Journal of Pharmacognosy and Phytochemistry
Available online at www.phytojournal.com

E-ISSN: 2278-4136
P-ISSN: 2349-8234
JPP 2017; 6(4): 946-950
Received: 16-05-2017
Accepted: 17-06-2017

Ranjeet Singh Dhakad
Department of Horticulture, Jawahar Lal Nehru Krishi Vishwa Vidyalay, Jabalpur, Madhya Pradesh, India

SK Sengupta
Department of Horticulture, Jawahar Lal Nehru Krishi Vishwa Vidyalay, Jabalpur, Madhya Pradesh, India

Govind Shiurkar
Department of Horticulture, Jawahar Lal Nehru Krishi Vishwa Vidyalay, Jabalpur, Madhya Pradesh, India

Narayan Lal
Department of Horticulture, Jawahar Lal Nehru Krishi Vishwa Vidyalay, Jabalpur, Madhya Pradesh, India

Correspondence
Ranjeet Singh Dhakad
Department of Horticulture, Jawahar Lal Nehru Krishi Vishwa Vidyalay, Jabalpur, Madhya Pradesh, India

Performance of coriander genotypes under Kymore plateau and Satpura hills in MP

Ranjeet Singh Dhakad, SK Sengupta, Govind Shiurkar and Narayan Lal

Abstract
The mean performance of the genotypes revealed a wide range of variability for all the traits. The variation was highest for plant height at 60 DAS (26.3-72.75cm) followed by plant height at 90 DAS (82.99-162.75cm), seed yield per hectare (3.61-22.49q), number of leaves per plant at 90 DAS (22.2-53.07), days to first flowering (45.67-67.00), days to 50% flowering (57.00-76.00), number of umbel per plant (17.2-37.00), number of primary branches per plant (4.8-10.40), plant height at 30 DAS (4.49-11.27cm), number of leaves per plant at 30 DAS (5.33-13.27), number of seeds per umbel (17.6-32.6), number of secondary branches per plant (8.13-15.47), number of leaves per plant at 60 DAS (10.07-19.33), days to germination (11.33-19.33), test weight (10.23-17.13g), number of umbellets per umbel (5.00-8.73) and days to maturity (103-118). While it was low for while number of seeds per plot (0.21-1.35kg) and seed yield per plant (5.13-9.53g) was found to be lowest.

Keywords: Genotypes, Variability, Germination, Umbel, Maturity, Yield

1. Introduction
India is well known as "land of spices" across the world since long back. India is the largest producer, consumer and exporter of seed spices in the world. Coriander plays a major role in the group of seed spices. Coriander (*Coriandrum sativum* L.) also called cilantro or dhania is an annual herb, belong to the family Apiaceae, and is a native of Mediterranean region. Three subspecies and 10 botanical varieties of coriander been proposed at the intra specific level (Diederichsen and Hammer, 2003) [6] based on phenotypic character. However; molecular evidence does not support classification based on phenotypic and/or biochemical characteristics (Lopez, 2006) [9]. In India, coriander is cultivated in the state of Madhya Pradesh, Rajasthan, Gujarat and Tamil Nadu. Madhya Pradesh is the producing coriander Area 160.00 MH, production 75.00 MT and productivity 0.47 T/h of coriander (Anon, 2015) [1]. However, the crop is also cultivated in considerable acreage in Kymore plateau & Satpura hills region of Madhya Pradesh. The cultivation of local varieties, are very low yielder and susceptible to diseases and pest. This crop is exported to other countries like Malaysia, Singapore, USA, Australia and Europe etc. It alarms for breeding of improved high yielding varieties of coriander through systematic breeding programmes.
Genetic variability is a prerequisite for any improvement in a crop. The success of any crop improvement programme depends on the magnitude of genetic variability and extent to which the desirable characters are heritable. The ultimate goal of breeding programme aims to improve the characteristic of plants so that they become more desirable. Seed yield being a complex polygenic trait composed of several components some of which affect yield directly while; others were contributing towards it indirectly. The knowledge of the magnitude and direction of inter-relationship between yield and its component characters has great importance in breeding programmes for the selection of desirable types.

2. Material and Methods
The present investigation was conducted at Vegetable Research Farm, Jawaharlal Nehru Krishi Vishwa Vidyalaya, Jabalpur (M.P.) during the year 2015-16. Jabalpur is situated in "Kymore Plateau and Satpura Hills" agro climatic region of M.P. It falls on 23.9° N latitude and 79.58°E longitudes with an altitude of 411.8 m above the mean sea level. Jabalpur is situated in the semi-arid region having sub-tropical climate with hot dry summer, and cold winter. The maximum and minimum temperature ranges between 34.5°C and 4.2°C. The average annual relative humidity is 85%. The experiment was laid out in randomized block design with three replications and thirty different genotypes were selected.

Treatment detail

Table 1: The following thirty genotypes of coriander were included in trial

Treatments	Genotypes	Source
T1	COR 95	IISR, Marikunnu, Kerala
T2	COR 96	IISR, Marikunnu, Kerala
T3	COR 97	IISR, Marikunnu, Kerala
T4	COR 98	IISR, Marikunnu, Kerala
T5	COR 99	IISR, Marikunnu, Kerala
T6	COR 100	IISR, Marikunnu, Kerala
T7	COR 101	IISR, Marikunnu, Kerala
T8	COR 102	IISR, Marikunnu, Kerala
T9	COR 103	IISR, Marikunnu, Kerala
T10	COR 104	IISR, Marikunnu, Kerala
T11	COR 105	IISR, Marikunnu, Kerala
T12	COR 106	IISR, Marikunnu, Kerala
T13	COR 107	IISR, Marikunnu, Kerala
T14	COR 108	IISR, Marikunnu, Kerala
T15	COR 109	IISR, Marikunnu, Kerala
T16	COR 110	IISR, Marikunnu, Kerala
T17	COR 111	IISR, Marikunnu, Kerala
T18	COR 112	IISR, Marikunnu, Kerala
T19	COR 113	IISR, Marikunnu, Kerala
T20	COR 114	IISR, Marikunnu, Kerala
T21	COR 115	IISR, Marikunnu, Kerala
T22	COR 116	IISR, Marikunnu, Kerala
T23	COR 117	IISR, Marikunnu, Kerala
T24	COR 118	IISR, Marikunnu, Kerala
T25	COR 119	IISR, Marikunnu, Kerala
T26	COR 120	IISR, Marikunnu, Kerala
T27	COR 121	IISR, Marikunnu, Kerala
T28	CIMPO S 33	Bangalore
T29	Local	Jabalpur
T30	RCr 728	IISR, Marikunnu, Kerala

3. Results and Discussions

3.1 Analysis of variance

The main objective of the present investigation was to study the diversity present in thirty genotypes of coriander. The estimates of mean sum of square due to genotypes were highly significant for all the characters (Table 2), indicating the presence of genetic diversity in the existing material. The findings Tripathi *et al.* (2000)[19], Singh *et al.* (2006)[16], Beemnet and Getinet (2010)[2], Singh *et al.* (2011)[17], Beemnet *et al.* (2013)[3] and Meena *et al.* (2014)[10] are similar to that of the present findings.

Table 2: Analysis of variance for various characters in coriander (mean sum of squares)

Source of variance	D.F.	Days to germination	Plant height (cm) at		
			30DAS	60DAS	90DAS
Replications	2	22.136	22.400	18.725	48.020
Genotypes	29	11.028**	6.624**	378.795**	1610.167**
Error	58	1.670	0.236	12.131	33.540

Source of variance	D.F.	No. of leaves / plant at			No. of primary branches / plant	No. of secondary branches / plant
		30DAS	60DAS	90DAS		
Replications	2	6.956	0.060	4.949	0.533	1.395
Genotypes	29	10.826**	17.980**	202.581**	4.448**	8.774**
Error	58	0.483	1.026	11.369	0.451	0.421

Source of variance	D.F.	Days to 1st flowering	Days to 50% flowering	Number of umbels per plant	Number of umbellate per umbel	Number of seeds per umbel
Replications	2	7.300	7.600	8.805	9.524	3.589
Genotypes	29	84.325**	57.157**	58.685**	2.110**	29.965**
Error	58	12.070	10.519	4.781	0.228	2.539

The variation was highest for plant height at 60 DAS (26.3-72.75cm) followed by plant height at 90 DAS (82.99-162.75cm), seed yield per hectare (3.61-22.49q), number of leaves per plant at 90 DAS (22.2-53.07), days to first flowering (45.67-67.00), days to 50% flowering (57.00-76.00), number of umbel per plant (17.2-37.00), number of primary branches per plant (4.8-10.40), plant height at 30 DAS (4.49-11.27cm), number of leaves per plant at 30 DAS (5.33-13.27), number of seeds per umbel (17.6-32.6), number of secondary branches per plant (8.13-15.47), number of leaves per plant at 60 DAS (10.07-19.33), days to germination (11.33-19.33), test weight (10.23-17.13g), number of

umbellets per umbel (5.00-8.73) and days to maturity (103-118). While it was low for while number of seeds per plot (0.21-1.35kg) and seed yield per plant (5.13-9.53g) was found to be lowest.

Table 3: Mean performance of growth characters of coriander

Genotypes	Days to germination	Plant height (cm) at			No. of leaves / plant at		
		30DAS	60DAS	90DAS	30DAS	60DAS	90DAS
COR 95	15.33	7.93	48.79	112.47	6.13	17.60	39.87
COR 96	13.33	9.21	51.28	118.60	7.00	13.13	39.20
COR 97	16.33	8.00	40.51	124.40	6.67	13.53	47.87
COR 98	15.00	8.13	38.48	138.69	7.00	17.20	40.13
COR 99	16.33	10.87	50.58	97.17	8.53	14.47	27.73
COR 100	13.00	7.16	51.73	94.10	9.40	17.13	35.03
COR 101	14.33	8.71	57.66	85.15	7.67	17.40	31.80
COR 102	17.00	5.35	45.15	89.23	7.07	13.60	40.20
COR 103	18.33	8.62	51.05	92.09	9.00	15.53	44.60
COR 104	13.67	7.70	50.98	84.83	7.13	16.47	35.93
COR 105	15.33	8.70	43.02	90.77	5.33	10.07	22.20
COR 106	17.00	9.03	62.63	95.75	7.80	16.20	36.47
COR 107	17.33	9.67	65.26	102.77	6.27	14.73	27.87
COR 108	11.33	11.27	72.75	162.75	13.27	19.33	53.07
COR 109	14.00	9.59	48.59	153.59	7.27	12.13	35.93
COR 110	14.67	10.82	70.13	132.29	7.93	13.47	46.93
COR 111	17.33	9.09	49.15	154.87	7.20	11.47	38.87
COR 112	17.33	9.12	46.81	96.59	7.13	16.67	23.53
COR 113	19.33	4.49	26.30	82.99	5.87	17.67	27.33
COR 114	14.67	8.33	46.98	132.27	12.07	15.47	27.13
COR 115	15.67	7.63	45.24	120.03	8.20	11.40	43.13
COR 116	14.00	6.31	45.93	140.42	8.47	17.73	38.87
COR 117	15.67	8.87	61.46	141.78	6.47	14.00	27.87
COR 118	16.33	9.60	63.33	131.54	10.60	12.00	48.93
COR 119	15.33	9.73	49.49	121.56	8.13	12.07	27.67
COR 120	13.33	10.11	67.07	122.77	5.93	14.40	36.87
COR 121	18.67	8.54	66.59	96.08	11.53	12.00	29.87
Cimpo S33 (C)	18.00	9.63	67.53	97.51	6.60	11.93	29.00
Local (C)	15.00	8.51	47.09	125.55	6.00	12.67	35.07
RCr 728 (C)	18.33	8.10	32.49	101.29	8.07	11.87	22.87
S.Em±	0.75	0.28	2.01	3.34	0.40	0.59	1.95
C.D.5% level	2.13	0.80	5.75	9.56	1.15	1.67	5.56

Maximum leaves per plant were recorded in genotype COR 108, while it was lowest in genotype COR 105. Number of leaves per plant has been primarily found to be relating with endogenous hormonal leaves and apical dominance. The findings were quite similar to as reported by Megiji and Korla (2002) [11].

The maximum number of primary and secondary branches per plant recorded under the genotypes COR 118, while the genotypes COR-98 exhibited minimum number of primary branches and secondary branches per plant genotypes COR-111 recorded, probable reasons for enhanced more number of primary and secondary branches per plant, might be due to endogenous hormonal level and apical dominanace. This finding is also in agreement with the findings of Srivastava *et al*. (2000) [15], Rajput and singh (2003) [13], Singh *et al.* (2005) [18], Singh *et al*. (2011) [17] and Dyulgerovand Dyulgerova (2013) [7].

The early first flowering and 50% flowering was recorded under the genotypes COR-117. However, the genotypes COR-113 was found to be late with respect of days taken to first and 50% flowering. Early flowering might be due to minimum branches per plant resulted in low quantity of florigen (a flowering hormone) which might have been responsible for period of reproductive phase. These genotypes can introduce diversity in crop improvement programme because the early and late type can easily fetch the market demand and give better economic returns. The result have been reported by Shrivastava *et al.* (2000) [15], Singh *et al.* (2005) [18], Singh *et al*. (2006) [16], Patel and Agalodiya (2007) [12], Bertini *et al.* (2010) [4] and Meena *et al.* (2014) [10].

The maximum number of umbels per plant was recorded in the genotypes COR-118. However, the genotypes COR-102 was recorded the minimum umbels per plant. These finding are in agreement with the findings of Shrivastava *et al.* (2000) [15], Jain *et al*. (2002) [8], Rajput and Singh (2003) [13], Singh *et al.* (2006) [16], and Meena *et al*. (2014) [10].

The maximum number of umbellets per umbe was recorded in the genotypes COR-102, while lowest umbellets per umbel was noted in COR-111. The results are in confirmation with the findings of Shrivastava et al. (2000) [15], Tripathi *et al.* (2000) [19], Rajput and Singh (2003) [13], Singh *et al*. (2005) [18], Singh *et al.* (2006) [16] and Bertini *et al*. (2010) [4].

The maximum seeds per umbel were recorded in genotype COR-118, COR-112, COR-121 while it was lowest in COR-111. Variation observed in this factor may be due to genetic makeup of the genotype. These results are in agreement with the finding of Shrivastava *et al.* (2000) [15], Choudhary and Ramkrishna (2003) [5], Rajput and Singh (2003) [13] and Singh *et al.* (2006) [16]. Genotypes COR-118, COR-121, COR-114 and COR-113 were recorded in maximum test weight (g). However, the lowest test weight (g) was obtained in COR-111. Variation observed in this factor may be due to genetic makeup of the genotypes. These results are in agreement with the finding of Shrivastava *et al.* (2000) [15] and Sharma *et al.* (2004) [14].

Table 4: Mean performance of different characters of coriander

Genotypes	No. of branches / plant		Days to 1st flowering	Days to 50% flowering	No. of umbels/ plant	No. of umbellate/ umbel	No. of seeds/ umbel
	Primary	Secondary					
COR 95	6.67	11.73	53.00	69.67	25.60	5.87	25.27
COR 96	5.93	13.60	61.33	68.00	22.73	6.33	26.93
COR 97	6.13	10.80	62.33	70.00	24.53	6.20	26.27
COR 98	8.00	14.87	54.33	66.33	24.80	5.93	29.73
COR 99	9.27	11.53	49.67	58.33	25.80	6.67	27.80
COR 100	8.00	9.80	47.33	59.33	31.07	8.00	27.67
COR 101	5.60	10.33	53.00	64.33	30.20	5.47	28.00
COR 102	6.40	9.80	55.33	71.00	17.20	8.73	28.33
COR 103	6.07	10.73	54.00	66.33	27.67	6.73	26.27
COR 104	9.20	9.73	57.00	69.33	21.27	6.60	28.40
COR 105	5.60	9.93	46.33	61.00	24.13	5.60	19.87
COR 106	7.20	10.47	55.67	66.00	29.00	6.53	30.13
COR 107	7.33	11.87	56.33	68.00	25.93	6.53	30.47
COR 108	7.13	12.80	61.00	69.00	24.60	6.53	28.67
COR 109	5.73	12.13	47.33	61.67	24.07	5.67	30.00
COR 110	6.93	11.93	47.33	61.67	29.27	6.13	29.13
COR 111	4.80	8.13	56.67	69.67	31.93	5.00	17.60
COR 112	7.13	12.60	56.00	62.33	21.07	5.27	32.33
COR 113	5.87	11.00	67.00	76.00	18.13	6.27	29.87
COR 114	6.60	9.47	55.67	66.67	24.80	6.27	24.80
COR 115	6.60	11.00	49.00	67.00	32.73	6.27	30.20
COR 116	6.13	8.43	55.67	65.00	27.33	6.20	29.13
COR 117	7.47	9.13	45.67	57.00	26.80	5.93	28.87
COR 118	10.40	15.47	63.67	74.00	37.00	7.87	32.60
COR 119	7.33	12.33	53.33	65.33	32.73	6.40	30.20
COR 120	6.33	9.40	54.00	64.67	27.20	6.27	29.00
COR 121	6.53	10.80	54.00	63.33	28.13	5.73	30.87
Cimpo S 33(C)	6.67	11.93	58.33	69.33	22.27	6.87	27.53
Local (C)	5.80	10.60	49.67	63.67	21.40	5.33	25.53
RCr 728 (C)	5.67	9.87	57.00	67.00	27.20	7.80	27.73
S.Em±	0.39	0.37	2.01	1.87	1.26	0.28	0.92
C.D.5% level	1.11	1.07	5.73	5.35	3.61	0.79	2.63

4. Conclusion

It is concluded that maximum leaves per plant, maximum number of umbels per plant and the maximum number of primary and secondary branches per plant recorded under the genotypes COR 118. The early first flowering and 50% flowering was recorded under the genotypes COR-117 and maximum number of umbellets per umbe was recorded in the genotypes COR-102.

5. References

1. Anonymous. National Horticulture Board, Gurgoan, Haryana, 2015.
2. Beemnet M, Getinet A. Variability in Ethiopian coriander accessions for agronomic and quality traits. African Crop Science journal. 2010; 18(2):43-49.
3. Beemnet MK, Getinet A, bizuayehu T. Correlation studies and path coefficient analysis for seed yield and yield components in Ethiopian coriander accessions. Journal of African Crop Science. 2013; 21(1):51-59.
4. Bertini CH de Pinheiro M, Nobrega, Duarte GMand J. Mi de L. Agronomic performance and genetic divergence of coriander genotypes. Revista ciencia Agronomica. 2010; 41(3):409-416.
5. Choudhary P, Ramkrishna K. Analysis of polygenic variation in the M4 families of coriander (*Coriandrum sativum* L). Indian Journal Genet. 2003; 63(2):181-182
6. Diedericnsen A, Hammer K. The infra specific taxa of coriander (*Coriandrum sativum* L.) Genetic Research Crop Evolution. 2003; 50:33-63.
7. Dyulgerov N, dyulgerova B. Correlation and path coefficient analysis of productivity elements in coriander (*Coriandrum sativum* L.). Journal of Central European Agriculture. 2013; 14(4):1512-1517.
8. Jain VK, Singh D, Jain SK. Assessment of genetic variability in coriander (*Coriandrum sativum* L.). Ann. Plant soil research. 2002; 4(2): 329-330.
9. Lopez PA. Phenotypic, biochemical and molecular diversity in coriander (*Coriandrum sativum* L.) germplasm, Ph.D. Disslowa state University Ames, 2006.
10. Meena RS, Kakani RK, Sharda Choudhary, Balraj S, Panwar S. Genetic diversity analysis in coriander (*Coriandrum sativum*) varieties. Indian Journal of Agriculture Sciences. 2014; 84(12):1508-1512.
11. Megeji NW, Korla BN. Heritability in coriander. Haryana journal of Horticulture Science. 2002; 31(3- 4):292-293.
12. Patel VR, Agalodiya AV. Genetic variability studies in coriander (*Coriandrum sativum* L). Department of Plant Breeding and Genetic, CP. College of Agriculture, 2007.
13. Rajput SS, Singh D. Variability in coriander (*Coriandrum sativum* L.) for yield and yield components. Journal of Spices and Agromatic Crops. 2003; 12(2):162-164.
14. Sharma KC, Meena BL, Singh D, Jakhar MI. Genetic variability, heritability and genetic advance in *Coriander sativum* L. germplasm. Published in National Seminar on New Perspective in Commercial Cultivation, Processing and Marketing of Seed Spices and Medicinal Plants held at S.K.N. College of Agriculture, Jobner, 2004.
15. Shrivastava SBL, Kamaluddin, Tripathi SM, Shrivastava JP. Genetic spices and aromatic plant challenges and opportunities in the new century contributory papers centennial conference on spices and aromatic plant Spices Calicut, Kerala, India. 2000, 68-70.

16. Singh D, Jain UK, Rajput SS, Khandelwal V, Shiva KN. Genetic variation in coriander (*Coriandrum sativum* L.). Journal of Spices & Aromatic Crops. 2006; 15(1):25-29.
17. Singh SK, Singh SJ, Devesh ST. Association analysis in elite germplasm lines in coriander (*Coriandrum sativum* L). Annual of Horticulture. 2011; 4(2):187-192.
18. Singh SP, Prasad R, Singh RK. Phenotypic correlation and heritability for studied in 30 genotypes of coriander (*Coriandrum sativum* L.). International journal of agriculture science. 2005; 1(1):84-86.
19. Tripathi SM, Kamaluddin, Srivastava SBL, Srivastava JP. Variability, heritability and correlation studies in coriander (*Coriandrum sativum* L.). Centennial Conference on Spices & Aromatic Plants held at Calicut. 2000, 31-34.