PATH COEFFICIENT ANALYSIS IN INDIAN MUSTARD

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ABSTRACT

In a collection of Indian mustard, seed yield showed highly significant positive genotypic and phenotypic correlations with plant height, number of primary branches, number of secondary branches, main shoot length and number of siliqua on main shoot. The path analysis of phenotypic level showed significant direct effect of number of primary and secondary branches on grain yield and also indirect effect of number of primary branches via number of secondary branches. At the genotypic level, in addition to the above scheme, there was considerable direct effect of main shoot length on grain yield. These schemes of path relationships accounted for 77 per cent of the phenotypic and 87 per cent of the genotypic variation for seed yield.

INTRODUCTION

Knowledge of correlation between different yield components is of great importance to the breeder, while selecting a suitable plant type which should have an optimum combination of different component traits. Path coefficient analysis provide reliable information on the nature, extent and contribution of different characters towards seed yield. In this study, path coefficient analysis has been made to identify the important seed yield components in Indian mustard (*Brassica juncea* (L) Czern & Coss.).

MATERIAL & METHODS

The material for the present investigation consisted of forty two genotypes, grown in randomised block design with three replications. Each genotype was sown in 3 rows 5 meters long. The spacing from plant to plant was 30 x 15 cm. The data were recorded on five competitive plants selected at random for plant height, number of primary branches, number of secondary branches, main shoot length, siliquae on main shoot, siliquae length, seeds per siliqua, 1000-seed weight and seed yield. The genotypic and phenotypic correlations were calculated according to Miller et al. (1958) and path coefficient analysis has been done following the method of Dewey and Lu (1959).

RESULTS AND DISCUSSION

Genotypic and phenotypic correlations between seed yield and its components have been presented in table 1. Seed yield had positive and significant correlation with plant height, number of primary branches, number of secondary branches, main shoot length and siliquae on main shoot. 1000-seed weight was significantly associated with siliquae on main shoot. Positive and significant phenotypic correlations of plant height with number of primary branches, main shoot length and siliquae on main shoot were observed. Number of primary branches showed significant positive correlation with number of secondary branches and siliquae on main shoot. Main shoot length had significant association with siliquae on main shoot and siliqua length. Most of the significant correlation coefficients of seed yield with other components were in agreement with those reported by Rawat and Anand (1977) and Paul et al. (1978). The genotypic correlations in general were larger than corresponding phenotypic correlations. The low phenotypic correlation could result due to modifying effect of environment on the association of characters at the genetic level.

The phenotypic and genotypic path analysis are diagrammatically presented in Fig. I and Fig. II respectively. The path analysis at phenotypic level showed significant direct effect of number of secondary branches and number of primary branches on seed yield and also indirect effect of number of primary branches via number of secondary branches. At the genotypic level, in addition to the above scheme, there was considerable direct effect of main shoot length on seed yield. Thus a good plant type in Indian mustard will be a plant with more number of primary branches, secondary branches and with longer main shoot length.

Simple correlations only measure mutual interrelationship between characters whereas the path coefficient analysis reveals specific forces in the build-up of a given correlation. In the present study, the path analysis revealed that characters like secondary branches, primary branches and main shoot length, played a major role in influencing the seed yield. The residual effect revealed that only 13 per cent at genotypic level and 23 per cent at phenotypic level of the total variability in yield was attributed to other factors not included in the present study. The nine characters, however, explained 87 and 77 per cent of genotypic variation in yield at genotypic and phenotypic level respectively. Hence the conclusions drawn from this study seemed to be fairly reliable.

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Table 1. Genotypic and Phenotypic correlation coefficients in Indian mustard

Character	Seed yield	
	Phenotypic	Genotypic
Plant height	0.54**	0.57
Number of primary branches	0.74**	0.78
Number of secondary branches	0.74**	0.79
Main shoot length	0.42**	0.47
Siliqua on main shoot	0.52**	0.55
Siliqua length	0.12	0.13
1000-seed weight	0.01	0.01
Seeds per siliqua	0.17	0.21

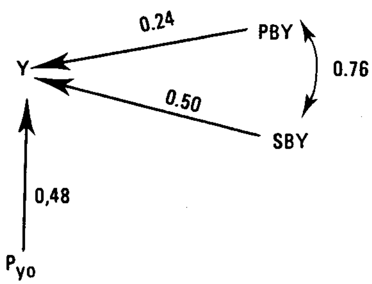

Fig. 1 : Path diagram at phenotypic level

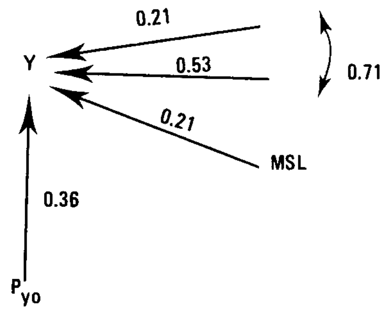

Fig. 2 : Path diagram at genotypic level