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Studies on variability in cumin (*Cuminum cyminum* L.) on normal and saline soil

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Abstract

Studies on variability in nine genotypes of cumin (*Cuminum cyminum)* (UC-217, UC-198, UC-216, UC-209, Local, UC-218, UC-89, RS-1 & UC-208) conducted at Jobner, India, indicated higher estimates of genotypic coefficient of variance, phenotypic coefficient of variance, heritability and genetic advance for plant height, number of umbels per plant, number of grains per umbel, test weight, grain yield per 10 plants, on normal soil and number of grains per umbel and test weight on saline soil, suggesting the probable role of additive gene effects on character expression.

Key words : cumin, *Cuminum cyminum*, genetic advance, heritability, variability.

Abbreviations

GCV : Genotypic coefficient of variance

PCV : Phenotypic coefficient of variance

Information on heritability and variability is important since these provide basis for improving efficiency of hybridization and handling of segregating populations by selection. Such information on cumin (*Cuminum cyminum* L.), an important seed spice, though available to some extent under normal conditions is completely lacking under saline conditions. Hence, the present investigation was carried out to study the nature and extent of genetic variability, heritability and genetic advance for seven characters in cumin under normal and saline conditions.

Nine genetically diverse genotypes of cumin were evaluated during *rabi* 1994-95 at SKN College of Agriculture, Jobner (India) in a Randomized Block Design with three replications each on normal (ECe 2.79 dSm^{-1} and pH 7.9) and on saline patches (ECe 8.28 dSM^{-1} and pH 9.15) of soil in a plot of 2.0 m x 1.5 m accommodating five rows spaced 30 cm apart. Plant to plant distance was maintained at 10 cm by thinning at 40 days after sowing. Normal agronomical practices were followed for raising the crop. The crop was irrigated five times at regular intervals.

Observations on 10 randomly selected plants from each treatment were recorded for yield contributing components and seed yield. Genotypic and phenotypic coefficient of variability, broad sense heritability and genetic advance were worked out following the methods of Burton & De Vane (1953) and Johnson *et al.* (1955).

Significant differences were observed among all the genotypes for all the characters on both normal and saline soils (Table 1). The range of variation was maximum for number of grains per umbel followed by plant height on both the soils. The range was comparatively restricted for all the traits on saline than normal soil. It is evident that the PCV values were higher than the corresponding GCV values for all the characters on saline soil suggesting different degrees of interactions with the environment. Whereas, GCV and PCV values were almost similar for all the characters on normal soil. This indicates that the major portion of the phenotypic variation for these characters was contributed by the genotypic component. Grain yield per 10 plants followed by number of grains per umbel indicated the highest values of GCV while number of umbels per plant and test weight showed moderate estimates of GCV on both the soils. The highest and moderate values of GCV observed in these characters provides a good scope for their genetic improvement.

On normal soil, heritability was much higher in respect of plant height, number of umbels per plant, number of grains per umbel, test weight and grain yield

Table 1. Estimates of parameters of variance in cumin on normal and saline soil

Parameter	Range	Mean	Genotypic variance	Phenotypic variance	GCV %	PCV %	H %	GA %
Plant	23.77-35.40	31.46	9.91	10.50	10.01	10.30	94.38	20.02
height (cm)	**15.10-21.03**	**18.11**	**1.67**	**5.26**	**7.14**	**12.67**	**31.74**	**8.28**
No. of branches per plant	4.30-5.70	4.90	0.10	0.20	6.44	9.17	50.00	9.38
	2.93-3.97	**3.40**	**0.05**	**0.16**	**6.99**	**12.11**	**31.25**	**7.57**
No. of umbels per plant	14.77-21.67	18.32	4.30	4.35	11.32	11.39	98.85	23.18
	4.00-7.80	**6.02**	**1.16**	**2.71**	**17.87**	**27.36**	**42.80**	**24.11**
No. of umbellets per plant	4.60-5.27	4.98	0.02	0.09	3.42	6.18	22.22	3.81
	3.33-4.43	**4.03**	**0.07**	**0.17**	**6.61**	**10.34**	**41.17**	**8.67**
No. of grains per plant	17.67-29.33	26.13	11.73	12.51	13.11	13.54	93.76	26.14
	11.03-21.27	**16.72**	**11.06**	**13.79**	**19.89**	**22.21**	**80.20**	**36.79**
Test weight (g)	3.20-4.20	3.80	0.07	0.08	7.29	7.85	87.50	13.94
	3.00-3.96	**3.60**	**0.10**	**0.11**	**8.79**	**9.21**	**90.90**	**17.25**
Grain yield per 10 plants (g)	13.60-19.07	16.38	4.79	6.05	13.37	15.03	79.17	24.49
	1.73-4.43	**2.62**	**0.31**	**2.09**	**21.12**	**54.60**	**14.83**	**16.85**

GCV=Genotypic coefficient of variance; PCV = Phenotypic coefficient of variance; H = Heritability (broad sense); GA = Genetic advance of mean.
Figures in bold letters denote parameters on saline soil

per 10 plants. However, heritability was higher in test weight and number of grains per umbel on saline soil. These traits estimates coupled with high values of genetic advance suggests additive genes for the expression of these traits on both soils. Johnson *et al.* (1955) also reported the importance of high heritability along with high genetic advance in predicting the gain under phenotypic selection than heritability estimates alone. The selection is therefore, likely to be useful in genetic improvement of characters like plant height, number of umbels per plant, number of grains per umbel, test weight and grain yield on normal soil and number of grains per umbel and test weight on saline soil.

References

Burton G W & De Vane F H 1953 Estimating heritability in tall fescue from replicated clonal material. Agron. J. 45 : 478-81.

Johnson H W, Robinson H R & Comstock R E 1955 Estimation of genetic and environmental variability in soyabeans. Agron. J. 47 : 314-318.