



Study on Genetic Variability in Coriander (*Coriandrum sativum* L.)

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

An experiment was conducted Research Farm, Department of Horticulture, Sam Higginbottom University of Agriculture Technology and Sciences, Prayagraj, Uttar Pradesh during Rabi 2023-2024. In which 14 varieties with three replication each of coriander viz., T₁:CIMPO S-33, T₂:Imp KCOH-0801, T₃:Pant Haritma, T₄:GDLC-1, T₅:Kashmiri, T₆:Green Valley, T₇:LS-800, T₈: K.S Deshi, T₉:Saurabh, T₁₀: Heena (Bold), T₁₁: Japany-47, T₁₂: Cross (91), T₁₃:Green King, T₁₄:Local Ajmer, were evaluated among each other's for quality, growth parameter and quantity parameters. In which among all the varieties used in the experiment the best and most promising variety was found to be

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Japany-47 in all the aspects i.e plant height, (132.33cm) number of primary branches (17.6) number of umbels (25.19) Days to maturity (155.86) seed yield (15.35) test weight (17.04) ,cost benefit ratio 2;12.

Keywords: *Coriander; plant height; number of primary branches; quality attributes; cost benefit ratio; seed yield.*

1. INTRODUCTION

“Coriander is also known as the Chinese Parsely, Cilantro, Dizzycorn, and Japanese parsely. India is also known as “Home of Spices Coriander (*Coriandrum sativum* L.) is an aromatic spice crop belonging to the family Apiaceae and its chromosome number is $2n=22$. Coriander (*Coriandrum sativum* L.) is a highly cross-pollinated annual crop valued as spic for its aroma and flavour. India has leading position in cultivation and production of coriander. At present, coriander is grown widely in parts of western and central India in the states of Gujarat and Rajasthan. Germplasm collection with good variability for the desirable characters is the basic requirement of any crop improvement program” [1-5]. “Again, in order to exploit the yield potential of coriander, the factors affecting yield and yield component ought to be thoroughly investigated. These factor consist of environment and cultural practices which directly affect the yield. The development of suitable plant type is of pronounced importance for all the crops through planned design programme [6]. Attempts have therefore been made by some scientists to analyse different morphological characters to make available meaningful information about the significance of characters in relation to seed yield in coriander. An ideal plant ideotype would only be defined if the different components of coriander seeds are analysed and their relative importance can be assessed. In the present study, genetic diversity of coriander genotypes collected from different sources were examined and yield component analyses were carried out to identify important coriander seed yield components” [1].

“In India, coriander is cultivated in the state of Madhya Pradesh, Rajasthan, Gujarat and Tamil Nadu. The productivity of this crop is very low. In India, it occupies an area of 516.00 MH with a production of 496.00 MT with an average productivity of 0.7 million t/ha [4]. The crop is also cultivated in Tamil Nadu, Karnataka, Orissa and Haryana Madhya Pradesh is the producing coriander Area 160.00 MH, production 75.00 MT and productivity 0.47 t/h of coriander”

(Anonymous, 2015). “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”. (Anonymous, 2015).

Coriander is not commonly grown under Prayagraj agro-climatic conditions, Hence different genotypes of coriander were collected from local, public and private sectors to find out the most suitable coriander genotypes for growth and yield attributes in Prayagraj agro-climatic conditions as well as to find out the economics of different genotypes [7-12].

Keeping the above point of view, the present investigation entitled "Genetic Variability in Coriander (*Coriandrum sativum* L.)" was taken up during 2023-2024 with the following objectives.

2. MATERIALS AND METHODS

2.1 Experimental Site

The experiment was conducted during rabi season of the year 2023–24 at Horticulture Research Farm, Department of Horticulture, Naini Agricultural Institute, Sam Higginbottom University of Agriculture Technology and Sciences, Prayagraj. The experimental site is located in the sub-tropical region which is located at 25. 271 N latitude, 81. 561 E longitude and 98 m above the mean sea level.

2.2 Climate

Prayagraj is situated at an elevation of 98 meters above sea level at 25.87° N latitudes and 81.15° E longitudes. This region has a sub-tropical climate prevailing in the South-East part of U.P.

with both the extremes in temperature, fe., the winter and the summer. In cold winter months (Dec- Jan), the temperature falls 2-5°C or even low, while in summer months (May-June) it reaches as high as 49°C. The average rainfall is about 850-1100mm which occurs mostly during July-September months with occasional showers in winter too.

2.3 Statistical Analysis

The statistical analysis of the data was carried out using STATISTICA (7.0) software

3. RESULTS AND DISCUSSION

The data pertaining to the growth parameters like days of germination, plant height, primary branches secondary branches of different genotypes differed significantly in various growth stages are presented in (Table 2), The minimum number of days taken to germination of plants with the treatment (6.33 days) was observed in T₄ (GDLC-1) followed by T₁ (CIMPO S-33), (7.33 days respectively) Maximum number of days to germination was found the treatment T₁₂ (Cross 91).

Maximum height was reported (132.33 cm) in T₁₁ (Japany-47) followed with an average height recorded in T₈ (KS Desi) (110.00 cm) and T₃. All the treatments significantly Increase plant height as compared to control. Where as the minimum plant height (28.67 cm) was found to be in T₄ (GDLC-1).

The highest number of primary branches per plant at 90DAS (8.3) was observed in T₅ (Kashmiri) which were statistically at par with all other treatments. Least number of primary

branches per plant was recorded in T₆ (Green Valley) (6.20 respectively).

The More number of umbels per plant (25.25) was observed in T₁₁ (Japany-47) followed by T₇ (LS-800) (20.85). Where as the less number of umbels per plant was found in T₄ (GDLC-1) (9.53respectively).

The maximum number of umbellets per umbel was observed in T₁₁ (Japany-47) (25.99) significantly higher from rest of the treatments. followed by T₁₄ (Local Ajmer) (25.53) which were found to be at par. Whereas the minimum number of umbellets per umbel was present in T₄ (GDLC-1) (15.85).

The more diameter of Umbel (5.25) was observed in T₁₁ (Japany-47) followed by T₆ (Green Valley) (4.92 respectively) . Whereas the less diameter was observed in T₄ (GDLC-1) (3.06).

The more number of days taken for maturity (155.86) was observed in T₁₁ (Japany-47) followed by T₁₃ Green King (152.19). Where as the less number of days taken for maturity was observed in T₄ (GDLC-1) (122.19).

The highest leaf yield per plant (17.34 g) was found in T₆ (Green Valley) (followed by T₂ (ImpKCOH-0801) (15.40 g). Whereas the lowest leaf yield per plant was found in T₁₀ (Heena Bold) (12.84 g).

The maximum seed yield per plant (7.45 g) was obtained in T₁₁ (Japany-47) However, the treatment T₆ (Green Valley) (7.18 g), Whereas the minimum seed yield per plant was obtained in T₄ (GDLC-1) (4.81 g).

Table 1. Details of the treatments

T1	CIMPO S-33	National seeds corporation LTD.
T2	Imp KCOH-0801	National seeds corporation LTD.
T3	Pant Haritma	National seeds corporation LTD.
T4	GDLC -1	National seeds corporation LTD.
T5	Kashmiri	Famous seeds company
T6	Green Valley	Famous seeds company
T7	LS – 800	National seeds corporation LTD.
T8	K.S Deshi	Famous seeds company
T9	Saurabh	Famous seeds company
T10	Heena (Bold)	Famous seeds company
T11	Japany- 47	Famous seeds company
T12	Cross (91)	Famous seeds company
T13	Green King	Ajmer
T14	Local Ajmer	Ajmer

Table 2. Growth parameter of coriander (*Coriandrum sativum* L.) for germination

S.No.	Varieties	Days to Germination	Plant Height (cm)		
			30 DAS	60 DAS	90 DAS
T1	CIMPO S-33	7.33	7.33	70	95.67
T2	Imp KCOH -0801	8.00	8.00	66	93.67
T3	Pant Haritma	7.67	9.33	61	101.00
T4	GDLC -1	6.33	5.67	51	28.67
T5	Kashmiri	11.00	8.33	69	86.33
T6	Green valley	12.00	8.33	75	54.00
T7	LS-800	12.67	8.00	76	38.00
T8	KS Deshi	12.33	7.00	60	110.00
T9	Saurabh	13.00	8.00	61	76.33
T10	Heena (Bold)	12.33	8.33	96	94.00
T11	Japany -47	13.00	10.00	111	132.33
T12	Cross (91)	15.67	8.67	96	37.33
T13	Green king	8.67	8.67	69	75.33
T14	Local Ajmer	9.00	8.67	60	51.33
F-Test		S	S	S	S
C.D. (5%)		1.11	0.70	0.70	1.36
S.E. (d)		2.29	1.43	1.44	2.80
CV		12.81	10.45	3.52	2.18

Table 3. Growth parameter of coriander (*Coriandrum sativum* L.) for branches per plant

S. No.	Varieties	Number of primary branches per plant		Number of Secondary branches per plant	
		[at 90 DAS]	[at 120 DAS]	[at 90 DAS]	[at 120 DAS]
T1	CIMPO S-33	4.26	6.5	11.3	14.75
T2	Imp KCOH -0801	3.93	6.7	15.6	20.59
T3	Pant Haritma	3.26	6.6	10.2	14.49
T4	GDLC -1	3.12	6.2	9.1	12.59
T5	Kashmiri	4.56	8.3	10.3	16.95
T6	Green valley	4.93	6.1	10.9	13.83
T7	LS-800	5.06	7.6	9.1	12.75
T8	KS Deshi	5.36	6.5	13.9	17.75
T9	Saurabh	5.65	7.6	9.3	13.43
T10	Heena (Bold)	5.94	6.3	13.7	18.95
T11	Japany -47	6.94	8.3	17.6	21.99
T12	Cross (91)	6.55	7.5	11.5	16.09
T13	Green king	6.24	7.3	13.0	17.09
T14	Local Ajmer	6.15	6.9	13.3	12.56
F-Test		S	S	S	S
C.D. (5%)		0.03	0.05	0.01	0.01
S.E. (d)		0.06	0.10	0.02	0.02
C.V		0.70	0.82	0.12	0.09

Table 4. Yield parameter in coriander (*Coriandrum sativum* L.) for umbels per plant

S. No.	Varieties	No of umbels per plant	No of umbellets per plant	Umbel diameter (cm)	Days to maturity
T1	CIMPO S-33	17.19	21.85	4.53	122.53
T2	Imp KCOH -0801	14.59	15.99	3.49	147.19
T3	Pant Haritma	9.95	21.39	4.44	132.19
T4	GDLC -1	9.49	15.85	3.06	122.19
T5	Kashmiri	10.69	19.33	4.22	138.53
T6	Green valley	9.49	16.85	4.92	130.92
T7	LS-800	20.80	24.05	4.44	131.19
T8	KS Deshi	12.49	25.20	4.60	126.86
T9	Saurabh	14.29	22.86	3.32	148.19
T10	Heena (Bold)	16.49	20.13	4.64	123.19
T11	Japany -47	25.19	25.99	5.25	155.86
T12	Cross (91)	15.39	24.60	3.84	128.19
T13	Green king	16.95	18.34	4.47	152.19
T14	Local Ajmer	11.29	25.53	4.22	138.86
F-Test		S	S	S	S
C.D. (5%)		0.01	0.13	0.01	0.01
S.E. (d)		0.01	0.26	0.02	0.02
C.V		0.06	0.73	0.26	0.01

Table 5. Yield parameter in coriander (*Coriandrum sativum* L.) for Leaf and seed yield

S. No.	Varieties	Leaf yield			Seed yield		
		per/plant	per/plot	per/ha.	per/plant	per/plot	per/ha.
T1	CIMPO S-33	13.20	316.72	29.33	6.02	136.85	12.32
T2	Imp KCOH -0801	15.40	369.52	34.21	4.90	142.51	13.18
T3	Pant Haritma	17.38	417.20	38.63	6.01	137.23	12.26
T4	GDLC -1	14.53	348.72	32.29	4.81	107.82	9.95
T5	Kashmiri	13.95	334.72	31.00	6.16	141.01	12.80
T6	Green valley	17.48	419.52	38.84	7.18	164.39	15.09
T7	LS-800	13.52	324.48	30.04	5.91	133.92	15.29
T8	KS Deshi	14.81	355.36	32.90	6.27	143.88	12.15
T9	Saurabh	14.00	335.92	31.10	6.31	144.76	13.05
T10	Heena (Bold)	12.84	308.08	28.53	6.01	129.64	13.08
T11	Japany -47	13.73	329.44	30.50	7.45	172.12	15.35
T12	Cross (91)	12.93	310.32	28.73	5.68	155.16	12.22
T13	Green king	13.62	326.96	30.27	6.74	138.39	11.51
T14	Local Ajmer	13.09	314.96	29.08	5.99	137.48	14.07
F-Test		S	S	S	S	S	S
S.E.(d)		1.016	24.338	2.258	0.50	0.75	0.21
C.D. (5%)		2.089	50.130	4.642	1.04	1.55	0.44

The highest Test weight was found in T11 (15.21 g), (15.16 respectively) which were on (Japany-47) are superior than all over the par. Whereas the lowest Test weight was found in treatments (17.04 g) followed by T7 LS-800 in T4 (GDLC-1) (10.30 g).

4. CONCLUSION

According to the current research the use of different varieties had a significantly positive impact on the growth and development of corianders. Among the various treatment that were evaluated, T₁₁ Yield the most favourable result in terms of growth viz. plant height ,number of primary branches, umbels, umbellets and diameter and yield viz. leaf yield, diameter of plant, number of umbels per plant seed yield per plant. Furthermore T₁₁ had the highest benefit cost ratio of 2.12.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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