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Genetic variability studies in Coriander (*Coriandrum sativum* L.)

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Abstract

Coriander (*Coriandrum sativum* L.) is an annual spice herb that belongs to the family of Apiaceae. The present investigation was undertaken to assess the variability, heritability and genetic advance in Coriander germplasm maintained at ICAR-NRCSS, Ajmer. The experiment was undertaken in Augmented Block Design (ABD) with five blocks, Sixty accession of coriander (*Coriandrum sativum* L.) along with five popular varieties namely Hisar Sugandh, Hisar Anand, RCr-728, RCr-436 and ACr-1 as check were evaluated during *Rabi* season of 2012-2013 . Analysis of variance revealed significant variability for most of the traits. High heritability (broad sense) coupled with high genetic advance as percent of mean was observed for the characters *viz*., number of basal leaves, length of longest basal leaf and number of umbel per plant.

Key words : Coriander, heritability, genetic advance, variability

Coriander is an important seed spice crop of Apiaceae family having chromosome number 2n=22. The crop is assumed to be originated in Western Europe and Asia. In India, it is mainly cultivated for both leaf and seed purpose. Coriander for seed purpose is cultivated mainly in the States of Rajasthan, Madhya Pradesh, Assam, Andhra Pradesh, Gujarat, Odisha, Uttar Pradesh (Spices Board, 2015). The national productivity based on production estimate of 2013-14 is about 9.6 q/ha. Exploitation of genetic potential for yield delivers varieties for enhancing the productivity of a crop, in coriander high genetic variation exists for yield and yield contributing traits. Seed yield is a complex character governed by several other yield attributing characters, therefore an observation with respect to the extent of genetic variability for the major agro-morphological traits reflects the status of variation available in hand for its effective utilization to breed improved varieties. An estimation of variability parameters viz., genotypic coefficient of variation (GCV), phenotypic coefficient of variation (PCV), heritability and genetic advance of the important yield contributing traits suggest the strategy to be adopted for its utilization in genetic improvement. Keeping in view the present experiment was laid to assess the variability parameters in coriander germplasm available at National Research Centre on Seed Spices, Ajmer

The experiment was laid out at research farm of National Research Centre on Seed Spices, Ajmer, Rajasthan, during '*Rabi*' season of 2012-2013. Experimental material consisted of sixty accessions of coriander, trial was conducted in Augmented Block Design (ABD) with five checks varieties *viz.* Hisar Sugandha, Hisar Anand, RCr-728, RCr-436, and ACr-1. Each genotypes were accommodated in single rows of 2m length with row to row and plant to plant spacing of 50 and 25 cm, respectively. The observations were recorded for 11 agro-morphological traits on five randomly selected plants in each plot in each replication for all the characters except for days to 50 percent flowering and days to maturity which were recorded on plot basis. The analysis was performed using Windo stat ver 8.0 software.

Analysis of variance was used to estimate the genetic variability parameters (Table 1). The genotypic and phenotypic coefficient of variation expressed as percentage of mean were high for the characters *viz.,* number of basal leaves, length of longest basal leaf, number of umbels per plant and seed yield per plant. The present results confirm the earlier reports of Jain *et al*. (2003), Rajput and Singh (2003), Singh *et al.* (2008) and Idhol *et al*. (2009). While moderate to high GCV for the characters *viz*. plant height up to main umbel, number of secondary branches per plant, number of seeds per umbellate and test weight, similar results were observed by Sharma *et al*. (2004). Both genotypic and phenotypic coefficient of variations were low for plant height up to top, number of primary branches per plant and number of umbellate per umbel, these findings were in accordance with that of Sharma *et al*. (2004).

The estimates of heritability in (broad sense) expressed in percentage was high for almost all the characters viz., number of basal leaves, length of longest basal leaf (cm), plant height up to top (cm), plant height up to main umbel (cm), number of secondary branches per plant, number of umbels per plant, number of umbellate per umbel,

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Table 1. Observation recorded for Mean, Range, GCV, PCV, Heritability, Genetic Advance and genetic advance as percent of mean for 11 traits in coriander germplasm

Particulars	Number of basal leaves	Length of longest basal leaf	Plant height up to top	Plant height main umbel	Number of Primary Branches plant^{-1}	Number of Secondary branches plant^{-1}	Number of Umbels plant^{-1}	Number of Umbellates umbel^{-1}	Number of seeds umbellate^{-1}	Test weight (g)	Seed yield plant^{-1} (g)
Mean	5.36	20.61	77.96	53.16	7.54	12.76	27.74	5.49	8.2	12.43	5.83
Range	2.7-10.6	7.7-47.7	49.4-109.1	28.2-87.2	3.8-11.2	6-22.82	14.7-59.3	3.8-9.1	5.39-12.63	7.17-17.85	2.03-12.19
GCV (%)	35.88	38.53	13.06	24.23	13.89	23.83	27.32	14.49	16.89	18.7	32.05
PCV (%)	36.52	39.23	13.61	25.04	16.36	25.58	28.8	15.67	18.37	18.94	38.31
Heritability (BS)	0.97	0.96	0.92	0.93	0.72	0.86	0.89	0.85	0.84	0.97	0.69
Genetic advance	3.92	16.07	20.12	25.68	1.83	5.83	14.8	1.51	2.62	4.73	3.22
Gen. Adv. as % of mean	73.17	77.96	25.81	48.3	24.31	45.73	53.37	27.61	31.99	38.05	55.23

number of seeds per umbellate and test weight (g) indicating less influence of environment and direct selection for these yield contributing traits would be effective for future improvement in seed yield. The present results confirm the earlier reports of Sharma *et al.* (2004), Singh *et al.* (2006), Sharma *et al.,* (2015) and Singh *et al.* (2008). Heritability estimates were moderate (70-80 %) for number of primary branches per plant and seed yield per plant.

High Heritability (broad sense) coupled with high genetic advance as percent of mean was observed for the characters *viz.*, number of basal leaves, length of longest basal leaf and number of umbels per plant. The high heritability coupled with moderate genetic advance was recorded for the characters *viz.,* plant height up to main umbel (cm), number of secondary branches per plant and test weight (g), whereas plant height up to top (cm) and number of umbellate per umbel showed high heritability with moderate to low genetic advance. High heritability coupled with moderate genetic advance was observed for number of seeds per umbellate. Moderate to high heritability coupled with low genetic advance was estimated for number of primary branches per plant. Moderate heritability coupled with high genetic advance was estimated for seed yield per plant (g).

Ample amount of genetic variation was recorded for number of basal leaves, length of longest basal leaf, number of umbels per plant and seed yield per plant. High heritability estimates for important traits like plant height up to main umbel (cm), number of secondary branches per plant, number of umbels per plant, number of umbellate per umbel, number of seeds per umbellate and test weight indicates low environmental effect on these traits. High heritability coupled with high genetic advance for umbels per plant strongly suggests its importance for performing selection for higher seed yield in coriander.

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