

Table 2. Path coefficient analysis indicating direct and indirect effects of various components on grain yield per plant in fenugreek

Characters	Direct effects	Plant height	Days to flowering	Days to maturity	Branches per plant	Pods per plant	Pod length	100 grain weight	Grains per pod	Protein content	Correlation coefficient
Plant height	-0.7440	-	-1.2696	0.9259	1.2250	-0.1021	0.2531	0.2234	0.0272	-0.0537	0.4853**
Days to flowering	4.0638	0.2324	-	-3.0106	-1.6151	0.1332	-0.0870	-0.4005	0.1322	-0.0059	-0.5665**
Days to maturity	-3.2692	0.2107	3.7423	-	-1.0815	0.1124	-0.0925	-0.3846	0.1374	0.0195	-0.6056**
Branches per plant	2.5691	-0.3547	-2.5548	1.3763	-	-0.3743	0.0971	0.2020	-0.1849	-0.0035	0.7793**
Pods per plant	-0.6966	-0.1090	-0.7771	0.5278	1.3804	-	0.0057	0.0239	0.2762	0.0599	0.6874**
Pod length	0.4580	-0.4111	-0.7720	0.6605	0.5451	-0.0087	-	0.1788	-0.1536	-0.0371	0.4597**
100 grain weight	0.5577	-0.2980	-2.9835	2.2548	0.9628	-0.0298	0.1468	-	-0.0902	0.0207	0.5414**
Grains per pod	0.9531	-0.0212	0.5640	-0.4716	-0.4986	-0.2019	-0.0738	-0.0527	-	-0.0753	0.1217
Protein content	0.6305	0.0634	-0.0382	-0.1016	-0.0143	-0.0618	-0.0270	0.0183	-0.1138	-	0.3536**

Residual effect = 0.6929 ** Significant at 1% level; * Significant at 5% level

branches per plant, pods per plant, pod length and 100-grains weight at genotypic and phenotypic level. Negative association between grain yield per plant and protein content was reported (Pant *et al.*, 1984). However, in present studies, positive association was observed between these traits indicating that selection for grain yield will be beneficial to achieve high protein content.

Grains per pod did not exhibit any significant association with grain yield per plant. Characters like days to flowering and days to maturity showed significant negative association with grain yield per plant. This indicates that any attempt to increase grain yield will adversely affect the days to flowering and maturity. In such cases, it is suggested that attempts can be made to break this undesirable linkage through hybridisation.

Path analysis is useful in partitioning the direct and indirect association among attributes and detail examination of specific forces acting to produce a given correlation and measure the relative importance of each casual factor. Hence such studies provide a realistic basis for allocation of weightage to each attribute in deciding suitable criterion for selection (Singh *et al.*, 1968; Sandhu *et al.*, 1979). Estimates of direct and indirect effects

of yield per plant showed that there was direct positive effect of 100-grain weight, grains per pod, pod length and branches per plant. Also the indirect effect of other traits were mainly through the above traits (Table 2). Though protein content also had positive correlation with grain yield per plant, its contribution was mainly through plant height and 100-grain weight.

Thus selection in fenugreek should be done for tall plant, more number of pods and seeds per pod with high test weight for maximum yield with high protein content.

REFERENCES

- PANT, K.C., CHANDEL, K.P.S. and PANT, D.C. (1984). Variability and path coefficient analysis in fenugreek. *Indian J. Agric. Sci.*, 54 : 655-658.
- RAO, C.R. (1952) *Advanced Statistical Methods in Biometric Research*. John Wiley and Sons, New York.
- SANDHU, T.S., BHULLAR, B.S., CHEEMA, H.S. and GILL, A.S. (1979). Variability and inter-relationship among grain protein, yield and yield components in mung bean. *Indian J. Genet.*, 39 : 480-483.
- SINGH, S.P., SINGH, H.B. MISHRA S.N. and SINGH, A. (1968). Genotypic and phenotypic correlations among some quantitative characters in mung bean. *Madras Agric. J.*, 55 : 233-237.

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