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PATH ANALYSIS OF SEED YEILD IN TWENTY DWARF GENOTYPES OF LABLAB BEAN

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ABSTRACT

Investigation was carried out in the farm of Genetics and Plant Breeding, Bangladesh Agricultural University, Mymensingh, to study the path analysis of seed yield in dwarf genotypes of lablab bean. The experiment was laid out in Randomized Complete Block Design with three replication. Twenty dwarf genotypes of lablab bean were evaluated for character association and path analysis. Observation was recorded on seed yield and its component viz. days to maturity, plant height, number of inflorescence per plant, number of pods per inflorescence, number of seeds per pod, ten pod weight, twenty seed weight, inflorescence length, and pod length-breadth ratio. Seed yield was found to be significantly and positively associated with almost all the characters, except pod length-breadth ratio, while negatively with pods per inflorescence. The highest positive direct effect on seed yield was obtained from twenty seed weight (2.411), whereas higher positive indirect effect on seed yield was obtained from all the characters studied through twenty seed weight except pods per inflorescence. Path analysis indicated the importance of twenty seed weight, pod length-breadth ratio, plant height, inflorescence per plant, seeds per pod and pods per inflorescence. The selection based on these yield attributes will be most advantageous to lablab bean.

Introduction

Lablab bean (*Lablab purpureus*) is a protein rich vegetable. It is a perennial crop with twinning, creeping or bushy habit. But generally it is cultivated as annual or biennial crop and, in Bangladesh, bushy type is unknown. Seeds of lablab bean are used in various culinary preparations, such as dry seeds are used as pulse. As a leguminous crop it is capable of fixing atmospheric N_2 in its root zone with the association of bacteria. The cultivation of lablab bean, especially short types in field scale, in the cropping pattern with cereal or non-legume crops, can help to maintain an equilibrium of carbon and nitrogen in the soil through crop residues and foliage shedding. Seed yield is the resultant of a number of quantitative characters. Although the knowledge of association plays a very important role in selection but it becomes ambiguous if number of components are more. In such a situation it is essential to partition the correlation co-efficients into components of direct and indirect effects in order to provide the relative importance of the causal factors. The path co-efficient analysis provides specific measures of the direct and indirect influences of each component character upon seed yield (Singh and Singh 1969; Chandel, 1983; Joshi *et al.*, 1992). In view of above the presented study was undertaken to identify the relative contribution of the important yield attributes towards yield through path analysis.

Materials and Methods

The materials for the present study consisted of 20 dwarf genotypes of lablab bean. These were grown in a Randomised Complete Block Design (RCBD) with three replications during July 2001 to April 2002 in the farm of Genetics and Plant Breeding, Bangladesh Agricultural University, Mymensingh. The plot size consisted of a single row of 5 meter in length, accomodating 50 plants per genotypes, was considered a unit plot in a replication. Individual rows cum-plots were 0.3 meter apart and plants within rows 10 cm spaced. The experimental plots were fertilized with recommended dose. All scheduled agronomic practices were followed. Observations on seed yield (SY) and its components viz., days to maturity (DM), plant height (PH), number of inflorescence per plant (I/P), number of pods per inflorescence (P/I), number of seeds per pod (S/P), ten pod weight (PW), twenty seed weight, g (SW), inflorescence length (IL) and pod length-breadth ratio (L/B) were recorded. The respective correlation co-efficients were partitioned into direct and indirect effects (Dewey and Lu, 1959).

Results and Discussion

The genotypic correlation co-efficients between seed yield and its nine components are presented in Table-1 and Figure-1. The result revealed that seed yield exhibited a positive significant association with days to maturity, plant height, inflorescence per plant, seeds per pod, ten pod weight, twenty seed weight and inflorescence length, indicating the importance of these characters during selection. Path co-efficient analysis showed that the highest positive direct effect on seed yield was obtained from twenty seed weight followed by pod length-breadth ratio, plant height, inflorescence per plant, seeds per pod and pods per inflorescence. Higher positive indirect effects on seed yield were obtained by days to maturity, plant height, inflorescence per plant, seeds per pod, ten pod weight and inflorescence length through twenty seed weight. It was also investigated from the present study that pods per inflorescence and seeds per pod had high positive indirect effect on seed yield via days to maturity and pod length-breadth ratio respectively.

Table 1. Path co-efficient analysis showing direct (bold) and indirect effects of 10 characters on seed yield in 20 dwarf lablab bean genotypes

Chara-cters	Effect through									Genotypic correlation with yield (SY)
	DM	PH	I/P	P/I	S/P	PW	SW	IL	L/B	
DM	**-0.736**	0.224	0.211	-0.059	0.142	-1.147	2.052	-0.470	0.498	0.714**
PH	-0.534	**0.309**	0.251	-0.059	0.133	-1.168	2.250	-0.428	0.140	0.894**
I/P	-0.613	0.305	**0.254**	-0.046	0.242	-0.892	1.748	-0.329	0.217	0.885**
P/I	0.564	-0.236	-0.151	**0.077**	-0.123	1.053	-1.712	0.293	-0.386	-0.621**
S/P	-0.471	0.185	0.162	-0.043	**0.222**	-1.393	1.742	-0.154	0.619	0.869**
PW	-0.581	0.248	0.156	-0.056	0.212	**-1.455**	2.145	-0.179	0.450	0.941**
SW	-0.627	0.288	0.182	-0.055	0.160	-1.294	**2.411**	-0.437	0.266	0.895**
IL	-0.562	0.215	0.136	-0.037	0.056	-0.424	1.630	**-0.615**	0.116	0.514*
L/B	-0.504	0.059	0.076	-0.041	0.189	-0.900	0.927	-0.098	**0.727**	0.435

Legend:

DM = Days to pod maturity, PH = Plant height, I/P = Inflorescences per plant, P/I = Pods per inflorescence, S/P = Seeds per pod , PW = 10-pod weight, SW = 20-seed weight, IL = Inflorescence length, L/B = Pod length-breadth ratio, SY = Seed yield per plant.

*P < 0.05; ** P < 0.01

Residual effect, R = 0.296

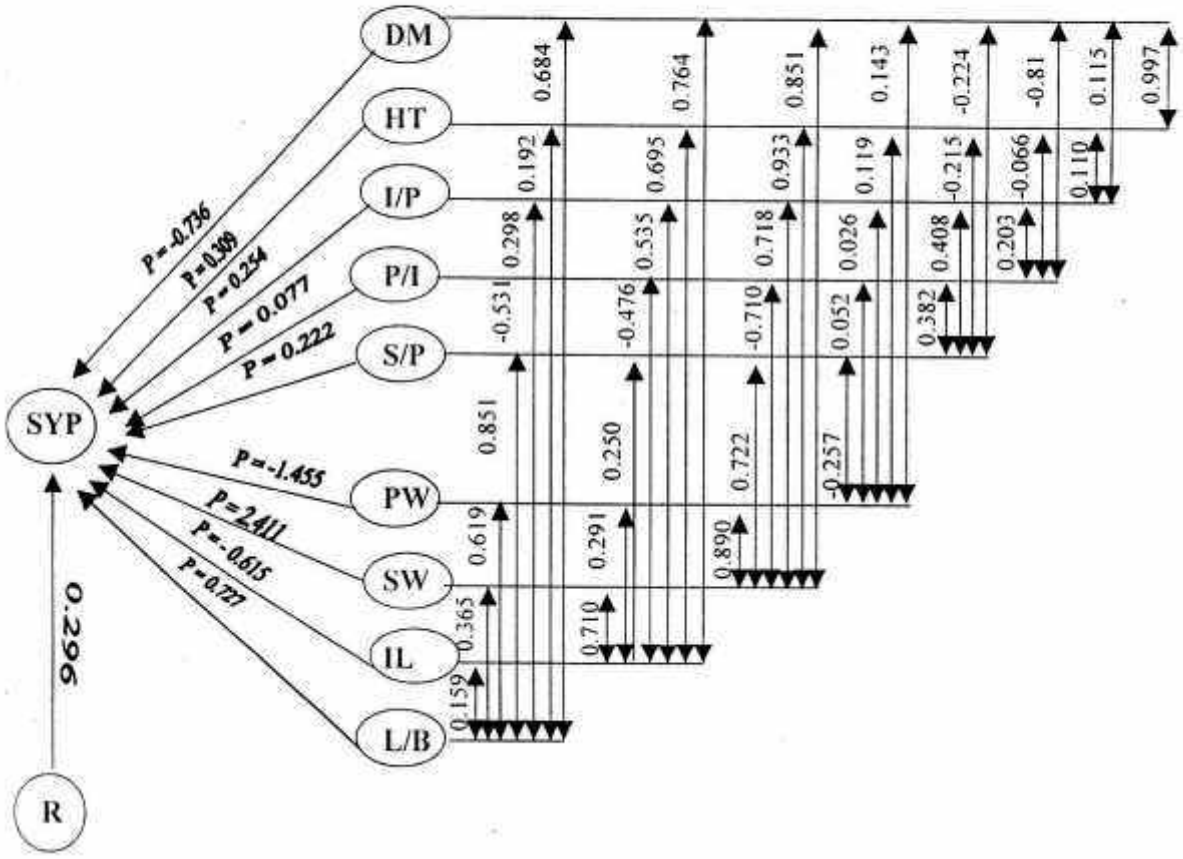

Fig 1: Genotypic path diagram of various characters on seed yield per plant in lablab bean. The single arrow lines indicate path co-efficients and double arrow lines indicate correlation co-efficients among the characters

Legend:

DM = Days to pod maturity
PH = Plant height
I/P = Inflor. per plant
P/I = Pods per inflor.
S/P = Seeds per pod
PW = 10- pod weight
SW = 20- seed weight
IL = Inflor. length
L/B = Pod length-breadth ratio
SYP = Seed yield per plant and
R = Residual effect.

The residual effect of the present study was 0.296, indicating that 70.4% of the variability in seed yield was contributed by the nine characters studied in the path analysis. This gives an impression that a few other characters than those involved in the present study might also contribute to yield. The results obtained in the present study are comparable with that of Narsinghani *et al.* (1978), Chandel (1983) and Achalshah and Lal (1992). The results from the present findings are that maximum direct positive contribution toward yield was observed in twenty seed weight, followed by inflorescence per plant, seeds per pod, pods per inflorescence and pod length-breadth ratio. There were marked indirect positive effects of a number of characters via inflorescence per plant, seeds per pod, twenty seed weight and pod length-breadth ratio.

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