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EVALUATION OF DIFFERENT OF CORIANDER GENOTYPES FOR QUALITY TRAITS

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Abstract

The study was conducted in *Rabi* 2009-10 and 2010- 11 to evaluate the performance of different genotypes of coriander with respect to quality parameters in North Eastern Transitional Tract (Zone-I) of Karnataka, India. The experiment was carried out at Agriculture Research Station, Janwada Farm, Bidar. Rajendra Swati recorded the highest essential oil content (0.56%), whereas, DCC-4 recorded the minimum essential oil content of 0.25 per cent. In the group of medium duration genotypes, significantly the highest essential oil content was noticed in Rajendra Swati (0.56%) and the lowest was recorded in Sadhna (0.26%). Significantly the highest essential oil yield was recorded in Hisar Sugandh (4.82 kg/ha) followed by NRCSS-ACr-1 and Rajendra Swati (4.21 and 3.66, respectively). The lowest was recorded in DCC-19 (0.37 kg/ ha).

Key words : Coriander, genotypes, quality traits.

Introduction

Coriander (*Coriandrum sativum* L.) is a culinary and medicinal plant from the Apiaceae family and cultivated for both seed as well as tender leaves. This plant has been used as flavoring agent in food products, perfumes and cosmetics. As a medicinal plant, *C. sativum* L. has been credited with a long list of medicinal uses. Powdered seeds or dry extract, tea, tincture, decoction or infusion have been recommended for dyspeptic complaints, loss of appetite, convulsion, insomnia and anxiety (Emamghoreishi *et al*., 2005). Moreover, the essential oil and various extracts from coriander have been shown to possess antibacterial (Burt, 2004; Cantore *et al*., 2004; Kubo *et al*., 2004), antioxidant (Wangensteen *et al*., 2004), anti diabetic (Gallagher *et al*., 2003), anti cancerous and anti mutagenic (Chithra and Leelamma, 2000) activities. In India, major coriander growing area is lying in semi arid climate where coriander is cultivated on conserved moisture in rabi season. India is the largest producer of coriander (*Coriandrum sativum* L.). Coriander is cultivated on an area of 530.5 thousand hectares in India with a production of 482.0 thousand MT and productivity is 900 kg per hectare. It is mainly grown in Rajasthan, Gujarat, Tamil Nadu, Andhra Pradesh, Chhattisgarh and in a limited extent in Karnataka. In Karnataka, it is grown on 7655 hectares with production of 1110 tonnes and productivity of 140 kg per hectare. From India, 0.37 lakh MT of coriander is exported with a value of 21,076.90 lakh rupees (Anonymous, 2013). In Karnataka, coriander is mainly grown under rainfed conditions both in *kharif* and *rabi* season. Since the farmers of Karnataka cultivate the local varieties under poor management conditions, the productivity is very low compared with the national average. Yield in this crop is governed by a multitude of component characters and is subject to genotype and environment interaction. One of the reasons for low oil yield is due to lack of potential genotype suited to a particular region. Though, coriander is grown on commercial scale for its herbage and also seeds in most parts of the state and in North Eastern Transitional tract of Karnataka in particular, besides the fact that coriander being an economically major seed spice and is put to a variety of different uses and is also important from the earnings of foreign exchange, the crop has received little or no concerted efforts for its improvement especially in this region. Hence, the present investigation was under taken.

Materials and Methods

The investigation on coriander was carriedout during *Rabi* 2009-10 and 2010-11 at Agriculture Research Station, Janwada Farm, Bidar, (Karnataka State) to study the performance of different coriander genotypes for quality traits. Bidar district receives well distributed rainfall from both south-west and north-east monsoons. 41 genotypes collected from different research stations, local collections and the genotype DWD-3 was sown as check (table 1). Randomised block design was adopted with three replications. The fertilizer applications and other cultural practices were followed as per the recommendations. The data was analysed statistically as per the methods suggested by Panse and Sukhatme (1978).

Table 1 : Genotypes with their source.

S. no.	Genotypes	Source
1.	NRCSS ACr-1	National Research Centre for Seed Spices (NRCSS), Ajmer, Rajasthan.
2.	Hisar Sugandh	NRCSS, Ajmer, Rajasthan
3.	RCr-41	-do-
4.	Azad Dhania	-do-
5.	Pant Haritama	-do-
6.	RCr-20	-do-
7.	RCr-435	-do-
8.	RCr-436	-do-
9.	RCr-446	-do-
10.	RCr-684	-do-
11.	Sadhna	Regional Agricultural Research Station (RARS), LAM, Guntur
12.	Sindhu	RARS, LAM, Guntur
13.	Sudha	RARS, LAM, Guntur
14.	Rajendra Swati	RARS, LAM, Guntur
15.	GCr-1	NRCSS, Ajmer, Rajasthan
16.	GCr-2	-do-
17.	CO-1	-do-
18.	CO-2	-do-
19.	JD-1	-do-
20.	CO-4	Tamil Nadu Agricultural University (TNAU), Coimbatore
21.	Swathi	RARS, LAM, Guntur
22.	DCC-1	Bagalkot
23.	DCC-2	Bijapur
24.	DCC-3	Bijapur
25.	DCC-4	Bijapur
26.	DCC-5	Bijapur
27.	DCC-6	Gulbarga
28.	DCC-7	Gulbarga
29.	DCC-8	Gulbarga
30.	DCC-9	Gulbarga
31.	DCC-10	Humnabad
32.	DCC-11	Humnabad
33.	DCC-12	Bidar
34.	DCC-13	Bidar
35.	DCC-14	Bidar
36.	DCC-15	Bidar
37.	DCC-16	Dharwad
38.	DCC-17	Dharwad
39.	DCC-18	Dharwad
40.	DCC-19	Dharwad
41.	DWD-3 (Check)	University of Agricultural Sciences, Dharwad

Table 1 continued....

Note : Genotypes from serial number 1 to 5 are long duration (>120 days to maturity).
Genotypes from serial number 6 to 19 are medium duration (91 to 120 days to maturity).
Genotypes from serial number 20 to 41 are early maturing (< 90 days to maturity).

Results and Discussion

Different entries were evaluated for grain yield, per cent essential oil and total yield of essential oil. Data on seed essential oil content revealed significant variations among the genotypes tested which ranged from 0.25 to 0.56 per cent. Rajendra Swati recorded the highest essential oil content (0.56%) which was on par with NRCSS-ACr-1 (0.51%) followed by Hisar Sugandh, GCr-2, DWD-3, Sudha, CO-4, Pant Haritama, GCr-1, RCr-41 and Sindhu (0.44, 0.43, 0.42, 0.41, 0.41, 0.40, 0.40, 0.39, 0.38% respectively) whereas DCC-4 recorded the minimum essential oil content of 0.25 per cent. It was noted that essential oil content was higher in long duration genotypes because those which required longer period for flowering and maturity resulted in higher yield in general and also the genotypes with lower seed weight were found to possess higher oil content which may be due to lower starch content in small size seeds. Starch

Table 2 : Essential oil content and oil yield per hectare in coriander genotypes.

S. no.	Genotypes	Essential oil content (%)			Essential oil yield (kg/ha)		
		2009-10	2010-11	Pooled	2009-10	2010-11	Pooled
Long duration genotypes							
1.	NRCSS ACr-1	0.49	0.54	0.51	4.20	4.22	4.21
2.	Hisar Sugandh	0.42	0.46	0.44	4.81	4.84	4.82
3.	RCr-41	0.38	0.39	0.39	1.99	2.00	2.00
4.	Azad Dhania	0.33	0.34	0.34	1.89	1.90	1.90
5.	Pant Haritama	0.38	0.42	0.40	2.26	2.27	2.27
Medium duration genotypes							
6.	RCr-20	0.26	0.28	0.27	1.48	1.49	1.48
7.	RCr-435	0.36	0.39	0.37	1.90	1.91	1.91
8.	RCr-436	0.35	0.38	0.36	1.72	1.73	1.72
9.	RCr-446	0.32	0.35	0.33	1.95	1.96	1.95
10.	RCr-684	0.33	0.36	0.35	2.40	2.41	2.41
11.	Sadhna	0.25	0.28	0.26	1.80	1.81	1.81
12.	Sindhu	0.36	0.41	0.38	2.10	2.11	2.11
13.	Sudha	0.38	0.44	0.41	2.60	2.61	2.61
14.	Rajendra Swati	0.53	0.60	0.56	3.66	3.67	3.66
15.	GCr-1	0.37	0.43	0.40	2.17	2.18	2.18
16.	GCr-2	0.40	0.46	0.43	3.07	3.09	3.08
17.	CO-1	0.29	0.33	0.31	1.53	1.54	1.53
18.	CO-2	0.36	0.41	0.38	1.88	1.89	1.89
19.	JD-1	0.36	0.41	0.38	1.46	1.46	1.46
Short duration genotypes							
20.	CO-4	0.39	0.44	0.41	2.40	2.41	2.40
21.	Swathi	0.24	0.28	0.26	1.46	1.47	1.46
22.	DCC-1	0.28	0.33	0.30	0.60	0.60	0.60
23.	DCC-2	0.25	0.30	0.27	0.43	0.44	0.43
24.	DCC-3	0.28	0.33	0.30	1.76	1.77	1.77
25.	DCC-4	0.23	0.27	0.25	0.52	0.52	0.52
26.	DCC-5	0.25	0.29	0.27	0.63	0.63	0.63
27.	DCC-6	0.27	0.33	0.30	0.38	0.38	0.38
28.	DCC-7	0.29	0.35	0.32	0.49	0.49	0.49
29.	DCC-8	0.26	0.30	0.28	1.04	1.05	1.05
30.	DCC-9	0.27	0.32	0.29	0.40	0.41	0.41
31.	DCC-10	0.26	0.31	0.28	0.48	0.48	0.48
32.	DCC-11	0.29	0.34	0.31	0.59	0.59	0.59
33.	DCC-12	0.28	0.33	0.31	0.70	0.70	0.70
34.	DCC-13	0.25	0.30	0.27	1.22	1.23	1.23
35.	DCC-14	0.28	0.33	0.30	0.53	0.54	0.53
36.	DCC-15	0.27	0.32	0.30	0.56	0.56	0.56
37.	DCC-16	0.28	0.33	0.30	0.54	0.54	0.54
38.	DCC-17	0.32	0.38	0.35	0.46	0.46	0.46
39.	DCC-18	0.27	0.32	0.30	0.47	0.47	0.47
40.	DCC-19	0.26	0.30	0.28	0.37	0.37	0.37
41.	DWD-3	0.38	0.45	0.42	2.35	2.37	2.36
	Mean	**0.31**	**0.36**	**0.34**	**1.54**	**1.55**	**1.55**
	SEm±	0.01	0.02	0.02	0.16	0.16	0.16
	C.D. at 5%	0.03	0.07	0.06	0.44	0.40	0.49

being a primary metabolite, may affect the accumulation of secondary metabolites like essential oil there for the genotypes with bigger seed will have low essential oil content mostly because of high starch content. The results are in confirmity with the earlier workers (Agarwal *et al.*, 1990; Sanjeev *et al.*, 1994; Rajagopalan *et al.*, 1996; Singh *et al.*, 2002; Prabhu and Balakrishnamurty, 2006 and Velayudham *et al.*, 2006). Similarly, the variation in the synthesis of essential oil might have been due to the promotive or inhibiting mechanism through physiological and biochemical reactions in the genotypes (Palanikumar and Rajamani, 2012).

Significant differences in essential oil yield were recorded among the genotypes evaluated. The highest essential oil yield was recorded in Hisar Sugandh (4.82 kg/ha) followed by NRCSS-ACr-1, Rajendra Swati, GCr-2, Sudha, RCr-684, CO-4, DWD-3 (4.21, 3.66, 3.08, 2.61, 2.41, 2.40 and 2.36 kg/ha respectively). DCC-19 recorded the lowest essential oil yield of 0.37 kg per hectare.

Among the long duration genotypes, the highest essential oil yield was recorded in Hisar Sugandh (4.82 kg/ha) followed by NRCSS-ACr-1 (4.21 kg/ha), Pant Haritama (2.27 kg/ha) and RCr-41 (2.00 kg/ha). The lowest was recorded in Azad Dhania (1.99 kg/ha).

Significant difference with respect to essential oil yield were also noticed in the group of short duration genotypes. CO-4 recorded significantly the highest essential oil yield of 2.4 kg per ha which was on par with DWD-3 (2.36 kg/ha) as against the lowest in DCC-19 (0.37 kg/ha). The reasons for the difference in essential among the genotypes is directly related to the essential oil content and the seed yield per hectare, those with higher oil content and higher seed yield have yielded higher essential oil yield per hectare. The results are in confirmity with the earlier workers (Agarwal *et al*., 1990; Rajagopalan *et al*., 1996; Singh *et al*., 2002; Prabhu and Balakrishnamurty, 2006 and Velayudham *et al*., 2006 and Meena *et al.*, 2013).

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