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Assessment of genetic variability in coriander (*Coriandrum sativum L.)*

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Abstract
An experiment was conducted at Main Experimental Station of Department of Vegetable Scienec, ANDUA&T, Kumarganj, and Ayodhya (U.P.) during *Rabi* season, 2020-21. Experimental material for study was consisted of sixty two coriander genotypes including two checks (Hisar Anand and ND Cor-2). The experiment was conducted in Augmented Block Design six blocks spaced 30 cm with plant to plant spacing of 15 cm. Each genotypes were grown in the plot size 2.0 m ×0.90 m. Observation were noted on eleven characters viz. days to 50% flowering (days), plant height (cm), nodes per plant, branches per plant, umbels per plant, umbellates per umbel, fruits per umbellate, fruits per umbel, umbel diameter (cm), 1000 seed weight (g) and seed yield per plant (g). The mean sum of square (analysis of variance) due blocks were highly significant for all eleven characters representing the variability among the genotypes considered in this study due to diverse genetic makeup of the genotypes. The higher extent phenotypic and genotypic coefficient of variation were observed for seed yield per plant. High heritability along with high expected genetic advance in per cent of mean was observed for most of the characters that provide good scope for further improvement in advance generations.

Keywords: Coriander, Heritability, variability, PCV, GCV and genetic advance.

Introduction
Coriander (*Coriandrum sativum* L.) is an important spice crop which belong to family Apiaceae (Umbelliferae) and having a somatic chromosome number 2n = 22. Coriander is native to the Middle East and Mediterranean, and also found in Egypt and Sudan in wild form. Now it is extensively cultivated in India as well as in the world for its demand of both seeds and leaves as a spice, herb and flavouring food. The fresh fruits, leaves and stem of coriander have a pleasant aromatic odour. The entire young plant of coriander is young is used in preparing chutney, whereas the leaves are used for flavouring the curries, sauce and soups. The grains are extensively employed as condiment in the preparation of curry powder, pickling, soups, sausages and seasoning. They are also added for flavouring pastry, cookies, buns, cakes and tobacco product. The fresh green seeds of coriander is also used to make 'Dhana dal' which is very popular in Gujarat state.
Genetic variability forms the basis for crop improvement. The success of any breeding programme depends upon mainly two factor, first is the nature and magnitude of genetic variability available in the breeding material and second is the intensity of selection. The knowledge of heritability is very essential for selection based improvement as it indicates the extent of transmissibility of a character into future generations (Sabesan *et al.*, 2009) [10]. The knowledge of association of yield and its components empowers breeder to know that how the selection pressure exerted on one trait will cause changes in other traits (Aliyu, 2006) [2].

Materials and methods
The experiment was conducted at Main Experimental Station of Department of Vegetable Scienec, ANDUA&T, Kumarganj, and Ayodhya (U.P.) during *Rabi* season, 2020-21. Experimental material for study was consisted of sixty two genotypes including two checks (Hisar Anand and ND Cor-2). The experiment was conducted in Augmented Block Design six blocks spaced 30 cm with plant to plant spacing of 15 cm. Each genotypes were grown in the plot size 2.0 m ×0.90 m. Observation were noted on eleven characters *viz*. days to 50% flowering (days), plant height (cm), nodes per plant, branches per plant, umbels per plant, umbellates per umbel, fruits per umbellate, fruits per umbel, umbel diameter (cm), 1000 seed weight (g) and seed yield per plant (g). The analysis of variance for different characters in augmented design was done following Federer (1956) [3].

Heritability (h^2) in broad sense was calculated by using the formula suggested by Hanson *et al.* (1956) [6].

Results and Discussion

In analysis of variance, the variance due to block were highly significant for all the characters, while, the variance due to checks are highly significant for all characters except nodes per plant and fruits per umbellate are significant and some characters umbel diameter and seed yield per plant are non-significant.

Seed yield per plant (15.74) showed highest phenotypic coefficient of variation followed by umbels per plant (11.02), fruits per umbellate (10.79), branches per plant (10.30), umbel diameter (8.83) and lowest phenotypic coefficient of variation was observed for days to 50% flowering (2.40) followed by plant height (5.46) While, highest genotypic coefficient of variation was observed for seed yield per plant (14.74) followed by umbels per plant (11.00),fruits per umbellate (10.72), branches per plant (10.13)) and lowest genotypic coefficient of variation was observed for days to 50% flowering (2.36) followed by plant height (5.45), and 1000 seed weight (7.57). Seed yield per plant showed highest genotypic coefficient of variation, highest phenotypic coefficient of variation and highest genetic advance in percent of mean.

In most of the cases, the phenotypic coefficient of variation (PCV) was higher than genotypic coefficient of variation (GCV) in all characters under study, indicated tha considerable amount of variation were recorded for all characters Gauhar *et al.* (2018) [5] and Acharya *et al.* (2020) [1].

In the present investigation, heritability values were ranged from 87.00% (seed yield per plant) to 99.00% (plant height, umbels per plant & fruits per umbel). High heritability was expressed for plant height (99.00) followed by umbels per plant (99.00), fruits per umbel (99.00), umbellates per umbel (98.00), fruits per umbellate (98.00), umbel diameter (98.00). The highest heritability was recorded for all characters. Farooq *et al.* (2017) [4], Jyothi *et al.* (2017) [7], Mishra *et al.* (2017) [8] and Sandhu *et al.* (2018) [9] also found high heritability estimates for most of the characters.

Table 1: Estimates of range, grand mean, genotypic and phenotypic coefficient of variation, heritability in broad sense, genetic advance and genetic advance in percent of mean for 11 characters in coriander genotypes

Parameters / Characters	Range		General mean $\bar{X}$	PCV (%)	GCV (%)	ECV (%)	Heritability ($h^2_{(bs)}$ %)	Genetic advance	Genetic advance in percent of mean
	Min.	Max.							
	1	2	3	4	5	6	7	8	9
Days to 50% flowering	83.64	91.94	87.79	2.40	2.36	0.42	96.00	4.24	4.79
Plant height (cm)	110.52	135.37	122.94	5.46	5.45	0.29	99.00	13.81	11.22
Nodes per plant	9.85	14.15	12.00	8.25	7.99	2.05	93.00	1.95	15.94
Branches per plant	5.39	8.34	6.86	10.30	10.13	1.87	96.00	1.42	20.52
Umbels per plant	23.07	35.42	29.24	11.02	11.00	0.65	99.00	6.63	22.62
Umbellates per umbel	5.51	8.11	6.81	7.89	7.85	0.85	98.00	1.11	16.07
Fruits per umbellate	5.88	8.43	7.15	10.79	10.72	1.30	98.00	1.57	21.92
Fruits per umbel	30.08	41.68	35.88	8.70	8.69	0.45	99.00	6.52	17.88
Umbel diameter (cm)	4.11	6.25	5.18	8.83	8.74	1.24	98.00	0.89	17.84
1000 seed weight (g)	7.99	12.18	10.08	7.58	7.57	0.27	98.00	1.62	15.59
Seed yield per plant (g)	6.92	14.09	10.50	15.74	14.74	5.32	87.00	2.94	28.43

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