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Study on genetic variability in germplasm of coriander (*Coriandrum sativum* L.)

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Abstract
The present investigation was conducted during *Rabi* season 2019-20 at Main Experimental Station of Vegetable Science, Acharya Narendra Deva University of Agriculture & Technology, Kumarganj, Ayodhya (UP). The field experiment was layout in Augmented Block Design with 70 genotypes with 3 check in 5 blocks. The character studied were days to 50 per cent flowering, plant height (cm), branches per plant, fruiting nodes per plant, inter-nodal length (cm), umbel diameter (cm), number of umbels per plant, number of fruits per umbel, number of umbellates per umbel, number of fruit per umbellate, 1000 seed weight (g), seed yield per plant (g). Analysis of variance due to the block were highly significant for all character except day to 50 per cent flowering, fruiting nodes per plant and test weight. Highest genotypic and phenotypic coefficient of variation was recorded for branches per plant. High estimate of heritability was expressed for plant height and fruit per umbel, while high genetic advance in per cent of mean observed for branches per plant (23.60).

Keywords: Coriander, heritability, variability, PCV, GCV and genetic advance

Introduction
Coriander *(Coriandrum sativum* L, 2n=2x=22) is an annual herb and grown for both green leaf and dried seeds. It is extensively grown in Andhra Pradesh, Tamil Nadu, Karnataka, Punjab, Rajasthan, M.P. and Uttar Pradesh. Rajasthan is the main growing state and contribute about 40 per cent production in India. In India it is grown in 6,29,000 ha area with annual production of 7,56,000 MT and 1.20 MT per hectares productivity (Anonymous 2020) [2].

The coriander plant has a fragrant odour and pleasant aromatic taste. Dry seeds contain 0.1- 1 percent essential oil which impart odour and taste. The principle constitute of essential oil is dextro- linalool. The volatile oil is used in cosmetics products and beverages. Dried seeds are used in flavouring sauces and meat product, some bakery and confectionary items. It is also used as major ingredient in most of the curry product. The fruit are considered as carminative, diuretic, anti-bilious, refrigerant andaphrodisiac. Coriander belongs to the family Apiaceae, which is consisting of 300 genera and more than 3,000 species. It is an annual herb with thin stem bushy appearance and 90-100 cm in height. Leaves are alternate, compound and petiole has a pair of stipules sheathing the stem base. The lower leaves are broad pinnate and have long petiole with crenately lobed margins. The upper leaves are cut with linear lobes and bi or tri- pinnate. The flowers are pink or white. The seeds are green round (botanically fruit) attain greyish brown colour at maturity.

Genetic variability is a pre-requisite 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. The survey of genetic variability with the help of suitable genetic parameters like genotypic and phenotypic coefficient of variations, heritability estimates and genetic advance as percentage of mean are indispensable in breeding programmes aimed at improvement of seed yield.

Materials and Methods
The present investigation entitled "Study on genetic variability for growth, yield and its attributing traits in coriander (*Coriandrum sativum* L.*)*" carried out at the Main Experiment Station, Department of Vegetable Science, Acharya Narendra Deva University of Agriculture and Technology, Kumarganj, Ayodhya (U.P.) India, in Augmented Block Design during *Rabi* season 2019-20 using Seventy genotypes with three checks (Hisar Anand, NDCor-1 and NDCor-2) of coriander collected from Department of Vegetable Science, Acharya Narendra

Deva University of Agriculture and Technology, Kumarganj, Ayodhya, Uttar Pradesh. Observations were recorded on days to 50% flowering, plant height(cm), number of branches per plant, number of fruiting node per plant, inter-nodal length, umbel diameter(cm), number of umbels per plant, number of fruits per umbel, number of umbelletes per umbel, number of fruit per umbellate, 1000 seed weight (g) and seed yield per plant (g). Analysis of variance for augmented design by (Federer, 1956) [5], Estimation of heritability by (Hanson *et al.* 1963) [6] and Genetic advance in per cent of mean was suggested by (Johnson *et al.* 1955) [7].

Result and Discussions

The observation recorded on 12 characters were subjected to analysis of variance due to the block were highly significant for all character except day to 50 per cent flowering, fruiting nodes per plant and test weight. Variance due to check were highly significant for branches per plant, fruiting nodes per plant, Umbel diameter, Umbel per plant and fruits per umbel.

The estimate of genotypic coefficient of variation (GCV) and phenotypic coefficient of variations (PCV) for all 12 traits of coriander germplasm had been represented in Table-1. Branches per plant (12.86) showed highest phenotypic coefficient of variation followed by yield per plant (11.56), fruits per umbellate (10.07), Umbel diameter (cm) (9.60), test weight (9.33) and lowest phenotypic coefficient of variation was observed for days to 50% flowering (2.44) followed by plant height (5.25) While, highest genotypic coefficient of variation was observed in branches per plant (12.33) followed by yield per plant (10.22), fruits per umbellate (8.73), umbellates per umbel (8.56), umbel diameter (8.53) and lowest genotypic coefficient of variation was observed for days to 50% flowering followed by plant height (5.18). The similar result were reported by Acharya *et al.* (2020), Mishra *et al.* (2017) [1, 10]. The estimate of heritability in broad sense range from 52.00 (Days to 50% flowering) to 97.00 (fruit per umbel and plant height). High estimate of heritability (>75%) was expressed for both plant height and fruit per umbel (97.00). The similar findings were reported by Kumar *et al.* (2017), Devi *et al.* (2019) [9, 3]. Genetic advance in per cent of mean was highest (>20) in case of branches per plant (23.60) While low genetic advance as (<10) per cent of mean was showed in day to 50% flowering (2.63). The similar result was reported by Farooq *et al.* (2017), Jyothi *et al.* (2017) [4, 8]. High heritability coupled with high genetic advance as per cent of mean was observed for plant height (97.00, 10.54), fruit per umbel (97.00, 12.84). The similar findings were reported by Jyothi *et al.* (2017) [8].

Table 1: Estimates of range, general mean, genotypic and phenotypic coefficient of variation, heritability, genetic advance and genetic advance in per cent of mean for twelve characters in coriander

S. N.	Characters \ Parameters	Range		General mean $\bar{X}$	GCV (%)	PCV (%)	Heritability Broad sense (h^2%)	Genetic advance	Genetic advance as per cent of mean ($\overline{Ga}$ %)
		Min.	Max.						
		1	2	3	4	5	6	7	8
1	Days to 50% flowering	83.60	93.93	89.67	1.77	2.44	52	2.36	2.63
2	Plant height (cm)	110.79	145.32	132.06	5.18	5.25	97	13.96	10.54
3	Branches per plant	4.51	7.91	6.03	12.13	12.86	89	1.42	23.60
4	Fruiting nodes per plant	10.79	15.09	12.43	7.28	7.75	88	1.75	14.09
5	Inter nodal length	8.32	14.23	10.62	9.37	11.01	72	1.75	16.45
6	Umbel diameter (cm)	3.87	6.50	5.16	8.53	9.60	79	0.81	15.63
7	Umbels per plant	23.47	34,03	28.19	7.74	8.21	89	4.25	15.03
8	Fruits per umbel	32.13	41.99	36.85	6.33	6.43	97	4.73	12.84
9	Umbellets per umbel	5.27	7.97	6.47	8.56	9.23	86	1.06	16.34
10	Fruits per umbellate	5.83	9.63	7.31	8.73	10.07	75	1.14	15.59
11	Test weight (g)	8.76	13.06	10.99	7.36	9.33	62	1.32	11.98
12	Seed Yield per plant(g)	7.58	13.12	10.04	10.22	11.56	78	1.87	18.62

(*) Significant at 5% probability level, (**) Significant at 1% probability level

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