Annals of Arid Zone 38(2): 157-160, 1999

Analysis of Seed Yield Components in *Lablab purpureus* L.

M.P. Rajora and M.S. Yadav
Central Arid Zone Research Institute, Jodhpur 342 003, India

Abstract: An analysis of seed yield components was performed for eight characters in ten genotypes of lablab bean (*Lablab purpureus* L.). Significant genotypic differences were observed for all the traits studied, viz., seed yield plant^{-1}, seeds pod^{-1}, 100-seed weight, pod length, pod weight, seed weight pod^{-1}, dry matter yield plant^{-1} and seed germination. The variabilities recorded were highest in seed yield plant^{-1} and dry matter yield plant^{-1}, and moderate for pod weight, seed weight pod^{-1} and 100-seed weight. The heritability estimates were high for dry matter yield plant^{-1} and seed yield plant^{-1}, moderate for 100-seed weight, seed weight pod^{-1} and pod weight, and low for rest of the traits. Path analysis revealed that seed weight pod^{-1}, 100-seed weight, pod length, pod weight and seeds pod^{-1} had positive effect on seed yield, and indicated that these traits might help in identifying high yielding varieties of lablab bean.

Key words: *Lablab purpureus*, seed yield, heritability, genetic advance, correlation coefficients, path coefficients.

Lablab bean [*Lablab purpureus* (L.) sweet] is distributed in tropical regions of Asia and Africa, with wide adaptability and uses, including food and feed. It makes excellent growth under warm arid conditions and its deep root system makes it drought tolerant. A study was undertaken to assess the variability, magnitude and direction of association of its different seed traits and the cause and effect relationships.

Materials and Methods

Ten genotypes of lablab bean (CAZRI 1258, CAZRI 1461, CAZRI 1462, CAZRI 40-10, LP-S 2, LP 836, LP 29, LP 2216, LP 27 and Bundel Sem 1) were sown in 10 rows each, with a distance of 30 cm between rows and 25 cm within rows, in a randomized block design with three replications during *kharif*, 1997, at the Experimental Farm of Central Arid Zone Research Institute, Jodhpur. Randomly taken five plants provided the material for the evaluation of seven seed yield components, viz., seed yield plant^{-1} (g), seeds pod^{-1}, 100-seed weight (g), pod length (cm), pod weight (g), seed weight pod^{-1} (g) and dry matter yield plant^{-1} (g). Seed germination was estimated as per ISTA rules (Anonymous, 1985). The genotypic and phenotypic coefficients of variation, heritability and genetic advance were determined as suggested by Burton (1952) and Johnson *et al.* (1955). Correlation and path coefficients were worked out as suggested by Dewey and Lu (1959).

Results and Discussion

The analysis of variance revealed that the genotypes differed significantly for all the characters. The highest variabilities were recorded in seed yield plant^{-1} and dry matter yield plant^{-1}, and moderate for pod weight, seed weight pod^{-1} and 100-seed weight,

Table 1. Estimates of various variability parameters for seed yield and its components in Lablab purpureus

Characters	Range	Mean ± SEm	Genotypic coefficient of variation	Phenotypic coefficient of variation	Heritability (broad sense) (%)	Genetic advance (as % of mean)
Seed yield/plant (g)	3.46-6.76	4.82±0.474	20.87	24.10	75.0	37.24
Seed/pod	3.17-3.77	3.51±0.167	4.56	7.39	38.1	5.80
100-seed weight (g)	20.39-25.79	23.01±1.058	8.20	9.95	67.9	13.91
Seed weight/pod (g)	0.69-0.91	0.800±0.051	7.77	11.01	49.7	11.28
Pod weight (g)	0.85-1.18	1.04±0.061	8.19	10.88	56.7	12.71
Pod length (cm)	4.13-5.23	4.61±0.253	5.91	8.96	43.5	8.03
Seed germination (%)	62.33-77.33	69.93±3.893	5.40	8.70	38.6	16.92
Dry matter yield/ plant (g)	36.90-73.70	51.03±4.243	19.56	22.05	78.7	35.75

while the values were low for rest of the traits (Table 1). Iannucci and Martiniello (1998) reported highest variability for seed yield and dry biomass in four Mediterranean annual clovers. Seed yield plant^{-1}, 100-seed weight and number of seeds pod^{-1} had high variabilities in green gram (Borah and Hazarika, 1995). Therefore, possibilities exist to get better genotypes for higher seed yield in lablab bean.

The characters having high heritability and high genetic advance are mostly controlled by additive gene action (Panse, 1957). In the present study, the heritability estimates were high for dry matter yield plant^{-1} and seed yield plant^{-1}, moderate for 100-seed weight, seed weight pod^{-1} and pod weight, and low for rest of the traits. Therefore, it would be inferred that dry matter yield plant^{-1} and seed yield/plant were under the control of additive gene action, and improvement of these characters is possible through simple selection. Srinivasan and Vijendra Das (1996) observed that additive gene action played important role in the inheritance of dry matter yield plant^{-1} in fodder lablab. Borah and Hazarika (1995) also reported similar results for seed yield in greengram. Rest of the traits had low to moderate heritability and low to moderate genetic advance, suggesting that these traits were under the control of non-additive gene action. Patil and Shinde *et al.* (1995) reported similar findings for seeds pod^{-1} and pod length in greengram.

The seed yield was significantly and positively associated with seeds pod^{-1}, 100-seed weight, seed weight pod^{-1} and pod weight at genotypic as well as phenotypic levels. It was significantly and positively associated with pod length only at genotypic level (Table 2). Shinde *et al.* (1996) also reported significant genotypic correlation between seed yield plant^{-1} and seeds pod^{-1} in soybean. Among the other characters, seeds pod^{-1} exhibited positive correlation with 100-seed weight, seed weight pod^{-1} and pod weight, but it was negatively correlated with seed germination

Table 2. Genotypic (G) and phenotypic (P) correlation coefficients for seed yield and its components in Lablab purpureus

Characters		Seed yield/ plant	Seeds/ pod	100-seed weight	Seed weight/ pod	Pod weight	Pod length	Seed germi-nation	Dry matter yield/ plant
Seed yield/p	G	1.000	0.756**	0.863**	0.757**	0.433**	0.433**	0.169	0.025
	P	1.000	0.286*	0.672**	0.518**	0.447**	0.193	0.002	-0.028
Seeds/pod	G		1.000	0.730**	0.629**	0.474**	0.118	-0.749**	-0.391**
	P		1.000	0.223	0.202	0.037	-0.042	-0.214	-0.265
100-seed/wt.	G			1.000	0.949**	0.756**	0.408**	0.279*	0.485**
	P			1.000	0.657**	0.652**	0.252	0.018	0.310**
Seed wt./pod	G				1.000	0.972**	0.819**	0.231	0.544**
	P				1.000	0.765**	0.397**	0.074	0.401**
Pod weight	G					1.000	1.033**	0.723**	0.705**
	P					1.000	0.616**	0.160	0.515**
Pod length	G						1.000	0.714**	0.420**
	P						1.000	0.366*	0.418**
Seed germ.	G							1.000	0.784**
	P							1.000	0.520**
Dry matter/p	G								1.000
	P								1.000

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

and dry matter yield. One hundred seed weight was positively associated with seed weight pod^{-1}, pod weight, pod length, seed germination and dry matter yield. Seed weight pod^{-1} with pod weight, pod length and dry matter yield plant^{-1}, pod weight with pod length, and seed germination with dry matter yield also showed significant and positive correlation with seed yield and were also positively correlated to each other. Therefore, selection for these characters, besides seed yield, could result in further seed yield improvement.

Path coefficient analysis revealed that the direct effects of seed weight pod^{-1}, 100-seed weight and pod length on seed yield were positive and of greater magnitude than direct effects of the other traits (Table 3). Kumar *et al.* (1995) also reported such findings in greengram. Pod weight and seed pod^{-1} had significant and positive genotypic correlation with seed yield, but the partitioning of the relationship into its components showed that the direct effects of these traits were negative and the correlation was the clear case of component compensation in determining the seed yield.

The findings of the study revealed that seed weight pod^{-1}, 100-seed weight, seed pod^{-1}, pod length and pod weight were the most important characters contributing to seed yield. It is suggested that these traits may be given due consideration during selection programme to evolve high yielding *Lablab purpureus* variety.

Table 3. Direct (diagonal) and indirect effects of component characters on seed yield in Lablab purpureus

Characters	Seeds/pod	100-seed weight	Seed weight/pod	Pod weight	Pod length	Seed germination	Dry matter yield/plant	Genotypic 'r' with seed yield/plant
Seeds/pod	*-3.327*	2.190	2.989	-2.233	0.192	-0.172	1.117	0.756**
100-seed wt.	-2.429	*3.000*	4.514	-3.565	0.663	0.064	-1.384	0.863**
Seed wt./pod	-2.029	2.848	*4.754*	-4.583	1.330	0.053	-1.554	0.757**
Pod wt.	-1.577	2.269	4.623	*-4.712*	1.679	0.166	-2.015	0.433**
Pod length	-0.393	1.224	3.891	-4.867	*1.625*	0.164	-1.201	0.443**
Seed germ.	2.491	0.838	1.097	-3.408	1.161	*0.230*	-2.239	0.169
Dry matter/p	1.301	1.454	2.587	-3.324	0.683	0.180	*-2.856*	0.025

**Significant at 1% level. Residual effect = -1.315.

References

Anonymous 1985. International rules for seed testing. *Seed Science and Technology* 13: 299-513.

Borah, H.K. and Hazarika, M.H. 1995. Genetic variability and character association in some exotic collections of greengram. *Madras Agricultural Journal* 82: 268-271.

Burton, G.W. 1952. Quantitative inheritance in grasses. *Proceedings of the 6th Grassland Congress* 1: 277-283.

Dewey, D.R. and Lu, K.H. 1959. A correlation and path coefficient analysis of components of crested wheat grass seed production. *Agronomy Journal* 51: 515-518.

Iannucci, A. and Martiniello, P. 1998. Analysis of seed yield components in four Mediterranean annual clovers. *Field Crops Research* 55: 235-243.

Johnson, H.W., Robinson, H.F. and Comstock, R.E. 1955. Estimates of genetic and environmental variability in soybeans. *Agronomy Journal* 47: 314-318.

Kumar, S.S., Sudarshanam, A., Vinod Kumar, S. and Narasimha Reddy, V. 1995. Correlation and path-coefficient analysis in green gram (*Vigna radiata*). *Madras Agricultural Journal* 82: 160- 162.

Panse, V.G. 1957. Genetics of quantitative characters in relation to plant breeding. *Indian Journal of Genetics and Plant Breeding* 17: 318-328.

Patil, H.S. and Shinde, Y.M. 1995. Genetic variability in green gram. *Madras Agricultural Journal* 82: 490-491.

Shinde, A.K., Birari, S.P., Bhave, S.G. and Joshi, R.M. 1996. Correlation and path coefficient analysis in soybean (*Glycine max* L. Merrill). *Annals of Agricultural Research* 17: 28-32.

Srinivasan, C.D. and Vijendra Das, L.D. 1996. Combining ability in fodder lablab. *Madras Agricultural Journal* 83: 621-622.