

# Genetic variability in fenugreek (*Trigonella foenum-graecum* L.) assessed in South Eastern Rajasthan

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## ABSTRACT

The present investigation was carried out using twenty fenugreek genotypes (*Trigonella foenum graecum* L.) to evaluate genetic variability, heritability and genetic advance in the population. Significant genetic variations were observed in the genotypes for all the characters except days to maturity. High phenotypic and genotypic coefficients of variation were observed for number of pods per plant, harvest index, number of seeds per pod while low estimates were seen for plant height, days to 50% flowering and pod length. High heritability estimates were recorded for number of seeds per pod, number of pods per plant, harvest index and test weight. Estimates of heritability were moderate for the traits seed yield and pod length whereas it was low for days to 50% flowering and plant height. High genetic advance as percent of mean together with high heritability and high GCV was observed for number of pods per plant, harvest index, number of seeds per pod, test weight and seed yield indicating additive gene action in the inheritance of these characters. On the basis of the present study, it can be concluded that simple direct selection can be exercised for improvement in these major yield contributing characters viz., number of pods per plant, harvest index, number of seeds per pod and test weight for enhancing fenugreek seed yield ultimately.

**Key words:** Fenugreek, Genetic variability, Heritability, Genetic advance.

## INTRODUCTION

Fenugreek is an annual herb mainly cultivated for seed as well as leaves. The seeds are used as a spice and condiment to improve the flavour and nutritive value of food. India is the highest producer of fenugreek in the world with the major production concentrated in the state of Rajasthan, Gujarat and Madhya Pradesh. The genetic improvement of any crop depends upon the existence of genetic variability, its nature and magnitude as it helps in formulating selection criteria for different traits in a breeding programme. Hence, keeping this in view, the present study was attempted to find out the magnitude of variability, heritability and genetic advance for different characters in fenugreek.

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## MATERIAL AND METHODS

The experimental material comprised of twenty indigenous fenugreek genotypes were grown in randomized block design with three replications at Research Farm of Agricultural Research Station, Kota during *rabi* 2008 -09. Each genotype was accommodated in paired rows of 3m length with row to row and plant to plant distance maintained at 30 cm and 10 cm, respectively. Recommended package of practices were followed to raise a good crop. Observations were recorded on five randomly selected competitive plants on nine metric traits viz., plant height, days to 50% flowering, days to maturity, number of pods per plant, number of seeds per pod, pod length, test weight, harvest index (%) and seed yield.

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## RESULT AND DISCUSSION

The analysis of variance revealed significant differences for all the characters except days to maturity indicating the presence of sufficient genetic variability in the experimental material with respect to all the traits except their maturity duration. The estimates of mean, genotypic (GCV) and phenotypic coefficient of variation (PCV), heritability (broad sense) and expected genetic advance as percent of mean are being depicted in table 1. The PCV estimates were, in general, higher than that of GCV for all the traits indicating environmental effect on the phenotypic expression of the traits. However, the component of environmental influence was comparatively low for the traits viz., harvest index, number of seeds per pod, test weight and number of pods per plant indicating greater role of genetic component. The highest estimates of PCV and GCV were obtained for number of pods per plant followed by harvest index and number of seeds per pod indicating the existence of higher magnitude of genetic variability in the material for all these traits. Lower values of PCV and GCV were observed for the traits plant height, days to 50% flowering and pod length indicating narrow range of variability. These results are in conformity with the earlier findings of Prajapati *et al.* (3).

Genetic contribution to phenotypic expression of a trait is better reflected by the estimates of heritability. A higher estimate of heritability indicates presence of more fixable variability. The estimates of heritability were very high for the traits number of seeds per pod, number of pods per plant, harvest index and test weight. Moderate estimates

of heritability were obtained for the traits seed yield and pod length indicating moderate influence of environment in their phenotypic expression. Selection for such traits should be made based on over the year's performance at multilocations. Low heritability estimates were observed for days to 50% flowering and plant height. Similar results were reported by Sarada *et al.* (4) for number of pods per plant, number of seeds per pod and seed yield. Johnson *et al.* (1) indicated that a high heritability is not always an indication of high genetic gain. The expected genetic advance would be low when the heritability is mainly due to non additive gene effect, but the genetic advance would be high when the heritability is due to additive gene effect (Panse, 2). High heritability and high genetic advance are crucial for the improvement of any character. High estimates of genetic advance as percent of mean was observed for the characters, number of pods per plant, harvest index, number of seeds per pod, test weight and seed yield indicating effectiveness of selection for these characters. The genetic advance was low for plant height, days to 50% flowering and pod length.

In the present study, high genetic advance as percent of mean together with high heritability and high GCV was observed for number of pods per plant, harvest index, number of seeds per pod, test weight and seed yield indicating additive gene action in the inheritance of these characters. Therefore, simple direct selection can be exercised for improvement in these major yield contributing characters and ultimately enhancing seed yield.

**Table 1.** Genetic parameters for various characters in fenugreek

Character	Mean	Range	GCV	PCV	Heritability (Broad Sense) %	Genetic advance	Genetic gain (as % of mean)
Plant height (cm)	58.35	43- 66	1.96	9.31	4.40	0.49	0.85
Days to 50% flowering	53.36	51 – 58	1.62	3.44	22.2	0.83	1.57
No. of pods per plant	13.70	5.31-28.91	38.46	40.23	91.4	10.38	75.75
No. of seeds per pod	15.31	12 -20	13.12	13.68	92.0	3.97	25.92
Pod length (cm)	8.80	7.48 -10.70	6.36	9.09	49.1	0.80	9.18
Test weight (g)	11.22	8.85 -13.80	10.35	11.42	82.2	2.17	19.34
Harvest index (%)	19.32	11.14-30.20	24.72	25.86	91.4	9.41	48.70
Seed yield per plant (g)	11.45	7.26 –13.82	10.33	14.02	54.2	1.79	15.67

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