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RRESEARCH ARTICLE

GENETIC VARIABILITY ANALYSIS IN CORIANDER (*CORIANDRIUM SATIVUM* L.) IN AGRO CLIMATIC CONDITION OF JHANSI, INDIA

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ABSTRACT

The present investigation was conducted to study the genetic variability in 30 indigenous populations of coriander. The genotypes were studied for two years in the rabi (Winter) seasons of 2014-15 and 2015-16. Data were recorded on 13 economic characters namely, fruit yield per plant, days to 50% flowering, days to maturity, plant height, number of primary branches per plant, number of secondary branches per plant, number of umbels per plant, number of umbellets per umbel, number of fruits per umbel, 1000 fruit weight, dry matter content per plant, harvest index and essential oil content of fruits. A considerable range of phenotypic, genotypic and environmental variation was noted for all the characters except essential oil content of fruits, number of umbellets per umbel, number of primary branches per plant, and dry matter content per plant. The highest estimates of heritability were recorded for essential oil content of fruits and fruit yield per plant. The estimates of genetic advance as % of mean for essential oil and yield were also high. Number of umbellets per umbel showed high heritability but low genetic advance. Hence breeding methods that consider heterosis was suggested to make effective improvement of this character.

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INTRODUCTION

Coriander an annual herb, belonging to the family *Umbelifeare,* is a native of the Mediterranean region and is commercially grown in India, Morocco, Russia, Hungary, Poland, Rumania, Czechoslovakia, Guatemala, Mexico, and U.S.A. It is one of the oldest known spices (probably one of the first species to be used by mankind), having been known as early as 5000 B.C. It is mentioned in Egyptian papyri dating from 1500 B.C. and in the early Sanskrit writing in India as *Kustumuru*, India is by far the largest producer of coriander (496240 tones and area of about 5.16 lakh hectares) and is grown in all the states of Indian Republic. It constitutes an important subsidiary crop in the black cotton soil of the Deccan and South India and the rich slit loams of North India. In spite of this no significant breakthrough has so far been made to develop high yielding varieties in Uttar Pradesh. Objective of the present investigation was to investigate the extent of genetic variability in 30 different cultivated types of coriander for their utilization in the crop improvement programme.

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MATERIALSAND METHODS

A collection of 30 indigenous (open pollinated) populations from different parts of India were the base material for study. The material evaluated in Randomized Complete Block Design with three replications during the Rabi (winter) season of 2014-15 to 2015-16. The collection of 30 genotypes were obtained from diverse eco – geographical regions of India and abroad and this collection was maintained at Horticultural Farm, Institute of Agricultural Sciences, Bundelkhand University, Jhansi U.P. Data were collected on 13 economic characters namely Fruit Yield per plant (g), days to 50% flowering, Days to Maturity, Plant Height (cm), Number of primary branches, Number of Secondary Branches per plant, Number of Umbels per plant, Number of Umbelletes per Umbel, Number of fruits per umbels, 1000 fruit weight (g), Dry matter content per plant (g), harvest index(y) and Essential oil content (%) of fruit. The observed variability was partitioned into its components following the standard statistical method of Panse and Sukhatme (1967). Since the error mean square of the one year were homogeneous as confirmed by Bartletts (1937) chi-square test , the data were subjected to combined analysis and the mean value were used for various statistical computations.

Phenotypic genotypic and environmental variance were estimated following Comstock & Ribinson (1952) and the expected estimation of heritability and genetic advance according to Burton and De Vane (1953) and Johnson *et al*. (1955).

Table 1. Range, mean and mean sum of squares due to varieties for 13 characters in coriander evaluated in two environments

Characters	Range	Mean & Standard error	Mean squares due to varieties
Fruit yield /plant (g)	6.37-30.47	20.57 ± 0.15	136.250**
Days to 50% flowering(no.)	47.33-85.20	68.29 ± 1.10	316.845**
Days to maturity(no.)	92.57-118.42	110.82 ± 1.00	96.210**
Plant height (cm)	52.27-96.5	80.04 ± 0.70	537.687**
Primary branches/plant (no.)	3.49-11.70	6.25 ± 0.22	14.0180**
Secondary branches/plant(no.)	6.78-30.69	16.96 ± 0.45	81.863**
Umbels/plant(no.)	14.42-53.40	33.15 ± 0.96	288.618**
Umbellets/Umbel(no.)	4.11-9.27	5.96 ± 0.32	7.365**
Fruit/Umbels(no.)	18.30-46.87	27.64 ± 0.72	105.645**
1000grains weight(g)	7.85-23.07	14.74 ± 0.28	36.846**
Dry matter content/plant (g)	11.07-18.07	13.08 ± 0.94	21.221**
Harvest Index (%)	32.94-47.47	39.25 ± 1.71	42.589**
Essential Oil content of fruits (%)	.027-.66	0.049 ± .001	0.185**

** Significant at 1 percent level of probability.

Table 2. Estimates of phenotypic (δ^2p), genotypic (δ^2g) and environmental variance (δ^2e)coefficients of variation, heritability and genetic advance for 13 characters of coriander evaluated in two environments

Characters	Phenotypic variance (δ^2p)	Genotypic variance (δ^2g)	Environmental Variance (δ^2e)	Coefficient of variation		Heritability %	Genetic Advance (GA)	GA as % of mean
				Phenotypic	Genotypic			
Fruit yield /plant (g)	44.84	36.10	8.74	32.55	29.21	80.51	11.10	54.0
Days to 50% flowering(no.)	104.96	64.78	40.18	15.00	11.79	61.72	13.02	19.1
Days to maturity(no.)	31.74	15.27	16.47	5.08	3.53	48.10	5.58	5.0
Plant height (cm)	177.85	93.02	84.83	16.66	12.05	52.30	14.37	18.0
Primary branches/plant (no.)	4.70	2.85	1.85	34.68	27.01	60.64	2.71	43.4
Secondary branches/plant(no.)	27.28	12.67	14.61	30.80	20.99	46.44	5.00	29.5
Umbels/plant(no.)	95.89	54.57	41.32	29.54	22.28	56.91	11.48	34.6
Umbellets/Umbel(no.)	2.42	1.94	0.48	26.10	23.37	80.17	2.57	43.1
Fruit/Umbels(no.)	34.88	22.99	11.89	21.37	17.35	65.91	8.02	29.0
1000grains weight(g)	12.20	8.07	4.13	23.70	19.27	66.15	4.76	32.3
Dry matter content/plant (g)	6.70	3.43	3.27	19.79	14.16	54.10	2.73	20.9
Harvest Index (%)	13.72	4.94	8.78	9.44	5.66	35.99	2.82	7.2
Essential Oil content of fruits (%)	0.06	0.05	0.01	49.99	45.63	83.33	0.42	85.7

RESULT AND DISCUSSION

The range, means, standard error of means and mean sum of squares due to varieties for the 13 characters are presented in Table 1. Highly significant differences (P<0.01) among the verities were present for all the characters. Fruit yield per plant showed a variation of 6.37g to 30.47g with a general mean of 20.57 ±0.15gms, which indicated a great scope of improvement of this character through simple methods of breeding like mass selection. Joshi *et al.* 1967, Suthanthirapandian *et al.* 1980, Raama Rao *et al.* 1981, Jain and Dubey 1982, Maurya and Saha 1989 also reported a wide variation in fruit yield and its components in coriander. The result of the present study corroborated these findings. The interaction effect of variety by environment was also significant for all the characters. A considerable range of phenotypic, genotypic, and environmental variation was recorded for all the characters expect essential oil content of fruits, number of umbel lets per umbel, number of primary branches per plants, and dry matter content per plant (Table 2). The highest phenotypic and genotypic variances were recorded for plant height followed by days to 50 percent umbel, flowering and number of umbels per plant. The phenotypic variances were grater in magnitude than the corresponding genotypic variance for all the characters. However, the proportion of genotypic variance was higher for essential oil content of fruits, fruit yield per plant, number of umbellate per indicating that these traits were not influenced by the environment to the same extent as the other traits. The results of our studies are comparable with the findings of Suthanthirapandian *et al.*1980, Raama Rao *et al.*1981, Jain and Dubey 1982, Maurya and Saha 1989, Alonso *et al.* (2008) and Bhardawaj and Singh (2007) in chillies, Singh & Singh 2013 in coriander and Seha *et al.*1987 in fennel. In was encouraging to note that the highest estimates of heritability were recorded for essential oil content of fruits and fruit yield per plant. The estimates of genetic advance as % of mean for theses two traits were also high (85.7% and 54% respectively). This shows that genotypic variance for these characters were probably due to high additive genetic effect. Therefore, selection based on phenotypic performance for these characters might be useful for achieving desired results. Number of umbellets per umbel had high heritability and low genetic advance which indicates the presence of non additive genetic variance, and therefore for the effective improvement in this trait one has to consider heterosis effect in breeding. Since traditional heterosis breeding in such open pollinated varieties would be time consuming, intervarietal crosses may be adopted to boost up the number of umbelletts per umbel and the yield of this crop. Lonnquist and Gardner (1961), Robinson and Cockerham (19961), Paterniani and Lonnquist (1963), Mukherjee and Saha (1978) have suggested the use of inter varietal crosses in maize (*Zia Maize* L.) to maximize the magnitude of heterosis for obtaining higher yield of the crop. It may be concluded that the a considerable rage of phenotypic, genotypic and environment variation was noted for all the traits except essential oil content of fruit, number of umbelettes per umbel, number of primary branches per plant and dry matter content per plant. The highest estimates of heritability were recorded for essential oil content of fruits and fruit yield per plant. The estimate of genetic advance % of mean for essential oil and yield were also high. Number of umbel lets per umbel showed high heritability but low genetic advance. Hence breeding methods that consider heterosis was suggested to make effective improvement of this trait.

REFERENCES

Alonso, R.A., Moya, C., Cabrera, A., Ponce, P., Quiroga, R., Rasales, M.A. and Zurat, J.L., 2008, In situ evaluation of the genetic variability of wild Chilli (capsicum spp.) In the frailesca region of Chiapas state Mexico. *Cultivar Tropicals*, 29(2), 49-55.

Bartlett, M.S. 1937. Some example of statistical method of research in Agriculture and Applied Biology. *J.Roy.Stat.Soc.Suppl*., 4:137-183.

Bharadwaj, D.N., Harvinder Singh and Yadav, R.K. 2007, Genetic variability and association of component characters for yield in Chilli (Capsicum annum L). *Progressive Agriculture*, 7(1/2): 72-74.

Burton, G.W. and De Vane, E.W. 1953. Estimating heritability in tall fescue (Festuca arundinaneca) from replicated clove material. *Agron.J*., 45:478-481.

Comstock, R.E. and Robinson, H.F. 1952. Genetic parameters, their estimation and significance, proceedings of the Sixth International Grassland Congress 1:284-291.

Jain, K.K. and Dubey, C.S. 1972. Study of yield attributes and heritability of some varieties of coriander (*Coriandrum sativium* L.) *Madras Agric. J*., 56:193-194.

Johnson, H.W., Robinson, H.F. and Comstock, R.E. 1955. Estimates of genetic and environmental variability in soybean. *Agron.J*., 47:314-318.

Joshi, B.S., A.B. and Ramanujam, S. 1967. Variation and Co variation in some umbelliferous spice crops. I. Variability in coriander. *Indian J. Genet*., 27 (2): 211-219.

Lonnquist, J.H. and Gardner, C.O. 1961. Heterosis in intervarietal crosses in maize and its implications in breeding procedures. *Crops Sci*., 1:179-193.

Maurya, K.R. and Saha, B.C. 1989. Genetic variability in Coriander (*Coriandrum sativium* L.) *Egypt.J.Genet.Cyto*., 18:259-263.

Mukherjee, B.K. and Saha, B.C. 1978. Investigation on the nature of heterosis expressed in crosses of varieties and synthesized populations of maize (*Zea maize* L.). Genetika, 10(3):277-285.

Panse,V.G. and Sukhatme, P.V. 1967. Statistical methods for agricultural workers (2nd ed.) I.C.A.R. New Delhi.

Robinson, H.F. and Cockerham, C.C. 1961. Hetrosis and inbreeding depression in populations involving two open-pollinated varieties of maize. *Crop Sci*., 1: 68-71

Suthanthirapandian, I.R., Shaw, H.A. and Muthuswami, S. 1980. Genetic variability in coriander (*Coriandrum sativium* L.) *Madras Agric.J*., 67(7):450-452.

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