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Evaluation of Coriander Germplasm for Green Leaf Purpose and Quality Parameters in Summer under Shadenet Conditions

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A B S T R A C T

Coriander is considered both as herb and spice. The experiment was conducted at Horticultural College and Research Institute, Venkataramannagudem during summer 2015 under 50 percent green colour shadenet with 66 coriander genotypes and four checks to select an ideal plant type for green leaf purpose with desirable growth, yield and quality parameters (Chlorophyll content and Vitamin C) which are significantly superior to checks sadhana, sudha, suguna, LCC-234. Compared to other entries evaluated the genotype LCC-176 recorded maximum yield (10.54t/ha) over the best check sadhana. In the present investigation, genotypes suitable for green foliage in coriander with desirable traits have been identified for off season cultivation in summer under shadenet conditions. However, it is better to grow in shadenet in summer for their better performance.

Introduction

Coriander, *Coriandrum sativum* is a tropical and sub-tropical crop. The word coriander derived from the Greek name for bug, 'korion' (Diederichsen, 1996). Coriander is considered both as an herb and spice. When the aromatic plant is consumed fresh, it is considered as herb. When consumed fresh, it is called cilantro, green coriander, and Chinese parsley. Its grains are used as spice Leaves are particularly rich in vitamin A equivalent (42%) 337 µg, vitamin C (33%) 27 mg and vitamin K 310 µg. Germplasm collection with good variability for the desirable characters is the basic requirement of any crop improvement programme (Singahania *et al., 2006*). Coriander has great demand in summer. Hence the present investigation was taken up to observe the performances of coriander genotypes and select the promising genotypes for foliage yield in summer under shadenet conditions.

Materials and Methods

The experiment was laid out in an augmented block design with four checks repeated randomly in each block. The plot size was 1 m x 1 m. Fertilizers were applied @ 80 kg N, 35 kg P, 60 kg K and 20 kg S and 10 ton cowdung per hectare (Anon., 2001). The

entire amount of cowdung, phosphorus and potassium, with one-half of nitrogen from urea were applied during final land preparation. The rest of the nitrogen was topdressed at 30 days after sowing. The seeds (fruits) were rubbed for separating the two mericarps (seeds) which were soaked in water for 24 hours to enhance germination. Seeds were also treated with Bavistin at 2 g per kg of seeds prior to sowing in raised seed bed at 10 cm apart rows continuously by hand @ 30 kg/ha. Seeds were mixed with some loose soil (about four to five times of weight of seeds) to allow uniform sowing in rows and were covered with good pulverized soil just after sowing with gently pressed by hands. The sowing was done on 18 May 2015. Light watering was done to supply sufficient moisture needed for quick germination. Weeding and thinning was not done. For good germination, water was given to the plots two times per day with rose can till germination, later on one irrigation was applied. Harvesting of green foliage was done before bolting by cutting just beneath the soil with root intact after 40-45 days of sowing depending upon genotypes. Data was collected from the inner rows of each plot to avoid the border effect. In each unit plot, 5 plants were selected randomly for recording data on plant height. Number of leaves, leaf area, fresh leaf weight, foliage yield, chlorophyll content, vitamin C. the plot yield was converted to hectare yield. The collected data were properly analyzed statistically by Crop Stat Version7.2. The mean comparision was done at 5% level of probability.

Results and Discussion

The results presented in the Table 1 revealed positive changes in crop growth and yield compared to the checks evaluated, plant height at harvest ranged from 8.16 to 22.51 cm. The highest plant height was recorded by LCC-7 (22.51 cm) which was superior to all other entries under evaluation. The minimum plant height at harvest was observed in LCC-117 (8.16 cm). Varied response of genotypes to environments in coriander plant height was reported by Giridhar and Sarada (2005).

LCC-9 (19.57) recorded significantly more number of leaves than any other entry evaluated. Our results are in concordance with those of Prabhu and Balakrishnamurthy (2006) from India and Moniruzzaman *et al.,* (2013).

Twelve entries recorded significantly higher leaf area over the best check Sadhana (23.24 cm^2). These entries are LCC-69 (27.74 cm^2), LCC-154 (29.45 cm^2), LCC-56 (29.72 cm^2), AD-1 (30.21 cm^2), LCC-190 (30.28 cm^2), LCC-171 (30.97 cm^2), LCC-50 (31.02 cm^2), LCC-172 (32.27 cm^2), LCC-188 (32.65 cm^2), LCC-119 (33.22 cm^2), LCC-47 (33.62 cm^2) and LCC-185 (33.75 cm^2), The minimum leaf area was observed in LCC-220 (6.99 cm^2) which was significantly inferior to all the checks evaluated, similar studies were done and reported by Meena *et al.,* (2014). The entries LCC-171 (4.72 g $plant^{-1}$), LCC-176 (2.47 g $plant^{-1}$), LCC-175 (2.13 g $plant^{-1}$), LCC-69 (1.99 g $plant^{-1}$) and LCC-182 (1.89 g $plant^{-1}$) recorded significantly higher fresh leaf weight over the best check Sadhana (1.34 g $plant^{-1}$). Palanikumar *et al.,* (2012) also reported that significant variation in fresh plant weight among the genotypes.

Eighteen entries recorded significantly higher yield over the best check Sadhana (5.218 t ha^{-1}). These genotypes are LCC-176 (10.54 t ha^{-1}), LCC-171 (9.743 t ha^{-1}), LCC-175 (9.443 t ha^{-1}), LCC-188 (9.018 t ha^{-1}), LCC-172 (8.743 t ha^{-1}), LCC-119 (8.618 t ha^{-1}), LCC-190 (8.618 t ha^{-1}), LCC-154 (8.218 t ha^{-1}), LCC-189 (8.118 t ha^{-1}), LCC-69 (7.468 t ha^{-1}), LCC-182 (7.443 t ha^{-1}), LCC-1 (7.168 t ha^{-1}), LCC -194 (7.118 t ha^{-1}), LCC-185 (7.118 t ha^{-1}), LCC-7 (7.068 t ha^{-1}), LCC-60 (6.768 t ha^{-1}), LCC-47 (6.768 t ha^{-1}) and LCC-183 (6.743 t ha^{-1}).

Table.1 Desirable characters of coriander germplasm in summer under shadenet conditions

S.No.	Genotype	PH (cm)	NL	LA(cm^2)	FLW(g)	Yield (tonnes)	CHL (mg/g)	VITC (mg/100g)
1.	LCC – 1	18.91	14.57	28.48	1.71	7.16	1.36	176.10
2.	LCC – 3	18.41	14.57	24.71	1.55	6.36	2.31	196.10
3.	LCC – 6	17.21	10.57	23.98	1.44	5.66	2.19	176.10
4.	LCC – 7	22.51	7.57	27.67	1.84	7.06	2.91	146.10
5.	LCC – 9	17.41	19.57	26.28	1.61	6.26	3.19	156.10
6.	LCC – 11	15.01	15.57	25.88	1.46	5.76	2.51	226.10
7.	LCC – 13	11.96	8.32	20.97	0.85	3.51	3.61	136.10
8.	LCC – 17	11.06	6.32	23.07	0.95	3.91	2.88	176.10
9.	LCC – 19	13.66	9.32	19.43	0.87	3.21	3.58	166.10
10.	LCC – 24	12.86	10.32	20.67	1.04	3.81	3.69	156.10
11.	LCC – 30	11.66	4.32	22.37	1.07	3.91	4.57	146.10
12.	LCC – 31	12.56	9.32	21.63	0.83	3.21	3.27	136.10
13.	LCC – 32	14.31	9.32	23.05	1.34	5.64	1.76	126.10
14.	LCC – 36	16.31	7.32	21.35	1.19	4.74	2.15	116.10
15.	LCC – 37	11.41	7.32	22.18	1.23	4.94	3.26	156.10
16.	LCC – 38	12.71	6.32	16.32	1.08	4.04	2.25	196.10
17.	LCC – 43	12.31	7.32	20.55	1.31	5.04	3.39	146.10
18.	LCC - 44	11.01	7.32	16.82	1.14	4.24	2.92	146.10
19.	LCC – 47	16.81	6.57	33.62	1.55	6.76	2.47	106.10
20.	LCC – 49	15.51	8.57	25.75	1.22	4.96	2.49	156.10
21.	LCC – 50	16.81	8.57	31.02	1.43	5.76	3.62	206.10
22.	LCC – 53	12.41	7.57	27.25	1.16	4.96	3.93	156.10
23.	LCC – 56	16.31	7.57	29.72	1.33	5.36	3.47	206.10
24.	LCC – 59	15.01	7.57	27.68	1.18	4.66	3.77	206.10
25.	LCC – 60	16.94	8.82	26.40	1.76	6.76	3.91	178.60
26.	LCC – 67	13.64	6.82	21.90	1.39	6.16	2.43	218.60
27.	LCC – 69	16.84	9.82	29.17	1.99	7.46	3.65	218.60
28.	LCC – 70	11.84	5.82	17.03	1.05	4.66	2.98	198.60
29.	LCC – 79	10.54	5.82	16.23	0.71	3.96	3.75	188.60
30.	LCC – 80	10.04	4.82	17.30	0.91	4.56	3.59	188.60
31.	LCC – 81	14.26	7.57	15.72	1.00	4.04	3.60	193.60
32.	LCC – 86	12.06	9.57	15.46	0.44	1.54	3.17	193.60
33.	LCC – 90	12.96	7.57	11.66	0.47	2.64	4.05	143.60
34.	LCC – 91	8.76	7.57	16.42	0.94	2.64	3.28	193.60
35.	LCC – 112	9.16	6.57	16.59	1.16	4.34	2.60	143.60
36.	LCC – 117	8.16	7.57	12.66	1.07	3.74	2.62	193.60
37.	LCC – 119	15.16	10.57	33.22	1.80	8.61	2.50	168.60
38.	LCC – 134	10.96	2.57	21.42	1.07	5.41	3.93	168.60
39.	LCC – 137	12.86	7.57	16.15	1.05	5.51	2.98	218.60
40.	LCC - 154	14.96	15.57	29.45	1.69	8.21	4.38	168.60
41.	LCC – 156	14.36	9.57	26.68	1.19	5.71	3.17	168.60

42.	LCC – 169	10.96	10.57	19.22	1.13	4.81	3.11	218.60
43.	LCC – 171	10.56	11.07	30.97	4.72	9.74	3.69	131.10
44.	LCC – 172	11.56	9.07	32.27	1.76	8.74	3.05	181.10
45.	LCC – 175	10.46	4.07	25.80	2.13	9.44	3.90	131.10
46.	LCC – 176	11.96	10.07	26.63	2.47	10.54	2.38	231.10
47.	LCC – 182	11.76	8.07	24.70	1.89	7.44	2.76	181.10
48.	LCC – 183	10.56	12.07	23.97	1.74	6.74	3.73	231.10
49.	LCC – 185	11.69	10.07	33.75	1.31	7.11	3.64	106.10
50.	LCC – 188	14.79	7.07	32.65	1.69	9.01	2.19	306.10
51.	LCC – 189	13.09	8.07	26.75	1.56	8.11	3.30	256.10
52.	LCC – 190	12.99	6.07	30.28	1.54	8.61	3.18	206.10
53.	LCC -194	11.89	9.07	27.45	1.12	7.11	1.82	256.10
54.	LCC – 204	16.89	10.07	28.72	1.47	6.21	4.15	156.10
55.	LCC – 209	11.74	5.57	12.82	1.27	4.21	3.02	131.10
56.	LCC – 211	13.74	4.57	18.66	1.25	4.71	2.86	171.10
57.	LCC – 218	11.94	5.57	12.19	0.96	3.41	3.73	181.10
58.	LCC – 220	9.34	6.57	6.99	1.04	4.31	3.08	171.10
59.	LCC – 221	12.04	5.57	13.03	1.00	3.81	4.19	121.10
60.	LCC – 228	11.14	7.57	8.49	1.08	4.01	4.51	131.10
61.	LCC – 237	12.54	8.57	21.64	1.60	5.69	3.79	236.10
62.	LCC – 238	14.44	9.57	25.27	1.65	5.99	2.87	156.10
63.	LCC – 277	10.44	7.57	10.88	1.74	5.59	3.27	156.10
64.	LCC – 298	15.14	6.57	28.44	1.33	4.19	2.09	196.10
65.	AD – 1	15.44	7.57	30.21	1.29	4.19	3.83	216.10
66.	Swathi	12.84	8.57	15.14	1.15	4.09	3.25	196.10
67.	Sadhana(C)	14.11	8.64	23.24	1.34	5.21	3.66	188.20
68.	Sudha(C)	13.06	8.55	20.71	1.12	4.44	3.32	179.10
69.	Suguna(C)	13.26	8.55	22.39	1.24	5.10	3.45	178.20
70.	LCC -234(C)	12.72	8.55	19.40	1.15	4.70	3.17	179.10
	Mean	13.30	8.42	22.46	1.35	5.48	3.19	170.92
	L.S.D. (5%)	2.29	2.05	5.51	0.33	1.29	1.21	5.87
	CV (%)	11.95	16.61	17.81	18.67	18.3	24.6	22.45

Note: PH-Plant height, NL-Number of leaves, LA-Leaf area, FLW-Fresh leaf weight, Y-Yield, CHL-Chlorophyll content, VIT C- Vitamin C.

Minimum yield was observed in the genotype LCC-86 (1.543 t ha^{-1}), the present findings are in accordance with the reports of Palanikumar *et al.,* (2012) and Moniruzzaman *et al.,* (2013).

The entries LCC-30 (4.57mg g^{-1}) and LCC-228 (4.51 mg g^{-1}) recorded higher chlorophyll content over the best check Sadhana (3.66 mg g^{-1}). The lowest chlorophyll content was observed in the entry LCC-1 (1.36 mg g^{-1}). Ben *et al.,* (2014) reported that coriander genotypes differed significantly in their leaf chlorophyll content. These findings are also corroborates with the findings of Kamineni *et al.,* (2008) and Naidu (2011).

Twenty one genotypes recorded significantly higher vitamin C content than the best check Sadhana (180.20mg 100 g^{-1}). The best ten elite entries are LCC-188 (306.20mg 100 g^{-1}), LCC-189 (256.10mg 100 g^{-1}), LCC -194

(256.10mg 100 g^{-1}), LCC-237 (236.10 mg 100 g^{-1}), LCC-176 (231.10 mg 100 g^{-1}), LCC-183 (231.10 mg 100 g^{-1}), LCC-11 (226.10 mg 100 g^{-1}), LCC-67 (218.60 mg 100 g^{-1}), LCC-69 (218.60 mg 100 g^{-1}) and LCC-137 (218.60 mg 100 g^{-1}). The lowest vitamin C content was observed in LCC-47 (100.60 mg 100 g^{-1}). Similar studies were reported by Lee and Kader (2000) and Vallejo *et al.*, (2003).

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