Original Research Article

EVALUATION OF DIFFERENT VARIETY OF CORIANDER (*Coriandrum sativum* L.)

ABSTRACT

A research experiment was carried out at the Horticulture Research Farm department of Horticulture, Naini Agricultural Institute, SHUATS, Prayagraj, during the year 2021-2022. The experiment were laid out in Randomized Block Design comprising of 8 varieties ~~viz., V_1:~~ Kashmiri, ~~V_2:~~ Japani 57, ~~V_3:~~ Panth Haritha; ~~V_4 :~~ Green King, ~~V_5 :~~ Sughanda, ~~V_6 :~~ Simco 55, V_7 : Simpco s 33, ~~V_8 :~~ and Simco with three replications. The observations were recorded as per the growth, yield and quality parameters. The results reveal that the varieties V_5 (Sughanda) was found to be the most suitable over all the other varieties ~~in relation to~~ in the growth, yield, and quality of Coriander.

Keywords: Coriander, growth, yield and Quality, Varieties.

INTRODUCTION

India, often referred as the "Home of Spices', grows about 63 spices and many of them, like coriander, cumin, fennel, and fenugreek, are counted among the major seed spices of the country on the basis of area and production and their importance in national economy. In India, seed spices are grown in an area of approximately 5.17 lakh hectare with an annual production of about 3.35 t. It has been estimated that the world demand ~~of~~ for seed spices by 2000 A.D. would be about 40 lakh tonnes, of which India has a larger role to play **(Anonymous, 1993).**

Coriander (*Coriandrum sativum)* is an important seed spice crop belonging to the family Umbellifereae or Apiaceae. It is a highly cross-pollinated crop being grown as irrigated as well as unirrigated. Practically all parts of coriander have their own particular appeal in foods, through tender stem, leaves, flowers and fruits are in greater demand. Coriander leaves contain a special type of flavor and people use it ~~in the preparation of~~ to prepare vegetable and "chatni".

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Coriander seeds are used as an ingredient in curry powder and spice powder. Its seeds also contain proteins and sugars. ~~The coriander oil is used for preparation of chocolate and sweets, coriander oil is also used in flavouring beverage, whisky, gin and other liquors.~~ Coriander oil is used to prepare 'chocolate' and sweets and in flavoring beverages, whisky, gin, and other liquors.

Coriander is mainly a crop of tropics and subtropics, cultivated primarily in Morrocco, Romania, France, Spain, Italy, Holland, Russia, Burma, Pakistan, Turkey, India, Mexico, Argentina, and to some extend in England and USA **(Nethaji *et al.* 1979).**

The coriander (*Coriandrum sativum*) of family Apiaceae. It is an annual herb Mainly cultivated for its fruit as well as its tender green leaves . The fruit have a fragrant odour and a pleasant aromatic taste . The seeds are also used as condiment.

Coriander is native to regions spanning from Southern Europe and Northern Africa to Southwestern Asia. It is a soft plant growing to 50 cm (20 in) tall. The leaves are variable in shape, broadly lobed at the base of the plant, and slender and feathery higher on the flowering stems.

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. Coriander is widely cultivated in countries like India, Morocco, Romania, France, Spain, Italy, Holland, Yugoslavia, Russia, Myanmar, Turkey, Mexico and to some extent in England and USA. In India, it is mainly cultivated in the states of Rajasthan, Gujarat, Andhra Pradesh, Madhya Pradesh and Tamil Nadu covering an area of 351710 hectares with an annual production of 259480 tonnes (Anonymous, 2007). In Rajasthan, coriander is largely cultivated in the districts of Jhalawar, Baran, Kota, Bundi, Chittorgarh, Banswara, Tonk, Sawai Madhopur, Nagpur and Jodhpur covering an area of 136741 hectares with an annual production of 142353 tonnes and productivity of 1041.04 kg/ hectare **(Anonymous, 2005-06).**

Coriander (*Coriandrum sativum* L.) is an important seed spice crop belongs to family Apiaceae (Umbelliferae) with a chromosome number of 2n=22. Mediterranean region is the centre of origin of this crop. Coriander is an annual herbaceous cross pollinated crop. Its name has been derived from Greek word “Koris” means bed-bug, because of unpleasant, fetid bug like odour of the green un ripened fruits. Coriander ranks first among the seed spices with respect to

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export. It is the major ingredient of curry powder up to 40%by weight and also forms an important ingredient for several alcoholic beverages, particularly in Seeds are also used as tonic, carminative, diuretic, stomachic and as an aphrodisiac. Oleoresin from coriander is used as a flavouring agent and as an ingredient in pharmaceutical formulation and in perfumery(Singh et al., 2006) [14]. Coriander fruits are an important spice of many countries of Europe, Northern Africa, West, Central and South Asia. In the Mediterranean region, coriander cultivation dates back to ancient Egypt; in Europe, coriander is known since the middle ages (Anonymous, 2012).

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.

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MATERIALS AND METHODS

The investigation on **"Evaluation of Different Variety of Coriander (*Coriander Sativum* L.)"** was carried out at Horticulture Research Farm department of Horticulture, Naini Agricultural Institute, SHUATS, Prayagraj U.P., which is located at 25º24'46.14" N latitude, 81º50'49.95" E longitude and 98 m above the mean sea level during Rabi season (December, 2021 – May, 2022).The minimum temperature during crop season was to be 21.38°C and the maximum was to be 37.82°C. The experiment was out covered in Randomized Block Design comprising of 8 varieties with three replications. climate, meteorological conditions, Plan layout, cultural practice and techniques employed for growth studies.

The following biometrical observations were recorded for the randomly selected plants. Plant height, number of primary branches per plant, number of secondary branches per plant, and number of leaves per plant were recorded at 30, 60 and 90 DAS . Days of 50% flowering, number of flower per umbellets, number of umbellets per plant, number of seeds per umbel, seed yield per plant (g), seed yield per plot (g), seed yield per ha (q), TSS , Ascorbic acid .

As per the existing market prices, the input and output costs were computed treatment wise and different economics parameters viz., Cost of cultivation, gross return,net return and benefit-cost ratio were calculated.

RESULTS AND DISCUSSION

The data related to plant height at 30, 60 and 90 DAS is presented in table 1. It is evident that all the varieties tried in this experiment produced considerable amount of changes in plant height at successive stages of growth.

At 30 DAS, the maximum plant height was recorded in ~~V_2 (~~Japani 57~~)~~ (21.16 cm) followed by V_6 (Simco 55) (20.83 cm), V_8 (Simco) (20.16 cm), V_7 (Simpco s 33)(17.86), V_1 (Kashmiri)(17.56) and V_5(Sughanda)(16.33) which were on par. Whereas the minimum plant height (14.26) was found to be in V_3 (Pant Haritha).

At 60 DAS, the maximum plant height was recorded in V_2 (Japani 57) (68.50 cm) which were on par. Whereas the minimum plant height (48.5 cm) was found to be in V_3 (Pant Haritha).

At 90 DAS, the maximum plant height (100.11 cm) was recorded in V_2 (Japani 57) followed by V_6 (Simco 55) (99.56 cm) which were on par. Whereas the minimum plant height (76.06 cm) was found to be in V_3 (Pant Haritha).

The differences in plant height among the varieties might be due to the genetic makeup of the plant and its expression to the growing soil and environmental conditions. The variation in plant growth of different coriander varieties were also observed by **Kalidasu *et al*., (2008)** and **Verma *et al*., (2014)** in coriander.

The data related to Number of leaves per plant at 30, 60 and 90 DAS is presented in table 1. It is evident that all the varieties tried in this experiment produced considerable amount of changes in Number of leaves per plant at successive stages of growth.

At 30 DAS, the maximum Number of leaves was recorded in V_2 (Japani 57) (23.28) followed by V_6 (Simco 55) (23.26), V8 (Simco) (23.15), V_7 (Simpco s 33) (23.10), V_1 (Kashmiri) (21.30) and V_5(Sughanda) (21.26) which were on par. Whereas the minimum Number of leaves (20.00) was found to be in V_3 (Pant Haritha).

At 60 DAS, the maximum Number of leaves was recorded in V_2 (Japani 57) (38.33) followed by V_6 (Simco 55) (37.31) which were on par. Whereas the minimum Number of leaves (30.11) was found to be in V_3 (Pant Haritha).

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At 90 DAS, the maximum Number of leaves (62.66) was recorded in V_2 (Japani 57) which were on par. Whereas the minimum Number of leaves (48.17) was found to be in V_3 (Pant Haritha).

The differences in Number of leaves among the varieties might be due to the genetic makeup of the plant and its expression to the growing soil and environmental conditions. The variation in plant growth of different coriander varieties were also observed by **Verma *et al.*, (2014)** and **Meena *et al.*, (2014)** in coriander.

The data related to Number of primary branches per plant are presented in table 1. The maximum number of primary branches per plant V_2 (Japani 57) (10.58) followed by V_6 (Simco 55) (8.97), V8 (Simco) (8.63), V_7 (Simpco s 33) (8.53), V_1 (Kashmiri) (8.50), V_5(Sughanda) (8.13), V_4 (Green King)(7.87) and V_3 (Pant Haritma) (7.80) which were on par.

Increase in number of primary branches could be attributes to particular genotype in condition on which it is grown. Similar variations among varieties with respect to primary branches were reported by several workers **Venkatareddy *et al.*, (1986), Shridhar *et al.*, (1990), Selvarajan *et al.*, (2002)** and **Velayudham, (2004)** in coriander genotype grown in different agro climatic condition.

The data related to Number of secondary branches per plant are presented in table 1.The maximum number of secondary branches per plant V_2 (Japani 57) (18.95) followed by V_6 (Simco 55) (18.93), V_8 (Simco) (16.67) and V_7 (Simpco s 33) (15.90) which were on par.Whereas the minimum number of secondary branches per plant was found to be in V_3 (Pant Haritma) (10.73).

These variations in secondary branches may be due to its genetic characters and due to interaction with environment. There are several reports indicating variation with respect to number of secondary branches by several workers in coriander, Hari Prasad rao and **Srinivasrao (2001), Selvarajan *et al.*, (2002)** and **Saxena *et al.*, (2005).**

The data related to the coriander in days 50 % flowering are presented in table 1. The minimum days taken for 50 % flowering per plant V_2 (Japani 57) (57.27) and whreas the maximum days to 50% flowering was found in V_3 (Pant Haritma) (44.93) respectively.

Growth is one of the important characters, which determines the earliness of the variety which is controlled by the genetic factors. Similar results were reported by **Moniruzzaman *et al.*, (2013)** and **Malik and tehlan (2013).**

The data related to the coriander in number of flowering per umbellet are presented in table 1.The minimum Number of days taken for flowering per umbellet V_2 (Jaypani 57) (8.3) followed by V_6 (Simco 55) (8.33), V8 (Simco) (8.03), V_7 (Simpco s 33) (7.9), V_1 (Kashmiri) (7.56), V_5(Sughanda) (7.53), V_4 (Green King) (7.53) and V_3 (Pant Haritma) (6.83) which were on par.

Growth is one of the important characters, which determines the earliness of the variety which is controlled by the genetic factors. Similar results were reported by **Moniruzzaman *et al.*, (2013)** and **Malik and tehlan (2013).**

The data related to number of umbellets per plant are presented in table 1 .The highest number of umbellets per plant was recorded in V_2 (Japani 57) (239.63). Whereas the minimum number of umbellets per plant was found to be in V_3 (Pant Haritma) (141.23).

This variation in the yield could be attributed to genotypic character and response of the particular genotype to the specified environment conditions. These results are more or less in consonance with the results **of Giridhar and Sarada (2005), Moniruzzaman *et al.* (2013)** and **Malik and Tehlan (2013).**

The data related to number of seeds per umbel are presented in table 1 it shows that there were significant differences among the varieties during the growth stages of the crop.

The highest number of seeds per umbel (57.73) was recorded in V_2 (Japani 57) (28) followed by V_6 (Simco 55) (27.4) and V8 (Simco) (26.16) which were on par. Whereas the lowest number of seeds per umbel was recorded in V_3 (Pant Haritma) (21.9).

This variation in the yield could be attributed to genotypic character and response of the particular genotype to the specified environment conditions. These results are more orless in consonance with the results of **Giridhar and Sarada (2005), Moniruzzaman *et al*. (2013)** and **Malik and Tehlan (2013)**

The data related to seed yield per plant are presented in table 1 .The highest seed yield per plant was recorded in V_2 (Japani 57) (6.03) followed by V_6 (Simco 55) (4.86), V8 (Simco) (4.78), V_7 (Simpco s 33) (4.6), V_1 (Kashmiri) (4.56), V_5 (Sughanda) (3.8), V_4 (Green King) (3.51) and V_3 (Pant Haritma) (3) which were on par.

The difference in seed yield per plant might be due to the genotypic difference and ecological variation. The results are more or less in consonance with the results of **Moniruzzaman et al.**

(2013) and **Malik and Tehlan (2013)**.

The data related to seed yield per plot are presented in table 2 and it shows that there were significant differences among the varieties during the stages of the crop growth.

The highest seed yield per plot was recorded in V_2 (Japani 57) (478.67). Whereas the lowest seed yield per plant was recorded in V_3 (Pant Haritma) (101.13).

Considerable variations in the seed yield among the genotypes and varieties ofcoriander were also reported earlier by several workers in coriander, **Velayudham (2004), Giridhar** and **Sarada (2005), Chaulagain *et al*., (2011), Palanikumar** and **Rajamani (2012), Malik** and **Tehlan (2013)** and **Moniruzzaman *et al*., (2013).**

The data related to seed yield per plot are presented in table 2. It shows that there were significant differences among the varieties during the stages of the crop growth.

The highest seed yield per plot was recorded in V_2 (Japani 57) (22.03) followed by V_6 (Simco 55) (21.03) and V8 (Simco) (20.30) was statistically on par. Whereas the lowest seed yield per plant was recorded in V_3 (Pant Haritma) (16.03).

Considerable variations in the seed yield among the genotypes and varieties of coriander were also reported earlier by several workers in coriander, **Velayudham (2004), Giridhar** and **Sarada (2005), Chaulagain *et al*., (2011), Palanikumar** and **Rajamani (2012), Malik** and **Tehlan (2013) and Moniruzzaman *et al*., (2013).**

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The data related to TSS Brix are presented in table 3.The highest TSS Brix was recorded in V_2 (Japani 57) (6.03) followed by V_6 (Simco 55) (4.86), V8 (Simco) (4.78), V_7 (Simpco s 33) (4.6), V_1 (Kashmiri) (4.56), V_5 (Sughanda) (3.8), V_4 (Green King) (3.51) and V_3 (Pant Haritma) (3) respectively.

The difference in TSS Brix might be due to the attributed lower starch content which is being a primary metabolite, may effect the accumulation of secondary metabolites like TSS. This is in confirmation with the studies of earlier workrs **Agarwal *et al*., 1990; Rajagopalan *et al* ., 1996; Prabhu** and **Balakrishnamurthy 2006; Velayudham *et al*., *2004***. The resuts are in conformity results of the **(palanikumar** and **rajamani, 2012).**

The data related to Ascorbic acid are presented in table 3.The highest Ascorbic acid was recorded in V_2 (Japani 57) (208.60) and the lowest Ascorbic acid content was found in variety V_3 (Pant Haritma) (151.72) respectively.

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CONCLUSION

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From the present investigation, it is concluded that the Variety V_2 (japani 57) was found to be the most suitable over all the other variety in relation to plant height, number of primary branches per plant, number of secondary branches per plant ,number of leaves per plant, days of 50% of flowering, number of flower per umbellet, number of umbel per plant, number of seeds per plant (g), seed yield per plot (g), seed yield per ha (q), gross return, net return and highest cost benefit ratio (1.68:1) of coriander.

Table 1. Evaluation of different varieties of coriander in Plant Height, No. of leaves per plant, No. of primary branches, No. of secondary branches, Days of 50% flowering, No. of flower per umbellet and No. of umbellets per plant.

Notation	Varieties	Days of 50% flowering	Plant Height (cm)			No. of leaves per plant			No. of primary branches	No. of secondary branches	No. of flower per umbellet	No. of umbellets per plant
			30 DAS	60 DAS	90 DAS	30 DAS	60 DAS	90 DAS				
V1	Kashmiri	49.00	17.56	52.58	86.5	21.30	33.79	52.31	8.50	15.30	7.56	172.03
V2	Japani-57	44.93	21.16	68.5	100.11	23.28	38.33	62.67	10.58	18.95	8.43	239.63
V3	Panth Haritha	57.27	14.26	48.5	76.06	20.00	30.11	48.17	7.80	10.73	6.83	141.23
V4	Green King	46.09	14.51	48.7	77.63	20.27	31.01	49.13	7.87	14.47	7.5	156.16
V5	Sughanda	47.97	16.33	50.66	81.8	21.26	33.06	49.17	8013	15.00	7.53	160.26
V6	Simco 55	53.93	20.83	57.7	99.56	23.26	37.31	59.163	8.97	18.93	8.33	218.70
V7	Simpco s 33	49.50	17.86	52.6	88.48	23.10	35.58	55.93	8.53	15.90	7.9	178.20
V8	Simco	51.10	20.16	52.86	89.7	23.15	35.97	57.83	8.63	16.67	8.0	191.16
	F- Test	S	S	S	S	S	S	S	S	S	S	S
	S.Em±	0.34	0.38	0.31	0.34	0.23	0.24	0.22	0.15	0.26	0.14	0.30
	SE(d±)	0.48	0.54	0.45	0.48	0.33	0.34	0.31	0.21	0.38	0.20	0.43
	CV (%)	1.00	5.59	1.53	1.01	0.70	0.71	0.64	0.45	0.79	0.42	0.90
		1.77	1.12	0.93	1.00	2.82	1.85	1.05	4.66	4.45	4.83	0.44

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Table 2. Evaluation of different varieties of Coriander in No. of seed per umbel, Seed yield per plant (g), Seed yield per plot (Kg), Seed yield per ha (q)

Notation	Varieties	No. of seeds per umbel	Seed yield per plant (g)	Seed yield per plot (kg)	Seed yield per ha (q)
V1	Kashmiri	23.5	4.56	244.67	18.40
V2	Japani-57	28	6.03	478.67	22.03
V3	Panth Haritha	21.9	3	101.13	16.03
V4	Green King	22.43	3.51	154.33	16.80
V5	Sughanda	22.76	3.8	207.67	17.53
V6	Simco 55	27.4	4.86	372.00	21.03
V7	Simpco s 33	24.5	4.60	252.00	19.23
V8	Simco	26.16	4.7	316.33	20.30
	F- Test	S	S	S	S
	S.Em±	0.20	0.08	1.70	0.17
	SE(d±)	0.28	0.11	2.40	0.24
	CV (%)	0.58	0.24	4.98	0.50
		2.09	4.98	1.66	2.35

Table 3. Evaluation of different varieties of Coriander based on quality parameters TSS °Brix and Ascorbic acid (mg/100gm).

Notation	Varieties	TSS (°Brix)	Ascorbic acid (mg/100gm)
V1	Kashmiri	5.36	141.00
V2	Japani-57	5.98	160.50
V3	Panth Haritha	4.83	127.33
V4	Green King	4.84	131.00
V5	Sughanda	5.26	137.00
V6	Simco 55	5.96	157.67
V7	Simpco s 33	5.66	146.67
V8	Simco	5.76	154.83
	F- Test	S	S
	S.Em±	0.09	0.67
	SE(d±)	0.14	0.94
	CV (%)	0.29	1.96
		4.67	1.20

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