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Genetic Variability Analysis in Coriander (*Coriandrum sativum* Linn.)

P. K. Desai*, Jyoti Asati and R. K. Patel

Department of Genetics and Plant Breeding, N. M. College of Agriculture, Navsari Agricultural University Navsari-396 450, Gujarat, India

*Corresponding Author E-mail: pk.desai007@gmail.com

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ABSTRACT

The investigation was undertaken to assess the genetic parameters in respect of yield and its attributes of fourty different genotypes of coriander (Coriandrum sativum Linn.). The maximum genotypic coefficient of variability (35.68%), broad sense heritability (94.19%) and genetic advance over mean (71.33%) were obtained for umbels per plant. Seed yield was positively associated with several characters such as plant height, primary branches per plant, secondary branches per plant, umbels per plant, umbellets per umbel and seeds per umbel. Quantitative trait like plant height, primary branches per plant, secondary branches per plant, umbels per plant, seeds per umbel, 1000-seeds weight, days to maturity, green biomass per plant harvest index and total oil content exhibited wide range of variability, maximum genotypic and phenotypic coefficient of variability, broad sense heritability and genetic gain (as per cent of mean). It was found that genotypes NCG-12, NCG-4, NCG-3, NCG-22 and NCG-7 were promising.

Key words: *Coriander, GCV, PCV, Genetic advance, Heritability, Quantitative traits*

INTRODUCTION

Coriander (*Coriandrum sativum* Linn.) is an annual spice herb that belong to the family *umbelliferae/Apiaceae.* It is also one of the most important spices crop grown in india and throughout the world. In India, it is mainly grown in Rajasthan, Madhya Pradesh, Andhra Pradesh, Tamil Nadu and some part of Gujarat with an area of 5.84 lakh ha having a production of 5.57 mt. information on extent of variation, estimates of heritability and expected genetic advance in respect of yield and its attributes constitutes the basic requirement for a crop improvement programme that is lacking, hence, the present investigation was aimed to evaluate variability, heritability and genetic advance of seed yield and its attributes in fourty coriander genotypes.

The preliminary trial conducted on fourty genotypes of coriander obtained from diverse eco-geographical regions of India, and the collection maintained at department of Genetics and Plant Breeding, N. M. College of Agriculture, NAU, Nasari.

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The materials were evaluated in Randomized Block Design with three replication during the *rabi* season of 2015-16. The results were evaluated using descriptive statistics and analysis of variance (ANOVA). Data observed on 13 quantitative traits were subjected to statistical and biometrical analysis and the manifests have been demonstrated *viz.*, analysis of variance, estimation of variability, estimation of heritability and genetic advance. Analysis of variance was carried out using standard procedure prescribed by Panse & Sukhatme[3]. Variability among accessions was estimated using range, mean, least significant difference, phenotypic and genotypic variance and coefficient of variability according to Burton & Dorane[1]. Broad sense heritability, genetic advance and genetic advance as per cent of the mean were analyzed according to Johnson *et al.*[2].

The information on genetic parameters of the population of coriander genotypes under study is given in Tables 2, 3. A wide range of variation was observed among different collections/ genotypes with regard to different characters the data shown Table 1, revealed that all the thirteen trait varied significantly.

Parameters of genotypic and phenotypic coefficients of variation (GCV &PCV) are useful in detecting the amount of variability present in the available genotypes. The PCV revealed that the seed yield kg/ha showed the maximum range of mean performance (703.29 – 1553.81) followed by days to maturity (61.00 – 126.67), umbels per plant (16.87 – 62.73), plant height (58.07 – 97.47), harvest index (18.32 – 51.91). The minimum range of mean performance was obtained for Umbellets per umbel (4.68 -7.42).

Table 1. ANOVA for 13 characters in coriander

Source of variation	D.F.	Days to 50 % flowering	Plant height (cm)	Primary branches per plant	Secondary branches per plant	Umbels per plant	Umbellets per plant	Seeds per umbel
Replication	2	0.11	112.23	0.85	2.79	18.14	0.22	8.25
Genotypes	39	68.36**	268.66**	6.66**	19.64**	479.25**	0.72**	83.59**
Error	78	1.18	27.21	0.43	1.14	9.65	0.20	7.65
C.V %		2.01	6.67	11.15	11.90	8.86	7.03	8.02

Source of variation	D.F.	Days to maturity	Seed yield (kg/ha)	1000-seed weight (g)	Green biomass per plant (g)	Harvest index (%)	Total oil content (%)
Replication	2	6.61	12213.88	0.12	1.01	16.86	1.23
Genotypes	39	380.38**	126888.59**	11.45**	22.68**	134.46**	54.36**
Error	78	2.68	7560.96	0.24	0.71	18.65	0.84
C.V %		1.72	7.35	4.50	8.54	11.79	5.61

*,** significant at 1% & 5% respectively

In the present analysis, the PCV was slightly higher than GCV for all the characters. However, the maximum PCV was observed for umbels per plant (36.76) followed by secondary branches per plant (30.12), green biomass per plant (28.74), primary branches per plant (26.86) and total oil content (26.47). The maximum GCV was obtained for umbels per plant (35.68) followed by secondary branches per plant (27.67), green biomass per plant (27.44), total oil contain (25.87) and primary branches per plant (24.43). On the other hand, the minimum GCV (6.52) observed for umbellets per umbel and PCV (8.98) for days to 50 per cent flowering. Therefore, the higher proportion of PCV observed on these traits was due to the larger proportion of GCV. Hence, estimate of GCV and PCV indicated that in general, the PCV was higher than GCV indicating the role of environment factors on character expression.

Heritability and genetic advance help in determining the influences of environment on expression of the characters and extend to which improvement is possible after selection. Thus, in the present study, selection of accessions based on umbels per plant would be more satisfactory to increase seed yield of coriander. Nevertheless, the maximum heritability value was obtained for days to maturity (97.92) followed by total oil content (95.5), days to 50 per cent flowering (95.01), umbels per plant (94.19) and 1000-seeds weight (93.89). Genetic advance is also of considerable importance because it indicates the magnitude of the expected genetic gain from one cycle of selection. The genetic advance over mean per cent was maximum for umbels per plant (71.33) followed by green biomass per plant (53.97), secondary branches per plant (52.36), total oil content (52.07) and primary branches per plant (45.79). Meanwhile, low genetic advance over mean per cent was low for Umbellets per umbel (9.14). Singh *et al.*[4], and Singh & Singh[5]. reported different genetic parameters for seed yield and its components in coriander and his finding support the present investigation.

Table 2. Range, mean, genotypic and phenotypic coefficient of variance (GCV and PCV) for 13 characters of coriander

Sr. no.	Character	Range	Mean	GCV %	PCV %
1	Days to 50 % flowering	42.67-65.67	54.09	8.75	8.98
2	Plant height (cm)	58.07-97.47	78.18	11.47	13.27
3	Primary branches per plant	2.60-9.93	5.89	24.43	26.86
4	Secondary branches per plant	4.33-16.41	8.97	27.67	30.12
5	Umbels per plant	16.87-62.73	35.06	35.68	36.76
6	Umbellets per umbel	4.68-7.42	6.38	6.52	9.59
7	Seeds per umbels	23.91-45.21	34.48	14.59	16.65
8	Days to maturity	61.00-126.67	95.01	11.81	11.94
9	Seed yield (kg/ha)	703.29-1553.81	1182.76	16.86	18.40
10	1000-seeds weight(g)	7.32-15.46	10.97	17.61	18.18
11	Green biomass per plant (g)	4.47-20.37	9.86	27.44	28.74
12	Harvest index (%)	18.32-51.91	36.62	16.97	20.66
13	Total oil content (%)	10.39-25.88	16.33	25.87	26.47

Table 3. Broad sense heritability, genetic advance and genetic advance as per cent of mean

Sr. no.	Character	Heritability (h^2b%)	Genetic advance (GA)	Genetic advance over mean (GA %)
1	Days to 50 % flowering	95.01	9.50	17.57
2	Plant height (cm)	74.73	15.98	20.43
3	Primary branches per plant	82.75	2.70	45.79
4	Secondary branches per plant	84.38	4.70	52.36
5	Umbels per plant	94.19	25.01	71.33
6	Umbellets per umbel	46.25	0.58	9.14
7	Seeds per umbels	76.79	9.08	26.34
8	Days to maturity	97.92	22.87	24.07
9	Seed yield (kg/ha)	84.03	376.61	31.84
10	1000-seeds weight(g)	93.89	3.86	35.16
11	Green biomass per plant (g)	91.17	5.32	53.97
12	Harvest index (%)	67.43	10.51	28.70
13	Total oil content (%)	95.50	8.50	52.07

It may be concluded that umbels per plant, secondary branches per plant, primary branches per plant, seeds per umbels, 1000-seeds weight were the economically important traits for seed yield. Therefore, the data revealed that among all the genotypes NCG-12, NCG-4, NCG-3 and NCG-22 gave promising results. Hence, individual plant selection based on these quantitative traits should form the criteria for selection of superior genotypes for future breeding programmes.

REFERENCES

1. Burton, G. A. and Dorane, E. H., Estimation of heritability in tall festca (*Festuca arundinacea)* from replication clonal material. *Agron. J.***45:** 478-479 (1953).
2. Johnson, H. W., Robinson, H. F. and Comstoc, R. E., Estimates of genetic and environmental variability in soybeans. *Agron. J.* **47:** 314-318 (1955).
3. Panse, V. G. and Sukhatme, P. V., *Statistical methods for agricultural workers*. Indian council of Agricultural Research, New Delhi. pp. 155 (1985).
4. Singh, D., jain, U. K., Rajput, S. S., Khandelwal, V. and Shiva, K. N., Genetic variation for seed yield and its components and their association in coriander (*Coriandrum sativum* L.) germplasm.Department of Plant Breeding and Genetics, SKNCollege of Agriculture, Jobner, Rajasthan, India. *J. Spices Arom. Crops* **15:** 25-29 (2006).
5. Singh, S. J. and Singh, S. K., Genetic variability analysis in coriander (*Coriandrum sativum* L.). *J.Spices Arom.Crops.* **22:** 81-84 (2013).