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QUALITATIVE AND YIELD CHARACTERS IN CORIANDER GENOTYPES

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Abstract

The present study was conducted during *rabi* season in the year 2015-2016 at HCRI Venkataramannagudem, Andhra Pradesh (India) to evaluate thirty genotypes of coriander (*Coriandrum sativum* L.) based on the data obtained from different stages. Among qualitative traits the colour of the stem was classified as light green in nineteen genotypes; light violet in six genotypes, greenish violet in three and deep violet in two genotypes. Leaf colour was classified as green in sixteen, light green in twelve and deep green in two genotypes. The aroma was classified as mild for seven genotypes, moderate for twelve genotypes and strong for eleven genotypes. Maximum plant height was achieved in genotype LCC-322 (74.68 cm), which was on par with LCC-200 (72.42 cm) but significantly superior over both the checks AD-1 (local check) and Suguna (commercial check) at 75 DAS. The grain yield was maximum in the genotype Suguna (commercial check) (502.17 kg/ha) which was significantly superior over the other genotypes evaluated.

Key words : Coriander, qualitative, yield.

Introduction

Coriander (*Coriandrum sativum* L.) is a native of Mediterranean region from where it was spread to Europe, Asia, North and South – America and Australia. It is the most important seed spice crop cultivated throughout the world both for seed and leaf purpose. It is grown in more than fifty countries with India at ranking 1st, both in area and production followed by Mexico, China, former Soviet Union, Central America and South America (Morales-Payan, 2011). The crop grows in tropics and requires a cool but comparatively dry frost-free climate, particularly at flowering and seed formation stages (Sharma and Sharma, 2004). It is grown in almost all the states of India either for grain or leaf or dual purpose. In India the crop is cultivated mainly in Rajasthan, Madhya Pradesh, Andhra Pradesh, Orissa, Tamil Nadu and Karnataka on an area of 5.43 lakh ha with a production of 5.24 lakh metric tonnes (Tiwari, 2014). The average crop productivity is only 965 kg ha^{-1} and is much lower in rainfed farming situation (477 kg ha^{-1}). The low productivity under rainfed situation is mainly due to terminal moisture stress that affects growth and productivity. Growing coriander in rainfed in Godavari zone farming situation demands highly productive types with short (75 days) to medium (85-100 days) duration for cultivation. Locally grown indigenous genotypes are low in productivity and give poor returns to the farmers. Critical evaluation of available selections of improved types with high yield potential/ traits is of great value to the breeder for crop improvement (Moniruzzaman, 2013). Mengesha and Getinetalemaw (2010) evaluated some Ethiopian coriander genotypes and reported that identification and evaluation of elite or promising genotypes for yield and quality is an important crop improvement strategy. Sarada and Giridhar (2009, 2011) opined that it is possible to realize 1500 kg ha^{-1} under rainfed conditions if a proper combination of genotypes and management are available to the farmers. Keeping this in view, the present study was undertaken to evaluate promising diverse genotypes from Godavri zone of Andhra Pradesh, India.

Materials and Methods

The present investigation entitled "Evaluation of Coriander (*Coriandrum sativum* L.) genotypes in Godavari Zone of Andhra Pradesh" was carried out during the year 2015-16 at Horticulture College and Research Institute, Dr. Y.S.R Horticultural University, Venkataramannagudem, West Godavari District, Andhra Pradesh, India. The location falls under Agro-climatic

zone-10, humid, East Coast Plain and Hills (Krishna-Godavari zone) with an average annual rainfall of 900 mm at an altitude of 34 m (112 feet) above mean sea level. The geo-graphical situation is 16° 63' 120" N latitude and 81° 27' 568" E longitude. It experiences hot humid summer and mild winter. A total of thirty genotypes were taken for evaluation study out of which fifteen genotypes were sourced from HRS Devihosur (Haveri) Karnataka (Ranibennur-1, Ranibennur-2, Ranibennur-3, Byadagi-1, Hangel-1, Hangel-2, Savanur-1, Savanur-2, Savanur-3, Hirekerur-1, Hirekerur-2, Hirekerur-3, Shiggaon-1, Shiggaon-2, Shiggaon-3) whereas, the rest of the accessions were sourced from HRS Lam Guntur, Andhra Pradesh (LCC-200, LCC-331, LCC-321, LCC-323, LCC-325, LCC-334, LCC-335, LCC-316, LCC-328, LCC-320, LCC-317, LCC-319 and LCC-322; and two checks *viz.,* AD-1 (local check) and Suguna (commercial check). The experiment was laid out in RBD with two replications and thirty genotypes. The observations were recorded on various growth, seed yield and quality parameters. The crop was raised at a plant spacing of 30 cm x 15 cm. The seed were sown during 2nd of November and harvested during 2nd fortnight of February. A basal fertilizer dose of 35 kg N, 35 kg P2O5 and 35 kg K2O ha-1 was given at the time of soil preparation each year. Soil was prepared to a fine tilth and the seed sown in rows using a labor. At 20 days after sowing (DAS), the plants were thinned 15 cm apart to maintain a uniform plant population. Need-based plant protection measures were taken up to raise a healthy crop. Plants were uprooted at harvest. Threshing was done with wooden sticks and seeds winnowed to remove any impurities. Five randomly selected plants from each replication were used for recording of yield attributes. Plant height was measured with the help of a scale. The number of leaves, schizocarps parameters were counted on randomly selected five tagged plants. Total grain yield was obtained from net plot yield which was converted to per hectare yield.

Results and Discussion

Qualitative characters

The data of 2015-2016 year indicated that the genotypes under evaluation varied significantly with respect to qualitative and seed yield attributes studied. The genotypes differed significantly in qualitative and seed yield (tables 1 and 2). Based on the stem colour the 28 genotypes and two checks of coriander were divided into four groups *viz*., light green (Ranibennur-1, Ranibennur-2, Ranibennur-3, Byadagi-1, Savanur-1, Savanur-2, Savanur-3, Hirekerur-1, Hirekerur-2, Hirekerur-3, AD-1, Suguna, LCC-200, LCC-316, LCC-328, LCC-320, LCC-317, LCC-319 and LCC-322), deep violet (Hangel-1 and Hangel-2), greenish violet (Shiggaon-1, Shiggaon-2 and Shiggaon-3) and light violet (LCC-331, LCC-321, LCC-323, LCC-325, LCC-334 and LCC-335). Commercial Suguna and local checks AD-1 had light green stem colour. The genotypes under study exhibited three types of leaf colour *i.e*. green (Ranibennur-1, Ranibennur-2, Ranibennur-3, Byadagi-1, Hangel-1, Hangel-2, Savanur-1, Savanur-2, Savanur-3, Hirekerur-1, Hirekerur-2, Hirekerur-3, Shiggaon-1, Shiggaon-2, Shiggaon-3, AD-1, Suguna and LCC-200), deep green (LCC-331 and LCC-321) and light green (LCC-323, LCC-325, LCC-334, LCC-335, LCC-316, LCC-328, LCC-320, LCC-317, LCC-319 and LCC-322). The leaves were green in colour in case of commercial and local check cultivars. Leaf aroma scores were at maximum of '3' (indicating mild aroma) in seven genotypes (Ranibennur-1, Ranibennur-2, Shiggaon-2, Shiggaon-3, AD-1, Suguna and LCC-200). A moderate aroma with score '2' was observed in 12 genotypes (Ranibennur-3, Byadagi-1, Hangel-1, Savanur-1, Hirekerur-2, Hirekerur-3, Shiggaon-1, LCC-331, LCC-321, LCC-323, LCC-335 and LCC-322) whereas, 11 genotypes (Hangel-2, Savanur-2, Savanur-3, Hirekerur-1, LCC-325, LCC-334, LCC-316, LCC-328, LCC-320, LCC-317 and LCC-319) exhibited strong aroma with score '1'. The differences in these qualitative characters can be attributed to the genetic differences among the accessions. The accessions falling in the same group with respect to any qualitative parameter are perhaps being influenced by the similar genetic structure at the corresponding locus. Similar grouping in case of qualitative characters was also done by Moniruzzaman *et al*. (2013) in coriander.

Plant height and number of branches

Significant differences were observed among the genotypes with respect to plant height (Table 2). The plant height at 75 DAS was found to be the highest (74.68 cm) in the genotype LCC-322 which was on par with LCC-200 and LCC-319 (72.42, 71.00 cm, respectively). The genotype Hangel-1 recorded the minimum plant height of 50.49 cm which was on par with Rabibennur-1 and Ranibennur-3 (51.11, 51.05 cm, respectively). Sixteen genotypes were significantly taller than the local check AD-1 (61.04 cm). The number of primary branches per plant was found to show significant differences among the genotypes at all stages of plant growth (table 2). The genotype LCC-335 produced the maximum number of primary branches per plant (30.31) at 75DAS, while the genotype Ranibennur-2 had the minimum number of primary branches per plant (9.65), which was on par with

Savanur-3(10.66). A total of 13 genotypes showed significantly higher number of primary branches per plant when compared to the commercial check Suguna (19.44). There were significant differences among the genotypes in respect of number of secondary branches at different stages of growth (table 2). The genotype LCC-322 produced the maximum number of secondary branches per plant at 75 DAS (19.02), which was on par with LCC-335(18.10). Minimum number of secondary branches (7.28) was recorded by Ranibennur-3 which was on par with Savanur-2, Savanur-3, Hirekerur-1, Byadagi-1, Shiggaon-2 and LCC-331 (7.81, 8.74, 9.64, 9.87, 10.12 and 10.26 respectively). A total 6 genotypes showed greater number of secondary branches per plant compared to local check variety AD- 1 (14.11). The height of plant normally denotes how many nodes are born and how long the internodes are. Therefore, the number of primary branches born may have a positive association with the height of main axis, though not compulsory in every case. It is evident from the results that there is a slight but not strong association between the height of plant and number of primary branches and in turn with number of secondaries. Genotypes or accessions reaching maximum height at maturity normally were noticed to possess reasonably good number of branches and however, slightly shorter genotypes also possessed number of branches on par with the tallest accessions. This can be attributed to the reason that there would be differences in the apical dominance property that might be due to differential contents or synthesis of auxins or their suppression due to antagonising plant hormones. These results are in concurrence with the findings of those reported by Meena *et al*. (2014) in coriander, Beemnet *et al*. (2013) in coriander, Anubha *et al.* (2013) in fenugreek and Bandela *et al*. (2014) in coriander. The variation observed in number of leaves among the genotypes was found to be significant (table 2).

Number of leaves and leaf area

The maximum number of leaves at 75 DAS (107.70) was recorded by the accession LCC-331, which was on par with Byadagi-1 (107.17), LCC-321 (106.02), Hirekerur-2 (105.68) and LCC-316 (105.62) whereas, the minimum number of leaves (93.92) was recorded in LCC-323 on par with Shiggaon-2 (94.10), commercial check variety Suguna (95.58) and LCC-334 (95.58). The number of leaves per plant was significantly superior in a total of 10 genotypes as compared to local check AD-1(103.03). The data in table 2 revealed that there were significant differences among genotypes with respect to leaf area at different stages of plant growth. The genotype LCC-325 showed maximum leaf area (83.19 cm^2) at 75 DAS, which was on par with LCC-320 (82.44 cm^2), LCC-323 (81.94 cm^2), Hangel-1(81.85 cm^2), LCC-328 (80.69 cm^2), LCC-316 (80.48 cm^2), LCC-319 (80.42 cm^2) and Shiggaon-2 (80.07 cm^2) whereas, LCC-200 showed minimum leaf area (68.30 cm^2) which was on par with Ranibennur -3 (68.68 cm^2), Savanur-2 (70.01 cm^2) and Savanur-3 (71.21 cm^2). Nineteen genotypes excelled the local check AD-1 (74.44 cm^2) with respect to leaf area per plant. The number of leaves is dependent largely upon the number of nodes and also on the number of branches both primaries and secondaries arising on the main shoot of the plant. When there are more branches a plant is likely to have more leaves but depending on the expansion of them the leaf area per plant may show a different trend. Therefore the number of leaves and leaf area may not behave in

Table 1 : Certain qualitative traits in different coriander genotypes.

Genotype	Stem color	Leaf color	Leaf aroma (1-3 scale)
Ranibennur-1	Light green	Green	3.00
Ranibennur-2	Light green	Green	3.00
Ranibennur-3	Light green	Green	2.00
Byadagi-1	Light green	Green	2.00
Hangel-1	Deep violet	Green	2.00
Hangel-2	Deep violet	Green	1.00
Savanur-1	Light green	Green	2.00
Savanur-2	Light green	Green	1.00
Savanur-3	Light green	Green	1.00
Hirekerur-1	Light green	Green	1.00
Hirekerur-2	Light green	Green	2.00
Hirekerur-3	Light green	Green	2.00
Shiggaon-1	Greenish violet	Green	2.00
Shiggaon-2	Greenish violet	Green	3.00
Shiggaon-3	Greenish violet	Green	3.00
AD-1 (check)	Light green	Green	3.00
Suguna (check)	Light green	Green	3.00
LCC-200	Light green	Green	3.00
LCC-331	Light violet	Deep green	2.00
LCC-321	Light violet	Deep green	2.00
LCC-323	Light violet	Light green	2.00
LCC-325	Light violet	Light green	1.00
LCC-334	Light violet	Light green	1.00
LCC-335	Light violet	Light green	2.00
LCC-316	Light green	Light green	1.00
LCC-328	Light green	Light green	1.00
LCC-320	Light green	Light green	1.00
LCC-317	Light green	Light green	1.00
LCC-319	Light green	Light green	1.00
LCC-322	Light green	Light green	2.00

Table 2 : Vegetative characters among different coriander genotypes.

Genotype	Plant height (cm)	No. of primary branches	No. of secondary branches	No. of leaves	Leaf area (cm^2)
Ranibennur-1	51.11	17.16	14.64	99.86	74.53
Ranibennur-2	54.12	9.65	12.17	97.86	71.73
Ranibennur-3	51.05	17.78	7.28	102.95	68.68
Byadagi-1	56.83	16.24	9.87	107.17	76.80
Hangel-1	50.49	17.25	13.76	99.37	81.85
Hangel-2	60.98	17.14	10.93	99.16	78.35
Savanur-1	58.77	14.28	14.28	104.35	74.26
Savanur-2	61.92	14.99	7.81	98.89	70.01
Savanur-3	56.54	10.66	8.74	97.01	71.21
Hirekerur-1	62.68	16.07	9.64	103.56	73.55
Hirekerur-2	60.84	19.00	13.30	105.68	77.13
Hirekerur-3	66.78	17.40	12.67	104.89	76.03
Shiggaon-1	59.92	17.39	12.82	103.19	78.96
Shiggaon-2	63.42	19.16	10.12	94.10	80.07
Shiggaon-3	62.22	17.91	14.89	103.13	78.85
AD-1 (check)	61.04	19.23	14.11	103.03	74.44
Suguna (check)	56.46	19.44	12.89	95.58	73.55
LCC-200	72.42	20.92	13.73	101.37	68.30
LCC-331	60.50	23.59	10.26	107.70	74.27
LCC-321	56.74	20.17	11.93	106.02	76.08
LCC-323	68.59	21.13	13.29	93.92	81.94
LCC-325	61.75	20.53	12.01	99.89	83.19
LCC-334	70.66	22.71	12.23	95.58	72.62
LCC-335	64.34	30.31	18.10	101.71	78.79
LCC-316	66.14	23.93	13.86	105.62	80.48
LCC-328	66.70	23.31	11.65	102.16	80.69
LCC-320	66.82	21.13	12.20	100.97	82.44
LCC-317	65.54	20.70	14.60	98.91	78.42
LCC-319	71.00	20.53	13.32	100.69	80.42
LCC-322	74.68	19.85	19.02	98.99	76.58
Mean	**62.03**	**18.99**	**12.54**	**101.11**	**76.47**
S Em ±	0.76	1.32	0.86	0.94	1.03
CD	2.20	3.83	2.50	2.71	2.99

association however, they can follow similar trend partially due to variations in the individual growth of leaf laminae. In the present study, it is observed that though not very strong there is an association between the number of leaves and leaf area *i.e.* more the leaves in a genotype maximum is the leaf area per plant or at least on par with the most superior accession. The observations recorded by Banerjee and Kole (2004) and Mourya *et al*. (2015) in fenugreek for grain yield per plant were also in conformity with this.

Yield parameters

Significant differences were noticed among the genotypes with respect to number of schizocarps per umbel (table 3). The genotypes LCC-319 had maximum number of schizocarps per umbel (41.58) which was on par with LCC-316 (39.08). The genotype LCC-320 had minimum number of schizocarps per umbel (23.33) which was on par with Suguna (24.36), Hirekerur -1 (25.96) and Ranibennur-2 (26.23). Three genotypes were significantly more number of schizocarps per umbel as compared to local check AD-1 (36.78). Significant differences were observed among the genotypes with respect to number of schizocarps per umbellets (table 3). The genotype LCC-317 produced more number of schizocarps per umbellets (5.90). The genotype AD-1 produced less number of schizocarps per umbellets (3.90). Four genotypes produced more number of schizocarps per umbellets as compared to the commercial check Suguna (5.32). Significant differences were observed among the genotypes with respect to number of schizocarps per plant (table 3). The genotype LCC-317

Table 3 : Yield parameters in coriander genotypes.

Genotype	No. of schizocarps per umbel	No. of schizocarps per plant	No. of schizocarps per umbellets	Grain yield per plant (g)	Grain yield per plot (g)	Grain yield per ha (kg)
Ranibennur-1	31.50	169.92	4.00	8.80	105.60	255.07
Ranibennur-2	26.23	161.73	4.38	9.59	115.03	277.84
Ranibennur-3	31.93	188.51	4.84	5.67	82.50	199.28
Byadagi-1	29.33	170.10	4.26	4.75	74.64	180.29
Hangel-1	26.67	160.27	4.55	8.93	107.10	258.70
Hangel-2	29.46	211.90	4.90	6.70	94.15	227.42
Savanur-1	30.14	193.07	5.00	4.10	65.80	158.94
Savanur-2	27.00	186.56	5.40	11.17	133.98	323.62
Savanur-3	36.49	192.78	5.10	10.25	123.00	297.10
Hirekerur-1	25.96	159.79	5.20	10.82	129.78	313.48
Hirekerur-2	28.62	194.74	4.26	11.67	140.07	338.33
Hirekerur-3	32.83	206.91	4.78	10.84	130.10	314.24
Shiggaon-1	33.96	187.27	4.85	5.75	79.80	192.75
Shiggaon-2	28.98	170.99	4.98	8.63	103.53	250.07
Shiggaon-3	32.37	212.08	5.12	10.38	124.50	300.72
AD-1 (check)	36.78	144.05	3.90	9.25	110.97	268.04
Suguna (check)	24.36	213.06	5.32	17.33	207.90	502.17
LCC-200	32.89	184.90	5.00	12.57	150.84	364.35
LCC-331	36.96	213.48	4.76	13.80	165.60	400.00
LCC-321	35.86	218.02	4.85	11.50	138.00	333.33
LCC-323	35.62	146.37	4.90	12.66	151.92	366.96
LCC-325	32.55	191.14	4.38	9.98	119.70	289.13
LCC-334	34.02	209.08	4.60	8.93	107.10	258.70
LCC-335	35.78	216.61	5.21	9.38	112.50	271.74
LCC-316	39.08	171.72	5.50	13.44	161.25	389.49
LCC-328	34.76	207.26	5.26	15.60	187.20	452.17
LCC-320	23.33	147.28	4.70	7.42	98.54	238.02
LCC-317	32.50	228.04	5.90	7.48	96.72	233.62
LCC-319	41.58	208.74	5.60	11.55	138.60	334.78
LCC-322	33.12	197.80	5.32	10.00	120.00	289.86
Mean	**32.02**	**188.81**	**4.89**	**9.96**	**119.55**	**296.01**
S Em ±	1.01	3.90	0.10	0.80	12.10	25.88
CD	2.92	11.29	0.29	2.32	34.99	74.85

produced more number of schizocarps per plant (228.04) which was on par with LCC-321 (218.02). The genotype Shiggaon-3 produced less number of schizocarps per plant (144.05) on par with LCC-323 (146.37) and LCC-320 (147.28). Four genotypes produced more number of schizocarps per plant as compared to the commercial check Suguna (213.06). During reproductive phase, coriander produces umbellets in each umbel and these umbellets bear the schizocarps. It is the effectiveness of the schizocarp bearing points on the umbellets that decides the productivity of each umbel. The number of umbellets per umbel is not showing very wide variations perhaps it may be a crop bound character and not so dynamic with genotype. The accessions having greater leaf area and long duration of flowering are naturally vested with a great amount of time in which they can divert assimilates into the reproductive parts and therefore would be able to produce a higher quantity of fruits (schizocarps) in each plant. In the present study the accessions with merit in leaf area and other vegetative parameters coupled with a long crop duration are found to show a larger quantity of grain production compared to other accessions. The association of these parameters with grain yield was also observed among different varieties of coriander by Meena *et al*. (2014) in coriander.

The genotypes varied significantly in terms of grain yield per plant (table 3). The highest grain yield per plant (17.33 g) was recorded by commercial check Suguna which was on par with LCC-328 (15.60 g). The genotype Savanur-1 produced the lowest grain yield per plant (4.10

g) on par with Byadagi-1 (4.75 g), Ranibennur-3 (5.67 g) and Shiggaon-1 (5.75 g). Twenty nine genotypes had significantly lower grain yield per plant as compared to the commercial check Suguna (17.33 g). The grain yield per plot exhibited significant differences among the genotypes studied (table 3). Maximum grain yield per plot at (207.90 g) was recorded by Suguna which was on par with LCC-328 (187.20 g). The genotype Savanur-1 recorded the lowest grain yield per plot (65.80 g) on par with Byadagi-1 (74.64 g), Shiggaon-1 (79.80 g), Ranibennur-3 (82.50 g), Hangel-2 (94.15), LCC-317 (96.72) and LCC-320 (98.50 g). The commercial check Suguna genotype had significantly maximum grain yield per plot as compared to the all other genotypes (207.90 g). The grain yield per hectare exhibited significant differences among the genotypes studied (table 3). Maximum grain yield per hectare (502.17 kg) was recorded by Suguna which was on par with LCC-328 (452.10 kg). The genotype Savanur-1 recorded the lowest grain yield per hectare (158.94 kg) on par with Byadagi-1 (180.29 kg), Shiggaon-1 (192.75 kg), Ranibennur-3 (199.28 kg), Hangel-2 (227.42 kg) and LCC-317 (233.62 kg).The commercial Suguna genotypes had significantly maximum grain yield per hectare as compared to the all other genotypes (502.17 kg). The boldness of grain and its weight and oil content are dependent on how it was able to drag the assimilates from different sources and also perhaps due to its genetic makeup. It is the speed and steady flow of the photosynthetic products that decides over time the size of the fruits and its weight. Therefore, these quality parameters are necessarily influenced by greater values of vegetative parameters as evident from the data obtained on these parameters from various genotypes. Bold grains and in higher quantities would definitely lead to greater grain yield per plant which in turn govern corresponding top rank of a genotype in grain yield per plot and per hectare. However, grain quality has no bearing on total yield or quantity produced by an accession. In the present study, it is evident that genotypes had independent ranking with regard to quality parameters as against grain yield. Yield is a complex character and is influenced by several attributing parameters. Similar trends were also noted by Meena *et al*. (2014) in coriander and Anubha *et al*. (2013) in fenugreek.

Conclusion

The genotype Suguna was superior in grain yield over other genotypes. The superiority of this genotype may be attributed to its wide adaptability, precocity and robust growth under rainfed conditions. Hence, the genotype may be recommended for cultivation in Godavari zone of Andhra Pradesh for seed purpose.

References

Anubha, J., Balraj Singh, K. R. Solanki, N. S. Saxena and K. R. Kale (2013). Genetic variability and character association in fenugreek (*Trigonell foenum-graecum* L.). *International Journal of Seed Spices*, **3(2)** : 22-28.

Banerjee and C. P. Kole (2004). Genetic variability, correlation and path analysis in fenugreek (*Trigonell foenum-graecum* L.). *Journal of Spices and Aromatic Crops*, **13(1)** : 44-48.

Datta, S. and P. Choudhuri (2006). Evaluation of coriander germplasm under Terai zone of West Bengal. *Haryana Journal of Horticultural Sciences*, **35** : 348-349.

Gomez, K. and A. Gomez (1984). *Statistical Procedures for Agricultural Research*. Wiley Interscience, New York, USA.

Malik, T. P. and S. K. Tehlan (2013). Performance of coriander (*Coriandrum sativum* L.) varieties for growth and seed yield. *International Journal of Seed Spices*, **3** : 89-90.

Mengesha, B. and G. Getinetalemaw (2010). Variability in Ethiopian coriander accessions for agronomic and quality traits. *African Crop Science Journal*, **18(2)** : 43-49.

Meena, K. Y., S. V. Kale and P. O. Meena (2014). Correlation coefficient and path analysis in coriander. *International Journal of Scientific and Research Publications*, **4(6)** : 2250-3153.

Moniruzzaman, M., M. M. Rahman, M. M. Hossain, A. S. Karim and Q. A. Khaliq (2013). Evaluation of coriander (*Coriandrum sativum* L.) genotypes for seed yield and yield contributing characters. *Bangladesh Journal of Agricultural Research*, **38** : 189-202.

Morales-Payan, J. P. (2011). Herbs and leaf crops: Cilantro, broadleaf cilantro and vegetable amaranth. pp. 1-28. In: *Soils, Plant Growth and Corp Production,* Vol. **3** (Ed. W.H. Verheye). Eolss Publishers, Oxford, UK.

Mourya, P. B., K. B. Yadav, P. V. Pandey and S. P. Yadav (2015). Correlation and path analysis in Fenugreek (*Trigonella foenumgraecum* L.). *Research of Environmental Life Science*, **8(4)** : 569-70.

NHB (2014). *Data base on horticultural crops during 2013-14*. National Horticulture Board, New Delhi, India.

Sarada, C. and G. Kalidasu (2009). Elite genotypes of coriander suitable for rain fed cultivation in Andhra Pradesh. *Annals of Plant Physiology*, **23** : 174-176.

Sarada, C. and G. Kalidasu (2011). Threats in production of coriander (*Coriandrum sativum*) in Andhra Pradesh. *Journal of Spices and Aromatic Crops*, **17** : 158-162.

Sharma, M. M. and R. K. Sharma (2004). Coriander. pp. 145-161. In: *Hand book of Herbs and Spices*. (Ed. K.V. Peter). Woodhead Publishing Limited, Cambridge, England.

Tiwari, R. K. (2014). Crop-wise area, production and productivity of major spice crops in India during 2010-11, 2011-12 and 2012-13. In: *Indian Horticulture Database, 2013* (Eds. N.C.