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

ABSTRACT

An experiment entitled **'Genetic Variability in Coriander *(Coriandrum sativum L.)* crop under Controlled conditions'** 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 varities with three replication each of coriander viz., T1;CIMPO S-33, T_2:Imp KCOH-0801, T_3:Pant Haritma, T_4:GDLC-1, T_5:Kashmiri, T_6:Green Valley, T_7:LS-800, T_8: K.S Deshi, T_9:Saurabh, T_{10}: Heena (Bold), T_{11}: Japany-47, T_{12}: Cross (91), T_{13}:Green King, T_{14}:Local Ajmer, were evaluated among each other's for quality,growth parameter and quantity patrametes.in which among all the varieties used in the experiment the best and most promising variety was found to be 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.*

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 (Moniruzzamanal.2013) . 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. 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.

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. 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.

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.

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.

MATERIALS AND METHODS

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 250. 271 N latitude, 810. 561 E longitude and 98 m above the mean sea level.

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.

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

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

3. Result and Discussion Growth Parameters :

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 T_4 (GDLC-1) followed by T_1 (CIMPO S-33), (7.33 days respectively) Maximum number of days to germination was found the treatment T_{12} (Cross 91) .

Maximum height was reported (132.33 cm) in T_{11} (Japany-47) followed with an average height recorded inT_8 (KS Desi) (110.00 cm) and T_3. All the treatments significantly Increase plant height as compared to control.Whereas the minimum plant height (28.67 cm) was found to be in T_4 (GDLC-1).

The highest number of primary branches per plant at 90DAS (8.3) was observed in T_5 (Kashmiri) which were statistically at par with all other treatments. Least number of primary branches per plant was recorded in T_6 (Green Valley) (6.20 respectively).

The More number of umbels per plant (25.25) was observed in T_{11} (Japany-47) followed by T_7 (LS-800) (20.85). Whereas the less number of umbels per plant was found in T_4 (GDLC-1) (9.53respectively).

The maximum number of umbellets per umbel was observed in T_{11}(Japany-47) (25.99) significantly higher from rest of the treatments. followed by T_{14} (Local Ajmer) (25.53) which

were found to be at par. Whereas the minimum number of umbellets per umbel was present in T_4 (GDLC-1) (15.85).

The more diameter of Umbel (5.25) was observed in T_{11} (Japany-47) followed by T_6 (Green Valley)(4.92 respectively) . Whereas the less diameter was observed in T_4 (GDLC-1) (3.06)
The more number of days taken for maturity (155.86) was observed in T_{11} (Japany-47) followed by T_{13} Green King (152.19).Whereas the less number of days taken for maturity was observed in T_4 (GDLC-1) (122.19).

The highest leaf yield per plant (17.34 g) was found in T_6(Green Valley) (followed by T_2 (ImpKCOH-0801) (15.40 g). Whereas the lowest leaf yield per plant was found in T_{10} (Heena Bold) (12.84 g).
The maximum seed yield per plant (7.45 g) was obtained in T_{11} (Japany-47) However, the treatment T_6(Green Valley) (7.18 g), Whereas the minimum seed yield per plant was obtained in T_4 (GDLC-1) (4.81 g).
The highest Test weight was found in T11 (Japany-47) are superior than all over the treatments (17.04 g) followed by T7 LS-800 (15.21 g), (15.16 respectively) which were on par. Whereas the lowest Test weight was found in T4 (GDLC-1) (10.30 g).

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
T_2	Imp KCOH -0801	8.00	8.00	66	93.67
T_3	Pant Haritma	7.67	9.33	61	101.00
T_4	GDLC -1	6.33	5.67	51	28.67
T_5	Kashmiri	11.00	8.33	69	86.33
T_6	Green valley	12.00	8.33	75	54.00
T_7	LS-800	12.67	8.00	76	38.00
T_8	KS Deshi	12.33	7.00	60	110.00
T_9	Saurabh	13.00	8.00	61	76.33

T_{10}	Heena (Bold)	12.33	8.33	96	94.00
T_{11}	Japany -47	13.00	10.00	111	132.33
T_{12}	Cross (91)	15.67	8.67	96	37.33
T_{13}	Green king	8.67	8.67	69	75.33
T_{14}	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
T_2	Imp KCOH -0801	3.93	6.7	15.6	20.59
T_3	Pant Haritma	3.26	6.6	10.2	14.49
T_4	GDLC -1	3.12	6.2	9.1	12.59
T_5	Kashmiri	4.56	8.3	10.3	16.95
T_6	Green valley	4.93	6.1	10.9	13.83
T_7	LS-800	5.06	7.6	9.1	12.75
T_8	KS Deshi	5.36	6.5	13.9	17.75
T_9	Saurabh	5.65	7.6	9.3	13.43
T_{10}	Heena (Bold)	5.94	6.3	13.7	18.95
T_{11}	Japany -47	6.94	8.3	17.6	21.99

T_{12}	Cross (91)	6.55	7.5	11.5	16.09
T_{13}	Green king	6.24	7.3	13.0	17.09
T_{14}	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
T_2	Imp KCOH -0801	14.59	15.99	3.49	147.19
T_3	Pant Haritma	9.95	21.39	4.44	132.19
T_4	GDLC -1	9.49	15.85	3.06	122.19
T_5	Kashmiri	10.69	19.33	4.22	138.53
T_6	Green valley	9.49	16.85	4.92	130.92
T_7	LS-800	20.80	24.05	4.44	131.19
T_8	KS Deshi	12.49	25.20	4.60	126.86
T_9	Saurabh	14.29	22.86	3.32	148.19
T_{10}	Heena (Bold)	16.49	20.13	4.64	123.19
T_{11}	Japany -47	25.19	25.99	5.25	155.86

T_{12}	Cross (91)	15.39	24.60	3.84	128.19
T_{13}	Green king	16.95	18.34	4.47	152.19
T_{14}	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
T_2	Imp KCOH -0801	15.40	369.52	34.21	4.90	142.51	13.18
T_3	Pant Haritma	17.38	417.20	38.63	6.01	137.23	12.26
T_4	GDLC -1	14.53	348.72	32.29	4.81	107.82	9.95
T_5	Kashmiri	13.95	334.72	31.00	6.16	141.01	12.80
T_6	Green valley	17.48	419.52	38.84	7.18	164.39	15.09
T_7	LS-800	13.52	324.48	30.04	5.91	133.92	15.29
T_8	KS Deshi	14.81	355.36	32.90	6.27	143.88	12.15
T_9	Saurabh	14.00	335.92	31.10	6.31	144.76	13.05
T_{10}	Heena (Bold)	12.84	308.08	28.53	6.01	129.64	13.08
T_{11}	Japany -47	13.73	329.44	30.50	7.45	172.12	15.35

T_{12}	Cross (91)	12.93	310.32	28.73	5.68	155.16	12.22
T_{13}	Green king	13.62	326.96	30.27	6.74	138.39	11.51
T_{14}	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**

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,T_{11} 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 T_{11} had the highest benefit cost ratio of 2.12.

REFERENCES:

Rajput, S. S. and Singh, D. 2003.Variability in coriander (Coriandrum sativum L.) for yield and yield components. J. Spices and Aromatic Crops 12: 162-164.

Idhol, B. D., Desai, R. T., Khandelwal, V. and Ghodke, U. R. 2009. Genetic variability, character association and path analysis studies in coriander (Coriandrum sativum L.). Published in National Workshop on "Spices and Aromatic Plants in 21 st century India" held at S.K.N. college of Agriculture, Jobner (Rajasthan)

Moniruzzaman M, Rahman MM, Hossain MM, Karim AJMS, Khaliq QA. Evaluation of coriander (Coriandrum sativum L.) genotypes for seed yield and yield contributing characters.Bangladesh Journal of Agricultural Research. 2013; 38(2):189-202

Akshata Hongal, N. Basavaraja, Shivanand Hongal, N.K. Hegde and Sudheesh Kulkarni. (2018). Evaluation of Coriander (*Coriandrum sativum L.*) Genotypes for Yield and Quality under Hill Zone (Zone-9) of Karnataka, India. Int. J. Curr. Microbiol.App.Sci (2018) 7(5): 2494-2502

Singh SP, Prasad R, Singh D. Variability and character association of grain yield and its component character in coriander. Journal of Applied Bioscience. 2006; 32(1):64-67.

Bhati, D. S., Dharma, R. K. and Bhargava, S. C. (1988). Effect of icaf plucking in coriander. Indian Cocoa, Arecanut Spices J, 11(3): 4

Rajput SS, Singh D. Variability in coriander (Coriandrum sativum L.) for yield and yield components. J Spices Aromatic Crops 2003;12(2):162-164.

Singh SP, Katiyar RS, Rai SK, Yadav HK, Tripathi SM, Nigam HK et al. Studies on genetic variability and character association in coriander (Coriandrum sativum L.) grown on sodic soil. J Medicinal Aromtic Plant Sci 2008;30(2):164-167.

Dhokle, G. C., Naik, P. G., Suryawanshi, A. B., and Phad, G. N. (2010). Performance of different varieties of coriander for yield, quality and germination under Marathwada onditions. Asian J. Hort, 4: 355-357

Dhuhan, D., Partap, P. S., Rana, M. K. and Baswana, K. S. (2005). Effect of rhizobium inoculation and greens leaf cutting on test weight and seed yield of fenugreek genotypes. Haryana J. Hort. Sci., 34(1-2): 156-160.

Easwarareddy, S., Venkateswarlu, K. and Narayanareddy, Y. (1988). Studies on the sowing time and efficacy of certain coriander cultivars in biomass production. Indian Cocoa Arecanut Spices J., 11(3): 110-112

Giridhar, K. and Sarada, C. (2005). Identification of coriander (*Coriandrum sativum L.*) genotypes for vertisols of Andhra Pradesh. Nat. Symp. Cur. Trends in Onion, Garlic, Chillies and Seed Spices-Production, Marketing and Utilization, SYMSAC-II, NRCOG, Rajgurunagar, p. 92.

Panse VG. Application of genetics to plant breeding inheritance of quantitative Literature Cited 77 characters. Genet 1940;48:283-302.

Hariprasadrao, N. and Srinivasrao, G. (2001). Studies on the performance of exotic and indigenous coriander (*Coriandrum sativum L.*) genotypes for greens. The Andhra Agric J., 48(3-4): 324-326.

Agnihotri P, Dashora SL, Sharma RK. Variability, correlation and path analysis in fennel (Foeniculumvulgare Mill) J. Spices and Aromatic Crops, 1997; 6(1):51-54.

Jindla, L. N., Singh, T. IL, Allahrang and Bansal, M. L. (1985). Stability for seed yield and its components in coriander (*Coriandrum sativum L.*). Indian J. Genet. Plant Breed 45: 358-361.

Kalidasu G, Sarada Cand Reddy TY (2008). Eficacy of biofertilizers on the performance of rainfed coriander (*Coriandrum sativum L.*) in vertisols. J Spices and Aromatic Crops 17(2): 98-102.

TP. Malik and S. K. Tehlan (2013). Performence of coriander (*Coriandrum sativum L.*) varieties for growth and seed yield. International J. Seed Spices 3(2), July 2013:89-90

Reddy PV, Rao TSR, Rao SBSN, Reddy AN. Genetic variability in coriander. Indian Cocoa, Arecanut and Spices J, 1989; 12(3):90-92.

Mohideen, M. K., Mohammad, A. J. B. M. and Muthuswami, S. (1984). Coriander, a crop of good prospects for Tamil Nadu. Indian Cocoa, Arecamut Spices J, 8: 82- 83.