7	16.08	2.84	8.79	13.04	5.14
5	IC-332188	16.48	4.64	15.79	29.04	4.58
6	IC-332296	14.68	4.24	10.19	16.78	5.83
7	LFC-9	15.48	2.24	9.59	14.42	4.14
8	IC-282921	17.88	4.24	11.19	17.51	4.6
9	IC-144261	14.28	4.24	11.99	18.95	3.85
10	IC-266803	16.46	4.64	14.59	23.51	7.79
11	IC-312830	15.03	3.98	13.26	24.77	4.17
12	IC-279860	12.03	4.18	10.46	19.49	3.76
13	LFC-36	14.25	3.18	7.66	14.69	4.57
14	LFC-66	14.29	2.58	7.46	14.21	5.52
15	IC-313046	13.63	3.38	10.66	19.97	6.17
16	IC-312044	13.73	2.78	13.06	24.29	5.05
17	IC-334411	13.23	4.18	13.86	26.09	5.92
18	LFC-76	13.23	2.38	9.86	18.65	3.9
19	IC-279168	12.03	3.98	9.06	17.21	3.13
20	IC-278690	13.77	3.98	11.86	22.13	3.92
21	IC-310625	12.35	3.81	11.29	22.29	4.82
22	IC-312865	13.19	4.61	9.49	18.93	5.2
23	IC-255596	14.25	5.61	13.29	25.77	5.02

24	IC-328464	15.57	5.01	12.49	24.57	5.94
25	IC-333183	12.65	4.81	8	16.17	4.58
26	IC-328567	10.65	4.81	14.09	22.17	4.53
27	IC-333214	11.85	4.01	8.09	16.77	4.79
28	Local	16.25	3.41	7.29	15.21	5.68
29	LFC-82	15.87	3.01	8.49	17.37	6.06
30	LFC-118	15.33	3.61	8.69	17.37	6.12
31	RMt-1	17.63	5.38	12.26	21.11	5.95
32	RMt-143	18.43	4.78	11.26	22.05	5.14
33	RMt-303	15.63	3.98	11.66	19.86	4.91
34	RMt-305	14.83	3.98	14.66	22.01	6.03
35	RMt-351	11.23	4.38	11.26	18.1	5.96
36	RMt-361	13.23	4.78	11.06	16.43	5.45
37	RMt-354	12.83	5.18	14.66	24.96	6.56
38	RMt-365	6.53	4.18	15.86	25.35	5.45
39	UM-68	11.43	4.78	12.06	22.62	6.6
40	UM-262	12.63	4.78	10.46	19.07	7.66
41	Hisar Sonali (C)	13.27	4.15	9.85	16.41	6.43
42	PEB (C)	9.7	4.5	13.8	17.16	5.07
43	Gujarat methi-3 (C)	13	3.3	9.85	16.83	5.5
44	Lam methi-3 (C)	14.06	3.3	10	16.86	5.11
45	Lam methi-2 (C)	13.18	4.2	10.45	17.85	6.17
46	Gujarat methi-2 (C)	13.98	4.6	12.25	18.64	5.62
	Mean	14.191	4.071	11.561	20.217	5.417
	Maximum	20.08	5.61	18.19	31.59	9.20
	Minimum	6.53	2.24	7.29	13.04	3.13
	CV%	13.326	7.351	3.001	13.437	13.799
	CD@5%	4.740	0.767	0.882	6.708	1.947

Conclusion

The present investigation found that significant genetic variability was observed among all the fenugreek genotypes for all traits tested, including plant height, number of branches per plant, number of leaves per plant, leaf area and total leaf yield. Genotypes such as Afg-5, IC-266803, UM-262, Afg-3, UM-68 and RMt-354 consistently outperformed others in vegetative growth parameters and total leaf yield, making them viable candidates for commercial cultivation and future breeding projects. The considerable range of variability obtained implies that these features are regulated by genetic factors and can be effectively used for fenugreek selection and improvement in terms of yield and quality attributes.

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