

GENETIC VARIABILITY FOR YIELD AND YIELD RELATED CHARACTERS OF 20 LABLAB BEAN GENOTYPES.

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ABSTRACT

An experiment was carried out with 20 lablab bean genotypes in the experimental farm of the Department of Genetics and Plant Breeding, Bangladesh Agricultural University, Mymensingh from November 2001 to March 2002. Randomized Complete Block Design with three replications were followed. The characters days to maturity, plant height, no. of inflorescence per plant, no. of pods per inflorescence, no. of seeds per pod, 10-pod weight, 20-seed weight, inflorescence length, pod length-breadth ratio, pod yield per plant, and seed yield/plant were studied. Genetic variability, heritability and genetic advance were estimated. There were significant variations among the genotypes for all the characters studied. The Phenotypic co-efficient of variation (PCV) were higher than the Genotypic co-efficient of variation (GCV). Highest GCV and PCV values were recorded for seed yield per plant and was followed by 20-seed weight, 10-pod weight and pod yield per plant. High heritability associated with high genetic advance was obtained for 20-seed weight, seed yield per plant, pods per inflorescence and 10-pod weight. It is expected that selection for improvement of traits in lablab genotypes will be effective.

Introduction

Lablab bean (*Lablab purpureus* L.) is an important protein rich vegetable. Its beans can be used as green vegetable, mature seeds as 'Dal', leaves and plant parts as animal feed and fodder. Like other legume crops it can fix atmospheric nitrogen through nodulation. In Bangladesh the crop can be grown both in Rabi and Kharif seasons. In recent years some genotypes of lablab bean has been collected/developed in the Department of Genetics and Plant Breeding, Bangladesh Agricultural University, Mymensingh (Newaz *et al.* 1990; 1991). These materials may be utilized for cultivation as well as in different breeding programmes for further improvement provided their mode of inheritance like heritability, genetic advance etc. are known. With this view point an experiment was carried out during the Rabi season of 2001-2002.

Material and Methods

The experiment was conducted in the experiment farm of the Department of Genetics and Plant Breeding, Bangladesh Agricultural University, Mymensingh from November 2001 to March 2002. Twenty genotypes were evaluated in randomised complete block design with three replications. A single row of 5 meter length, accomodating 50 plants per genotype was considered a unit plot. Between row and plant spaces of 30 and 10 cm were maintained. Recommended agronomic practices were followed to raise the crop. Observations were recorded on ten randomly selected plants in each replication. The characters days to maturity, plant height, no. of inflorescence per plant, no. of pods per inflorescence, no. of seeds per pod, 10-pod weight, 20-seed weight, inflorescence length, pod length-breadth ratio, pod yield per plant, and seed yield per plant were recorded. The recorded data were analysed for genotypic variance (σ^2_g), phenotypic variance (σ^2_p), genotypic co-efficient of variation (GCV), phenotypic co-efficient of variation (PCV), heritability in broad sense (h^2_b) and genetic advance in percentage of mean (GA%).

Results and Discussion

The analysis of variance revealed the presence of highly significant differences among the genotypes for all the characters (Table 1). The higher range of variation among the genotypes indicated the presence of sufficient amount of variability among the genotypes used. This suggested the possible use of there genotypes for various breeding programmes. Similar observation was also recorded by Kabir and Sen (1987). The

Table 1. Analysis of variance for yield and yield contributing characters of 20 Lablab bean genotypes

Item	d.f	Days to maturity	Plant height (cm)	No. of Inflor./ plant	No of pods/ inflor.	No. of seeds/ pod	10-pod weight (g)	20-seed weight (g)	Inflor. length (cm)	Pod length-breadth ratio	Pod yield/ plant (g)	Seed yield/ plant (g)
Replication	2	37.717	826.021	4.389	0.392	0.650	522.450	1.298	342.756	1.130	2466.843	52.602
Genotype	19	84.158***	116.60***	2.046***	0.956***	1.175***	753.771***	8.953***	35.394**	2.008***	1140.85***	136.263***
Error	38	13.317	37.455	0.491	0.105	0.211	85.292	0.197	13.134	0.396	197.527	5.594

Note : **p < 0.01; ***p < 0.001

phenotypic co-efficient of variations (PCV) were higher than the genotypic co-efficient of variation (GCV) for all the characters (Table 2). This indicated that differences among the genotypes were mostly due to genetical reasons and selection on the basis of phenotypic expression would be effective. However maximum GCV and PCV value were recorded for seed yield per plant followed by 20-seed weight, 10-pod weight and pod yield per plant.

It is generally known that higher values of GCV are reliable, if substantiated by high heritability values. Thus highest heritability was noticed for 20-seed weight followed by seed yield per plant, pods per inflorescence, 10-pod weight, days to maturity, pod yield per plant and pod length-breadth ratio. Burton (1952) suggested that GCV along with heritability estimates would give a better idea about the efficiency of selection as heritability measures the proportion of variability of a character which is transmitted to the progeny. However most of the traits considered this study displayed high heritability, days to maturity showed high heritability, but poor GCV and GA% indicated that selection for early maturity using these genotypes would not be effective. Patil *et al.* (1993) found high heritability and poor GA% in days to maturity. Heritability estimates may be of great help for selection on the basis of phenotypic performances. High heritability along with high genetic advance is usually more useful in predicting the resultant effect for selecting the best individuals than heritability alone (Johnson *et al.*, 1955). In the present study the results indicated that 20-seed weight, seed yield per plant, pods per inflorescence, 10-pod weight and pod yield per plant had high heritability with high GCV and GA, suggesting that there is a good prospect of these materials for further improvement through selection and use in different breeding programmes for creating genetic variability.

Table 2. Estimate of genetic parameters for 9 characters in 20 dwarf lablab bean genotypes

Characters	Mean	Range	σ^2_g	σ^2_p	GCV	PCV	h^2_a	GA (%)
Days to maturity	100.83	94-108.67	23.62	36.93	4.82	6.03	63.95	7.94
Plant height	52.12	39-61.93	26.38	63.84	9.85	15.32	41.33	13.05
Inflores./plant	5.28	3.80-6.80	0.52	1.01	13.63	19.01	51.37	20.12
Pods/inflores.	2.67	2.13-4.27	0.28	0.39	19.95	23.35	73.00	35.12
Seeds/pod	4.15	3.00-5.00	0.32	0.53	13.65	17.58	60.30	21.84
10-pod weight	59.85	29.33-85.33	222.83	308.14	24.94	29.33	72.32	43.69
20-seed weight	5.37	2.63-8.27	2.92	3.12	31.83	32.89	93.66	63.45
Inflores. length	20.95	13.87-26.33	7.42	20.53	13.01	21.63	36.16	16.11
Pod length breadth ratio	4.43	3.16-5.86	0.59	0.97	17.43	22.29	61.17	28.08
Pod yield	83.63	46.30-129.43	314.44	511.97	21.20	27.05	61.42	34.23
Seed yield	15.51	6.56-31.03	43.56	49.15	42.54	45.19	88.62	82.49

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