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Variability studies in Coriander (*Coriandrum sativum* L.)

PREETI VERMA* AND R.K. SOLANKI[1]
Agricultural Research Station, Kota (Agricultural University, Kota)

Abstract

Variability studies were performed in 15 coriander genotypes including three check varieties during rabi *2007–08 to 2009–10 at ARS, Kota (Raj.). The analysis of pooled data indicated highly significant differences among the genotypes and environments for all the traits. A perusal of the variability parameters suggested that for achieving higher yield levels in coriander, effective selections can be made on the basis of number of primary branches, number of secondary branches and number of umbels per plant owing to their high estimates of GCV, heritability and genetic advance.*

Key words: Coriander, variability

Introduction

Coriander is an important seed spice crop of Apiaceae family having a wide importance in food and pharmaceuticals. India is the biggest producer, consumer and exporter of coriander in the world. In Rajasthan, the South eastern region; well known as *Hadoti* region (comprising of districts of Kota, Bundi, Baran, Jhalawar) covers approximately 98 percent coriander area of the state. In this pre-dominating area of Rajasthan i.e., the Kota zone, both high yielding varieties and local material is cultivated. The local material has been grown here traditionally since long and is popular due to its adaptation to the prevailing environmental conditions of Kota zone and its pleasant aroma owing to high essential oil content. This local material is a good source of genetic variability for yield, yield contributing traits and essential oil. Since genetic variability in a population is a pre requisite for exercising selection to isolate the best genotype having desirable traits, the present study was done to evaluate a set of coriander germplasm representing the local material of south eastern Rajasthan to have an insight about the extent of variability for yield and essential oil.

Materials and methods

The experimental material for the present investigation comprising of twelve promising genotypes selected from the local collection maintained at ARS, Kota along with three state checks (CS - 6, RCr- 41and RCr - 436) was laid out in randomized block design with three replications during *Rabi* 2007 – 08 to 2009-10 at ARS, Kota. Each genotype was accommodated in eight rows of 4m length with row to row and plant to plant spacing of 30 and 10 cm, respectively. The observations were recorded on five randomly selected plants in each plot in each replication for all the characters in all the environments. The data for days to 50 percent flowering and days to maturity were recorded on plot basis. Variability parameters were computed by Johnson *et al*. (1955).

Results and discussion

Pooled analysis of variance was used to estimate the genetic variability parameters (Table 1). The analysis of pooled data indicated highly significant differences among the genotypes and environments for all the traits, thereby justifying the selection of the experimental material. Among the ten component traits studied, number of umbels per plant had the highest GCV (34.49) followed by number of primary branches (28.16), number of secondary branches (21.74) and number of umbellets per plant (21.14). The least GCV was found for days to 50 per cent flowering (3.12) followed by days to maturity and plant height. This may be due to a very narrow genetic base of the local material of Kota zone for days to flowering, days to maturity and plant height. This germplasm is characterized by medium stature, early flowering and early maturity by 10-15 days as compared to the other

[1]National Research Centre on Seed Spices, Tabiji, Ajmer
*Corresponding Author: Agricultural Research Station, Ummedganj, P.O. Box 7, GPO – Nayapura, Kaithun Road, Kota (Raj.) – 324001.
Email: preetiarskota2005@hotmail.com

Table 1: Pooled Analysis of three years for variability parameters, heritability and genetic advance in coriander

Source	Days to 50% Flowering	Plant Height (cm)	No. of Primary Branches	No. of Secondary Branches	No. of Umbels per Plant	No. of Umbellets per Plant	Days to Maturity	Test Weight (g)	Yield (kg/ha)	Essential Oil Content (%)
Mean	59.54	86.32	3.39	4.95	17.37	59.62	103	11.05	1166.17	0.31
Range	55.83-65	76.6-94.06	2.76-4.2	5.96-8.32	13.96-26.2	49.63-73.37	100-112.67	8.46-12.45	849-1481.33	0.16-0.41
GCV	3.12	8.56	28.16	21.74	34.49	21.14	7.02	13.88	13.90	17.13
PCV	6.0	14.64	32.50	29.69	47.0	33.22	11.11	22.47	27.97	25.82
h^2 0.27	0.34	0.75	0.53	0.53	0.40	0.39	0.38	0.24	0.44	
GA	1.99	8.9	1.74	1.62	9.06	16.52	9.43	1.95	166.01	0.07
GAM	3.35	10.32	50.26	32.79	52.13	27.72	9.15	17.67	14.23	23.41

leafy type or dual purpose material. The difference between GCV and PCV was highest for seed yield followed by number of umbels per plant and number of umbellet per plant; indicating complex nature of these traits and strong influence of the environment on these traits. The least difference between GCV and PCV was observed for days to 50 per cent flowering, it may be due to strong adaptability of the local lines to the environmental conditions of Kota zone as they have evolved in this region since a very long time and have got adapted to the prevailing environmental conditions. Heritability was found to be high for number of primary branches, number of secondary branches and number of umbels per plant, whereas it was moderate for essential oil, number of umbellets per plant, days to maturity and seed weight. Low estimates of heritability were recorded for seed yield, days to 50 per cent flowering and plant height. This again shows strong environmental effect on these traits. Genetic advance as percent of mean was high for number of primary branches and number of umbels per plant. These traits are said to have strong positive association with yield and, therefore, should be considered for effective selections. Similar findings were also observed by Singh *et.al*. (2006) in coriander. A moderately high estimate of genetic gain was observed for secondary branches per plant, number of umbellets per plant and essential oil content while low estimates were observed for days to 50% flowering, days to maturity, plant height, seed yield and test weight. Singh and Singh (2013) also observed similar results in their study in which plant height, number of primary and secondary branches, number of umbels and umbellets per umbel showed maximum genotypic and phenotypic variability, broad sense heritability and genetic gain. Meena *et al.* (2014) also observed highest genotypic and phenotypic variance for number of umbels per plant, plant height and days to harvesting; high genotypic and phenotypic coefficients of variances for seed yield; high heritability coupled with high genetic advance as percentage of mean for test weight, plant height and number of seed per umbel.

Based on the high estimates of GCV, heritability and genetic gain observed for number of primary branches, number of secondary branches and number of umbels per plant in our study, it can be concluded that selection should be practiced for these important yield contributing traits to realize the yield increase in coriander.

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