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GENETIC VARIABILITY AND CORRELATION STUDIES IN SEM [*LABLAB PURPUREUS* (L.) SWEET]

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Introduction

Indian bean popularly known as Sem, is one of the important annual and perennial legume vegetable with twining, creeping or bushy habits. Green pods provide about 24.9 per cent protein in addition to vitamins and minerals. (Gopalan *et al.* 3).For genetic amelioration of crop plants, the assessment of available genetic variability is pre-requsite. Large genetic variability in the inital material ensures chances of obtaining desired genotypes. The present study was planned to estimate genetic variability, heritability and genetic advance in respect of various components of pod yield, to analyse the association pattern among them.

Material and Methods

The materials for the present study, comprising eighteen diverse genotypes of Sem [*Lablab purpureus* (L.) Sweet], was grown in a randomized block design with three replications during kharif, 1982. The inter and intra-row spacings were 2.5 m and 0.4m, respectively. Plants were supported by bamboo poles. From each entry, five plants were randomly taken for recording data on days to first flowering, days to first picking, number of flowers per cluster, number of pods per cluster, 100-seed weight, pod length, pod width and green pod yield per plant. Genotypic and phenotypic coefficients of variation were calculated according to Burton and De-vane (2). Heritability estimates were obtained following the method of Hanson *et al.* (4). The genetic advance and correlation coefficients were obtained following Johnson *et al.* (5).

Results and Discussion

Analysis of variance showed that genotypes differed significantly for yield as well as other yield components, The mean value for all the eight characters are presented in Table 1. The range, general mean coefficient of genetic variation, heritability and genetic advance are given in Table 2. Strains FD-1 and JDL-77 were found to be earliest and latest in flowering, respectively. Number of flowers per cluster ranged from 10.73-22.87. The maximum number of flowers per cluster was recorded in strains FD-8 followed by 7010 and FD-5 and minimum with JDL-85. Significant variation was also observed for number of pods per cluster. Maximum number of pods per cluster was found in FD-8 and minimum in JDL-53 Seed weight varied from 25.07-49.95 g in FD-1 and HD-60, respectively. The pod length and width varied significantly, Genotypes 6802, JDL-71, FD-5 and HD-60 were found desirable.

TABLE 1

Mean values for eight characters in Sem

S. No.	Strains	Days to first flowering	Days to first picking	No. of flowers per cluster	No. of pods per cluster	100-seed weight (g)	Pod length (cm)	Pod width (cm)	Green pod yield per plant (kg)
1.	FD-1	67.33	87.67	15.27	7.23	25.070	10.54	1.33	0.93
2.	FD-5	111.00	131.67	17.87	9.53	30.287	13.11	1.54	1.38
3.	FD-8	118.67	142.67	22.87	13.93	37.482	12.46	1.60	1.32
4.	HD-60	97.33	119.33	11.67	6.47	49.959	12.05	2.78	2.91
5.	JDL-17	97.67	116.00	17.27	5.20	45.107	9.81	2.21	2.00
6.	JDL-37	126.67	148.00	11.47	6.60	44.301	9.84	4.70	2.57
7.	JDL-53	79.00	99.33	13.33	4.90	33.609	9.33	2.47	2.55
8.	JCL-71	131.00	149.67	14.47	7.93	33.689	14.14	2.87	1.02
9.	JDL-77	132.33	152.00	11.87	7.20	40.178	11.37	1.97	1.70
10.	JDL-79	132.00	151.67	11.73	5.53	40.021	9.70	3.68	2.22
11.	JDL-85	97.67	118.33	10.73	6.53	46.800	11.45	2.99	2.81
12.	Lal Sem	83.67	102.00	20.07	7.67	36.819	7.73	2.86	2.26
13.	Rajani	107.33	126.00	14.33	6.50	34.752	10.52	1.31	1.33
14.	Type-2	123.33	148.67	10.73	6.07	39.538	10.24	3.58	2.65
15.	6802	113.67	134.67	16.33	8.87	47.362	14 24	2.74	1.58
16.	7010	114.67	135.33	17.93	7.67	33.408	10.63	2.70	3.21
17.	7015	130.33	151.00	12.40	8.00	34.634	11.42	3.88	2.39
18.	7023	107.00	127.67	12.80	5.60	33.287	9.41	1.58	0.95
C. D. at 5%		6.59	6.57	4.16	2.44	3.75	0.89	0.32	1.18
C. D. at 1%		8.88	8.85	5.16	3.29	5.06	1.21	0.44	1.59

TABLE 2

General mean, range, coefficients of variation, heritability and expected genetic advance in per cent of mean for eight characters in Sem

S. No.	Characters	General mean	Range	Coefficient of variation			Herita-bility (%)	Expected genetic advance in % of mean
				Pheno-typic	Geno-typic	Environ-mental		
1.	Days to first flowering	109.48	67.33 — 132.33	17.91	17.54	3.61	95.92	35.37
2.	Days to first picking	130.07	87.67 — 152.00	15.41	15.10	3.03	96.12	30.50
3.	Number of flowers per cluster	14.61	10.73 — 22.87	27.53	21.56	17.12	61.30	34.77
4.	Number of pods per cluster	7.32	4.9 — 13.93	32.65	25.78	20.03	62.34	96.58
5.	100-seed weight (g)	37.46	25.07 — 49.95	17.61	16.59	5.88	88.85	32.21
6.	Pod length (cm)	11.00	7.73 — 14.24	16.12	15.35	4.91	90.69	30.09
7.	Pod width (cm)	2.60	1.31 — 4.70	37.20	36.50	7.33	95.12	73.84
8.	Green pod yield per plant (kg)	1.99	0.93 — 3.27	47.16	30.67	35.83	42.27	41.20

TABLE 3

Correlation coefficients among eight characters in Sem

S. No.	Characters		Days to first flowering	Days to first picking	No. of flowers per cluster	No of pods per cluster	100-seed weight (g)	Pod length (cm)	Pod width (cm)	Green pod yield per plants (kg)
1.	Days to first flowering	(P)		0.991**	—0.174	0.151	0.254	0.352	0.422	0.037
		(G)		0.998**	—0.256	0.207	0.282	0.379	0.439	0.020
2.	Days to first picking	(P)			—0.171	0.178	0.259	0.369	0.436	0.059
		(G)			—0.256	0.234	0.287	0.381	0.443	0.046
3.	No. of flowers per cluster	(P)				0.658**	—0.353	0.127	—0.406	0.253
		(G)				0.730**	0.264	0.083	—0.497	0.234
4.	No. of pods per cluster	(P)					—0.123	0.480*	—0.238	—0.248
		(G)					—0.179	0.581*	—0.299	—0.428
5.	100-seed weight (g)	(P)						—0.395	0.783**	0.318
		(G)						0.217	0.458	0.491*
6.	Pod length (cm)	(P)							—0.118	—0.199
		(G)							—0.139	—0.393
7.	Pod width (cm)	(P)								0.492*
		(G)								0.783*
8.	Green pod yield per plant (kg)	(P)								
		(G)								

Significant differences were recorded for green pod yield per plant. Genotype 7010 gave maximum yield per plant followed by HD-60, JDL-85 and JDL-37 whereas FD-1 was the lowest yielding. Thus, the lines which showed higher mean values can be tested for their combining ability and utilized in the hybridization programme.

The coefficient of genetic variation was lowest (15.10 per cent) for days to first picking and highest for pod width (36.5 per cent) and green pod yield per plant (30.67 per cent). Highest coefficient of genetic variability revealed the possibilities that the desired type can be selected. Contrary to this, chances of improvement were low for days to first picking as genetic coefficient of variability was low. These findings are in a agreement with that of Pandey and Dubey (6) for number of flowers per inflorescence, number of fruit per cluster, size of pod and yield per plant. All the characters indicated high heritability values; the days to first picking showed highest heritability estimate. The genetic gain for number of pods per cluster was highest (96.58) and lowest for length of pod (30.09). Genetic gain for other characters were also fairly high.

High heritability associated with high genetic gain, if considered together are more useful than heritabillty alone (Johnson *et al*, 5). In the present study, high heritability for days to first flowering was not associated with high genetic gain, indicating less scope for improvement by selection for this character. Similar were the findings of Aggarwal and Kang (1). However, in case of pod width and number of pod per cluster, the higher genetic gain was associated with higher heritability values indicating the presence of additive genetic variation for these traits. Therefore, it must be worthwhile to select for these two characters.

Information on correlation coefficient is useful in many ways It is particularly useful if the breeder has to resort to indirect selection. As evident from Table 3. The green pod yield per plant showed significant and positive correlation with pod width and 100-seed weight. Obviously, selection for these two traits can be effective in bringing about the improvement in pod yield. Notably these characters also had high heritability. Therefore, one expects high degree of correlated response. Singh and Singh (8) also found similar results. Srivastava *et al.* (9) reported significant and positive genotypic correlation between pod yield and pod width. Highly signficant and positive correlation were found for days to first flowering with days to first picking, number of flowers per cluster with number of pod per cluster, 100-seed weight with pod width. Significant and positive correlation was also found between number of pod and pod length. Thus most of the correlations appeared to be in desired directions. It is, therefore, possible to combine them in a selection index for making selection of all of them simultaneously.

Summary

Eighteen genotypes were evaluated for eight characters with regard to genetic variability and correlation pattern in Sem. Highly significant differences were observed among the genotypes for all the characters. Pod width and number of pods per cluster showed higher genetic gains associated with higher heritability estimates. Yield was positively correlated with pod width and 100-seed weight.

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