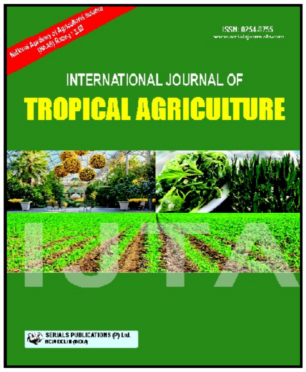


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# Genetic Variability in Cumin *(Cuminum Cyminum* L.) Under Salinity

**Hadiya R. G., Desai P. K., Patel K. C. and Baxi H. C.**

*Department of Research and Development, Dinkar Seeds Pvt Ltd, Himatnagar, Sabarkantha, Gujarat -383001, India*

***Abstract:*** Variability parameters were estimated using 10 genotypes of cumin *(Cuminum cyminum* L.) under saline condition for days to 50% flowering, plant height, branches per plant, umbels per plant, umbellets per umbel, test weight, harvest index, and grain yield. Relatively high GCV and PCV, heritability along with high genetic advance as percentage of mean were recorded for grain yield, umbels per plant, grains per umbel and harvest index. Selection based on these traits would be effective for yield in cumin under salinity.

## INTRODUCTION

Cumin is an important seed spice crop grown during *rabi* in Rajasthan and Gujrat. In Gujarat cumin is grown in an area of about 370000 ha with an annual production of 280000 tonnes. High concentration of salts in the soil is a serious threat to commercial production of cumin. Use of salt tolerant varieties is an easy and cost effective alternative solution to overcome this problem (Asana and Kale, 1965). Progress in breeding programmes under any agro-climatic or soil condition depends on the extent and nature of variability existing in the base population. Variability analysis is useful in getting information on the traits that are expected to respond towards simple selection. Such information on cumin under saline condition is completely lacking. However some reports are available for normal environment (Mathur *et al.,* 1971 and Basana *et al.,* 1983). The present investigation was therefore, undertaken to study the genetic variability, genetic advance and heritability in cumin under saline condition.

## MATERIALS AND METHODS

Ten genetically diverse genotypes of cumin *(Cuminum cyminum* L.) were raised on saline (Ece 8.0 dsm-l and pH 9.0) sandy soils at Research Farm of Dinkar Seeds Pvt Ltd, HImatnagar,Gujarat. A randomized block design with three replications was used. Each genotype was represented by 2 meter long 5 rows with 30x5 cm2 spacing. Recommended package of practices was followed to raise the crop. Observations from each treatment were recorded for days to 50% flowering, plant height (cm), branches per plant, umbels per plant, umbellets per umbel, grains per umbel, biological yield per ten plants (g), harvest index (%) and test weight (g). The genotypic and phenotypic coefficient of variation and genetic advance were estimated according to formula adopted by Johanson *et aI., (1955)*. Heritability estimates were worked out by the method suggested by Burton and de Vane (1953).

| *S.No.* | *Genotype* |
|---|---|
| 1 | DSC-102 |
| 2 | DSC-103 |
| 3 | DSC-104 |
| 4 | DSC-105 |
| 5 | DSC-106 |
| 6 | DSC-107 |
| 7 | DSC-108 |
| 8 | DSC-109 |
| 9 | DSC-110 |
| 10 | DSC-111 |

## RESULTS

Analysis of variance revealed that mean squares due to genotypes were highly significant for all the characters except plant height and umbellets per umbel indicating adequate variation amongst genotypes under saline environment. The mean performance of genotypes for various traits (Table-I) revealed the wider range of variation in the genotypes for umbels per plant, grains per umbel, grain yield and harvest index. Relatively high estimates of phenotypic and genotypic coefficient of variation (PCV and GCV) were recorded for grains per umbel, umbels per plant, harvest index and grain yield indicating that selection for these traits may be effective.

High heritability in broad sense was observed for grain yield and umbels per plant while moderate for grains per umbel, harvest index and branches per plant indicating high transmission index. Burton (1952) suggested that GCV along with heritability estimates would give a better idea about the efficiency of selection as heritability measures the proportion

**Table 1**

**Grand mean, range, estimates of variances, coefficients of variation, heritability (Broad sense and genetic advance for yield and other attributes under salinity**

| *Sr. No.* | *Character* | *Grand mean* | *Range* | *Estimates of Variance* | | | *Coefficients of Variation* | | *Heritability (%) (Broad sense)* | *GA (% of mean)* |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | $\sigma^2 q$ | $\sigma^2 p$ | $\sigma^2 e$ | *Genotypic* | *Phenotypic* | | |
| 1 | Days to 50% flowering | 76.59 | 75.52-80.50 | 3.70 | 11.119 | 7.359 | 2.53 | 4.35 | 33.81 | 3.032 |
| 2 | Plant height (cm) | 18.51 | 16.82-21.36 | 0.379 | 6.330 | 5.951 | 3.33 | 13.59 | 6.00 | 1.674 |
| 3 | Branches per plant | 3.50 | 3.20-4.29 | 0.079 | 0.167 | 0.088 | 8..02 | 11.67 | 47.30 | 11.420 |
| 4 | Umbels per plant | 6.92 | 5.07-8.90 | 1.389 | 2.110 | 0.730 | 17.03 | 21.03 | 65.50 | 28.468 |
| 5 | Umbellets per umbel | 5.00 | 4.42-5.30 | 0.018 | 0.177 | 0.160 | 2.67 | 8.44 | 10.00 | 1.800 |
| 6 | Grains per umbel | 4.55 | 3.18-5.81 | 0.605 | 1058 | 0.453 | 17.11 | 22.62 | 57.20 | 26.590 |
| 7 | Biological yield per 10 plants (g) | 10.77 | 8.10-13.45 | 3.093 | 4.777 | 1.684 | 17.17 | 21.33 | 64.70 | 28.510 |
| 8 | Grain yield per 10 plants (g) | 4.32 | 3.14-5.35 | 0.612 | 0.814 | 0.203 | 18.07 | 20.86 | 75.00 | 32.400 |
| 9 | Harvest index (%) | 43.23 | 34.50-60.07 | 46.774 | 88.224 | 4.450 | 15.82 | 21.73 | 53.00 | 23.733 |
| 10 | Test weight (g) | 3.77 | 3.21-4.46 | 0.079 | 0.193 | 0.113 | 7.48 | 11.64 | 41.30 | 9.810 |

to which the variability of a character is transmitted to progeny. Moderately high heritability values couples with high GCV were observed for grain yield, grains per umbel, umbels per plant and harvest index.

Johanson *et aI*. (1955) sugg~sted that heritability and genetic advance when calculated together would more useful in predicting the' resultant effects of selection. In the present study larger genetic advance as o per cent of mean was noted for grain yield, umbels per plant, grains per umbel and harvest index along with high heritability indicating that selection for these traits would be effective for the improvement in yield levels of cumin under salinity.

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