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NATURE OF VARIABILITY AND ASSOCIATIONS IN FENUGREEK

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ABSTRACT

One hundred genotypes of fenugreek (*Trigonella foenum-graecum* L.) showed significant variability for 11 characters except number of grains/pod and 1000-grain weight. The broad sense heritability, however, was high (>40) for days to flowering, pods/plant, straw and grain yield/plant. It was moderate or low for plant height, branches/plant, days to maturity and pod length. Grain yield/plant showed significant positive association with plant height, branches/plant, effective branches/plant, pods/plant and straw yield/plant. Out of these characters, however, only straw yield had significant direct positive effect on grain yield.

Key words: Fenugreek, coefficient of variation, correlations, path coefficient.

Information on the relative magnitude of genotypic and phenotypic variances is of basic importance in judging the potential of germplasm collections and selection of parental material for a breeding programme. The knowledge of association of different plant characters among themselves and with yield helps in designing suitable selection criteria. In the absence of any information on these aspects in fenugreek, the present investigation has been undertaken to estimate the variability for yield and yield related characters in germplasm collection. Correlation and path coefficient analyses were done to determine the nature of the relationship of different characters, especially with the grain yield.

MATERIALS AND METHODS

One hundred fenugreek genotypes (89 indigenous and 11 exotic) were evaluated in randomized block design with three replications. Each plot consisted of three 3-m long rows of spaced at 40 cm. The plant-to-plant distance was adjusted at 10 cm by thinning one month after sowing. Five random competitive plants were used to record observations on eleven quantitative characters (Table 1). The genotypic and phenotypic coefficients of variation (GCV, PCV) and heritability in broad sense were estimated according to the method of Johnson et al. [1]. The genotypic and phenotypic correlations were calculated by the method

described by Al-Jibouri et al. [2], and path coefficient analysed as per Dewey and Lu [3].

RESULTS AND DISCUSSION

Analysis of variance indicated that genotypes differ significantly for all the characters except number of grains/pod and 1000-grain weight. The GCV and PCV were comparatively higher for grain and straw yield/plant, pods/plant, and effective branches/plant as compared to other characters (Table 1). However, broad sense heritability was high (>40) for days to flowering, pods/plant, straw and grain yield/plant, but moderate or low for plant height, branches/plant, days to maturity, and pod length. Among the characters showing significant variation, plant height, branches/plant, effective branches/plant, pods/plant and straw yield/plant had significant phenotypic correlation (r = 0.38, 0.12, 0.35, 0.51, 0.80,

Table 1. Estimates of coefficients of variations and heritability in fenugreek

Character	Coefficient of variation		Heritability
	genotypic	phenotypic	
Plant height	7.5	14.5	26.6
Total branches/plant	9.7	20.0	23.5
Effective branches/plant	12.0	22.5	28.5
Days to flowering	7.0	9.5	54.3
Days to maturity	1.0	2.9	11.9
Pods/plant	19.8	28.3	48.7
Pod length	4.0	11.3	12.5
Straw yield/plant	19.2	26.5	52.6
Grain yield/plant	24.2	32.4	55.7

Table 2. Phenotypic (P) and genotypic (G) correlation between pairs of important economic characters in fenugreek

Character pair	Correlation coefficient	
	phenotypic	genotypic
Plant height vs total branches/plant	0.19*	0.04
Plant height vs effective branches/plant	0.29**	0.31
Plant height vs pods/plant	0.37**	0.48
Plant height vs straw yield/plant	0.32**	0.05
Plant height vs grain yield/plant	0.38**	0.66
Total branches per plant vs effective branches/plant	0.79**	0.83
Total branches/plant vs pods/plant	0.45**	0.59
Total branches/plant vs straw yield/plant	0.21*	0.31
Total branches/plant vs grain yield/plant	0.12*	0.31
Effective branches/plant vs pods/plant	0.50**	0.60
Effective branches/plant vs straw yield/plant	0.28**	0.41
Effective branches/plant vs grain yield/plant	0.35**	0.59
Pods/plant vs straw yield/plant	0.55**	0.70
Pods/plant vs grain yield/plant	0.51**	0.69
Straw yield/plant vs grain yield/plant	0.80**	0.90

*, ** Significant at 5% and 1% levels, respectively.

respectively) with grain yield (Table 2). The genotypic correlation coefficients were generally higher than the corresponding phenotypic correlation coefficients. The path coefficient analysis using the significant correlation coefficients revealed that out of these five characters only straw yield/plant, had significant direct positive effect on grain yield (Table 3). The utility of this character as an indirect selection criterion for yield is also limited in view of low genetic variability of the trait.

Table 3. Path coefficient analysis of genotypic correlation coefficients to direct and indirect effects of five variables of grain yield in fenugreek

Character	Plant height	Total branches/ plant	Effective branches per plant	Pods per plant	Straw yield/plant	Genotypic correlation with grain yield per plant
Plant height	**0.189***	-0.005	0.059	0.015	0.399	0.656
Total branches/plant	0.008	**-0.102**	0.160	0.018	0.225	0.309
Effective branches/plant	0.071	-0.085	**0.193**	0.010	0.301	0.499
Pods/plant	0.090	-0.060	0.117	**0.031**	0,516	0.693
Straw yield/plant	0.102	-0.031	0.070	0.022	**0.732**	0.904
Residual effect	0.36					

*Diagonal figures (in bold) are the direct effects and non-diagonal values are indirect effects.

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