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Variability, heritability, correlation and genetic divergence studies in dolichos bean (*Lablab purpureus* L.)

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ABSTRACT

Variability, heritability, correlation and genetic divergence were studied in 30 strains of dolichos bean (*Lablab purpureus* L.) for various growth and yield attributing parameters. High phenotypic and genotypic coefficient of variation was found in number of flowers per cluster, fresh green pod yield per plant, green pod yield per hectare, and mineral content. High heritability and expected genetic advance was found in number of flowers per cluster, vine length, weight of 10 green pods, fresh green pod yield per plant, and green pod yield per hectare. Genotypic correlation was higher than phenotypic correlation. Yield per plant was positively and significantly correlated with number of branches per plant, number of pods per cluster, number of pods per plant, weight of 10 green pods, number of clusters per plant, and number of flowers per cluster. For genetic divergence studies, the genotypes were grouped into 11 clusters on the basis of relative magnitude of D^2 values. Maximum intercluster distance was recorded between Clusters VII and I, indicating a wide diversity among these two clusters. Minimum intercluster distance was observed between Clusters IX and VIII, indicating their close relationship. Thus, Clusters VII and I were generally the most divergent from the other clusters. Intra-cluster value was highest for Cluster IX. Intra-cluster distance was least for Clusters VI and X. Among the genotypes, SC-5, SC-7, SC-11, SC-16 and SC-17 were the best in traits related to yield compared to the Check, PS-2.

Key words: Dolichos bean, genetic variability, heritability, genetic advance, genetic divergence

INTRODUCTION

Dolichos bean (*Lablab purpureus*. L.) is an important vegetable legume crop grown throughout the country. India is the centre of diversity for dolichos bean, and a large numbers of indigenous strains are available in Northern India. Although this crop originated in India, very little work has been done for its genetic improvement. A great range of variation exists for plant and pod characters among the accessions grown all over the country. Planning and execution of a breeding programme for improving quantitative attributes depends, to a great extent, on the magnitude of genetic variability available. Several of the plant traits are governed by polygenes, greatly influenced by environmental conditions. There is a need to partition the overall variability into heritable and non-heritable components. Knowledge on genetic diversity, its nature, degree of variability and interrelationship between traits is useful in selecting suitable parents to initiate a successful breeding programme. Therefore, the present investigation was carried out to elucidate genetic variability, genetic gain, heritability and interrelationship using correlation, in a collection of strains of dolichos bean (*Lablab purpureus* L.).

MATERIAL AND METHODS

The experiment was laid out in Randomized Block Design, with three replications, at the Department of Vegetable Science, Punjab Agricultural University, Ludhiana. Each entry comprised 20 plants, at a spacing of 1.25m from ridge-to-ridge, and 0.45m from plant-to-plant. Data were recorded on all the characters pertaining to the study. Five plants selected randomly from each treatment were selected for different agronomic traits, viz., days taken to 50% germination, days to flowering, days to first-pod set, days to first picking, number of branches per plant, number of flowers per cluster, number of pods per cluster, number of pods per plant, number of clusters per plant, vine length

(cm), length of pod (cm), breadth of pod (cm), weight of 10 green pods (g), fresh green-pod yield per plant (kg), green-pod yield per hectare (q/ha), protein content (%), and dry matter content (%). Genotypic coefficient of variation was estimated as per Burton and Devance (1953). Heritability and genetic advance were calculated as per Allard (1999) and correlation was estimated as per Al-Jibouri *et al* (1958). All the biochemical parameters were determined as per A.O.A.C. (1970). Mahalanobis D^2 statistic, as detailed by Rao (1952) was applied to assess genetic divergence between genotypes.

RESULTS AND DISCUSSION

Analysis of Variance (ANOVA) revealed significant differences among various characters under study, indicating a high degree of variability in the material (Table 1). Days-to-first-picking were minimum in SC-29, and maximum in SC-19. Number of pods per cluster was highest in PS-2 and lowest in SC-21. Highest number of pods per plant was seen in SC-11, and, the lowest in SC-24 and SC-25. Length and breadth of the pod was maximum in SC-9, while, it was minimum in SC-15. Least breadth of pod was seen in SC-14. Fresh green-pod yield was maximum in SC-17, and minimum in SC-13. Crude protein content was maximum in SC-17, and minimum in SC-25. Highest soluble protein content was recorded in SC-30, and lowest in SC-29. Dry matter content was highest in SC-8, and the least in SC-25.

Genetic variability

A wide range of variation was observed for all the characters under study (Table 2). Phenotypic coefficient of variation ranged from 17.67 to 47.37. Highest phenotypic coefficient of variation existed for number of flowers per cluster (47.37), followed by fresh green-pod yield per plant (46.47) and green-pod yield per hectare (46.47). High- to moderate-phenotypic variability for pod yield per plant was

Table 1. Mean performance of some genotypes of dolichos bean

Sl. no.	Dolichos strain (genotype)	Days to first picking	Number of pods per cluster	Number of pods per plant	Length of pod (cm)	Breadth of pod (cm)	Fresh green-pod yield per plant (kg)	Crude protein (%)	Soluble protein (%)	Dry matter content (%)	Mineral content (%)
1	SC-1	119.62	6.58	196.67	11.66	1.58	0.58	14.69	17.50	12.64	1.36
2	SC-2	103.27	6.33	151.89	8.25	2.82	1.57	17.63	15.03	19.26	0.10
3	SC-3	102.93	7.25	155.00	8.72	2.32	1.38	15.67	14.30	16.80	0.74
4	SC-4	101.93	5.00	107.67	10.67	2.94	0.75	14.95	14.10	16.28	2.00
5	SC-5	103.73	9.08	240.64	6.79	2.16	1.33	21.35	20.93	23.35	2.66
6	SC-6	110.60	6.92	231.87	8.37	1.53	0.90	18.89	21.37	18.33	0.74
7	SC-7	101.60	9.13	288.56	9.29	2.03	1.30	20.54	20.97	23.36	1.36
8	SC-8	98.60	9.10	240.22	6.86	2.36	0.80	21.37	20.47	23.77	2.34
9	SC-9	108.8	4.37	109.83	12.66	3.03	0.73	13.26	12.53	12.36	2.66
10	SC-10	92.07	7.97	333.33	7.00	1.45	1.14	12.66	14.13	12.31	2.34
11	SC-11	90.20	7.72	370.42	8.44	1.52	1.35	13.27	11.93	13.32	2.66
12	SC-12	88.73	6.87	309.53	8.25	1.50	1.06	18.03	12.27	16.40	2.00
13	SC-13	87.40	7.00	115.60	6.67	1.41	0.28	13.76	18.53	12.74	1.36
14	SC-14	86.40	5.33	238.70	7.33	1.34	0.60	12.91	19.13	12.62	0.74
15	SC-15	88.87	9.48	275.20	5.74	1.52	0.91	19.08	16.17	20.65	1.36
16	SC-16	106.80	5.23	158.50	7.58	1.82	1.30	16.14	13.00	17.50	2.00
17	SC-17	116.40	5.93	253.56	8.29	2.22	2.24	21.46	15.67	22.71	1.36
18	SC-18	132.73	5.75	136.67	6.57	1.62	0.63	14.18	21.43	16.13	0.74
19	SC-19	154.60	5.77	145.25	6.65	1.90	0.57	16.11	12.10	16.87	0.74
20	SC-20	152.60	10.63	140.00	7.13	1.84	0.70	18.90	12.00	22.81	2.34
21	SC-21	148.60	2.77	100.00	6.36	1.78	0.50	17.20	14.30	17.29	0.74
22	SC-22	144.87	4.50	166.67	7.00	1.91	0.61	16.48	15.10	16.19	0.74
23	SC-23	139.20	4.08	123.33	6.57	2.04	0.67	15.67	13.37	16.57	2.66
24	SC-24	150.00	3.00	93.33	7.09	2.23	0.43	18.76	12.00	19.35	1.36
25	SC-25	151.93	4.17	93.33	7.19	2.05	0.39	12.02	12.33	11.77	1.36
26	SC-26	143.60	7.52	146.67	10.40	2.14	0.67	13.74	12.77	14.01	2.00
27	PS-2	107.40	12.57	160.00	11.23	1.99	1.19	17.13	21.13	15.47	2.66
28	SC-28	136.27	7.17	175.00	10.06	2.06	0.96	12.75	13.03	12.48	2.66
29	SC-29	51.60	10.17	271.67	9.08	1.57	1.04	16.17	11.10	15.81	2.34
30	SC-30	111.73	5.42	223.33	11.33	1.72	1.16	14.32	23.00	12.60	2.66
	CD *(P=0.05)*	1.54	1.12	32.17	0.52	0.14	0.18	1.19	1.40	1.27	0.69

Table 2. General mean, range and components of variance for 17 characters in dolichos bean

Character	General mean	Range	Genotypic coefficient of variation	Phenotypic coefficient of variation	Coefficient of variation	Heritability h^2 (%)	Expected genetic gain	Genetic advance (%)
Days taken to 50% germination	6.63	4.33 - 9.33	17.25	20.37	10.83	71.73	2.00	30.10
Days to flowering	90.88	34.73 - 127.47	25.57	25.62	1.51	99.65	47.80	52.59
Days to first-pod set	99.02	41.20 - 133.40	22.88	22.92	1.28	99.69	46.61	47.07
Days to first picking	114.44	51.60 - 154.60	22.43	22.44	0.82	99.87	52.84	46.17
Number of branches per plant	15.16	10.87 - 19.27	17.30	18.22	5.71	90.19	5.13	33.85
Number of flowers per cluster	14.43	3.02 - 25.05	46.31	47.37	9.97	95.57	13.46	93.26
Number of pods per cluster	7.30	2.00 - 12.57	38.06	39.60	10.90	92.42	4.75	75.38
Number of pods per plant	191.75	93.33 - 370.42	39.47	40.79	10.27	93.66	150.89	78.69
Number of clusters per plant	23.72	14.08 - 45.58	35.15	36.66	10.41	91.93	16.47	69.43
Vine length (cm)	344.98	70.83 - 580.67	38.38	38.49	2.85	99.45	272.03	78.85
Length of pod (cm)	8.31	5.74 - 12.66	22.01	22.34	3.87	97.00	3.71	44.65
Breadth of pod (cm)	1.95	1.34 - 3.03	22.55	22.96	4.35	96.41	0.89	45.60
Weight of 10 green pods (g)	50.66	24.59 - 103.33	39.52	40.48	8.73	95.35	40.27	79.50
Fresh green-pod yield per plant (kg)	0.93	0.28 - 2.24	44.86	46.47	12.13	93.19	0.83	89.20
Green-pod yield (q/ha)	157.32	48.34 - 380.80	44.86	46.47	12.12	93.19	140.34	89.21
Protein content (%)	16.30	12.02 - 21.46	17.09	17.67	4.48	93.56	5.55	34.05
Dry matter content (%)	16.73	11.77 - 23.77	22.39	22.87	4.65	95.87	7.55	45.17

reported by Kabir and Subir (1987) and Vashi *et al* (1999). Phenotypic variation alone does not reveal the relative amount of variation; hence, different aspects of genetic parameters were worked out. In our experimental material, genotypic variability for characters under study ranged from 17.09 to 44.86. Maximum genotypic coefficient of variation was observed for number of flowers per cluster (46.31), followed by fresh green-pod yield per plant, and green-pod yield per hectare (44.86 each). Similar results were reported by Borah and Shadeque (1992) and Uddin and Newaz (1997).

Selection is favoured when a major proportion of the large amount of phenotypic variability is a tributable to heritable variation. Burton and Devance (1953) stated that heritability alone was not enough to make efficient selection in the segregating generation, unless heritability was accompanied by a substantial amount of genetic advance. In the present investigation, number of flowers per cluster, number of pods per cluster, number of pods per plant, vine length, weight of 10 green pods, fresh green-pod yield per plant, and green-pod yield per hectare accounted for higher heritability (99.45% to 92.42%) and higher genetic advance (93.26% to 75.38%). These results are in conformity with Singh *et al* (1979), Uddin and Newaz (1997) and Bendale *et al* (2004).

Correlation

It is important to study inter-relationships between various characters. As most traits of economic importance in crop plants depend upon one or the other trait, the degree of expression of one trait increases or decreases with an increase or decrease in the other character. A trait such as yield is dependent on more than one contributing traits. It is important to learn of the association between yield and its components, as, this provides valuable information on a correlated response to selection. Highly significant and positive phenotypic correlation (Table 3) was observed between pod yield per plant and six other yield-related components, viz., number of branches per plant, number of pods per cluster, number of pods per plant, weight of 10 green pods, number of clusters per plant and number of flowers per cluster. Also, yield per plant was significantly and positively correlated to protein content and dry matter content.

Therefore, selection for yield and its positively-correlated characters, should result in a correlated response

Table 3. Phenotypic (rp) and genotypic (rg) correlation coefficient between various pairs of characters in *Dolichos lablab*

Character		Days taken to 50% germination	Days to flowering	Days to first-pod set	Days to first picking	Number of branches per plant	Number of flowers per cluster	Number of pods per cluster	Number of pods per plant
Days to flowering	rg	0.0874							
	rp	0.0773							
Days to first-pod set	rg	0.1340	0.9716						
	rp	0.1193	0.9700**						
Days to first picking	rg	0.0800	0.9598	0.9929					
	rp	0.0706	0.9579**	0.9911**					
Number of branches per plant	rg	0.0036	0.5089	0.5226	0.5329				
	rp	0.0308	0.4812**	0.4951**	0.5060**				
Number of flowers per cluster	rg	-0.2768	-0.6388	-0.6539	-0.6320	0.5571			
	rp	-0.2210*	-0.6206**	-0.6354**	-0.6154**	0.5048**			
Number of pods per cluster	rg	-0.4606	-0.4139	-0.4094	-0.4057	0.3493	0.6984		
	rp	-0.3940**	-0.3955**	-0.3955**	-0.3892**	0.3291**	0.6562**		
Number of pods per plant	rg	-0.3132	-0.6856	-0.6688	-0.6398	0.6900	0.6934	0.3951	
	rp	-0.2246*	-0.6622**	-0.6460**	-0.6174**	0.6801**	0.6490**	0.3643**	
Number of clusters per plant	rg	-0.3431	0.1604	0.1380	0.1511	0.2550	-0.0178	0.2626	0.0945
	rp	-0.2946**	0.1532	0.1321	0.1438	0.2287*	-0.0019	0.2454*	0.1094
Vine length (cm)	rg	0.0041	0.6797	0.6974	0.6780	0.2545	-0.6486	0.2852	0.4127
	rp	-0.0023	0.6761**	0.6935**	0.6754**	0.2404*	-0.6328**	0.2758**	0.3994**
Length of pod (cm)	rg	0.1446	0.1618	0.1255	0.1474	-0.1582	0.0756	0.0855	-0.0407
	rp	0.1343	0.1587	0.1235	0.1440	-0.1586	0.0675	0.0839	-0.0252
Breadth of pod (cm)	rg	0.4004	0.2292	0.2184	0.1956	-0.0241	-0.3791	-0.125	-0.4696
	rp	0.3186**	0.2224*	0.2127*	0.1909	-0.0267	-0.3760**	0-0.1067	-0.4509**
Weight of 10 green pods (g)	rg	0.3497	0.1634	0.1172	0.0542	0.2212	-0.1642	0.0368	-0.3042
	rp	0.3093**	0.1580	0.1117	0.0532	0.2118*	-0.1493	0.0395	-0.2898**
Fresh green-pod yield per plant (kg)	rg	0.0494	-0.3415	-0.3701	-0.3978	0.7318	0.4544	0.3447	0.5210
	rp	0.0740	-0.3297**	-0.3590**	-0.3827**	0.7156**	0.4311**	0.3296**	0.5324**
Green-pod yield (q/ha)	rg	0.0496	-0.3413	-0.3699	-0.3976	0.7316	0.4543	0.3466	0.5208
	rp	0.0743	-0.3295**	-0.3588**	-0.3825**	0.7154**	0.4310**	0.3294**	0.5323**
Protein content (%)	rg	-0.3419	-0.0110	-0.0767	-0.0532	-0.3503	0.3604	0.3631	0.2076
	rp	-0.2757**	-0.0056	-0.0759	-0.0511	-0.3192**	0.3382**	0.3330**	0.1953
Dry matter content (%)	rg	-0.2406	-0.0757	-0.0002	-0.0226	-0.2782	0.3080	0.3679	0.1323
	rp	-0.1784	-0.0725	-0.0013	-0.0223	-0.2500*	0.3017**	0.3350**	0.1287

Characters		Number of clusters per plant	Vine length (cm)	Length of pod (cm)	Breadth of pod (cm)	Weight of 10 green pods (g)	Fresh green-pod yield per plant (kg)	Green-pod yield (q/ha)	Protein content (%)
Days to flowering	rg								
	rp								
Days to first-pod set	rg								
	rp								
Days to first picking	rg								
	rp								
Number of branches per plant	rg								
	rp								

Continued

Table 3. Continued...

Character		Number of clusters per plant	Vine length (cm)	Length of pod (cm)	Breadth of pod (cm)	Weight of 10 green pods (g)	Fresh green-pod yield per plant (kg)	Green-pod yield (q/ha)	Protein content (%)
Number of flowers per cluster	rg								
	rp								
Number of pods per cluster	rg								
	rp								
Number of pods per plant	rg								
	rp								
Number of clusters per plant	rg								
	rp								
Vine length (cm)	rg	0.2425							
	rp	0.2349*							
Length of pod (cm)	rg	-0.1121	0.0620						
	rp	-0.1021	0.0606						
Breadth of pod (cm)	rg	0.2702	0.2709	0.3706					
	rp	0.2625*	0.2668*	0.3585**					
Weight of 10 green pods (g)	rg	-0.3444	0.1616	0.2786	0.6803				
	rp	-0.3134**	0.1580	0.2618*	0.6519**				
Fresh green-pod yield per plant (kg)	rg	0.3070	0.1823	0.1756	0.1789	0.6233			
	rp	0.2622*	0.1756	0.1679	0.1632	0.6198**			
Green-pod yield (q/ha)	rg	0.3069	0.1821	0.1758	0.1791	0.6234	1.0000		
	rp	0.2622*	0.1754	0.1681	0.1633	0.6199**	1.0000**		
Protein content (%)	rg	-0.4900	-0.2698	0.2852	0.1560	0.1881	0.4091	0.4090	
	rp	-0.4536**	-0.2581*	0.2625*	0.1423	0.1772	0.3787**	0.3785**	
Dry matter content (%)	rg	-0.4097	-0.1992	0.3846	0.2307	0.2375	0.3766	0.3765	0.9600
	rp	-0.3905**	-0.1956	0.3736**	0.2219*	0.2332*	0.3609**	0.3607**	0.9174**

*Significant at 5% level of significance; **Significant at 1% level of significance

for increase in yield. These positive correlations between yield and its contributing characters show simple, indirect selection criteria for developing high-yielding cultivars. Similar results were reported by Nandi *et al* (1997) and Uddin and Newaz (1997). Genotypic correlation between yield and other traits was slightly higher in magnitude and similar in direction to the corresponding phenotypic correlation. Other characters like vine length and length and breadth of the pod, had a positive but non-significant phenotypic correlation with pod yield. This shows that these characters cannot be treated as indices of higher pod yield. Such as association could be due to environmental factors, and cannot be used on its own. Pod yield was found to have a negative and significant correlation with days to flowering, days to first-pod set, and days to first picking.

Highest amount of phenotypic variation and coefficient of variation was recorded for mineral content. Highest amount of genotypic variation was recorded in fresh green-pod yield per plant. This suggests a high variability in the material and can be exploited further in improvement programmes. Lowest amount of phenotypic and genotypic coefficient of variation was seen in crude protein content; the lowest amount of coefficient of variation was found in days to first picking, indicating lesser variation in the material; thus, it cannot be exploited further in improvement programmes. High- to moderate- phenotypic variability estimate was earlier reported by Joshi (1971), Biju *et al* (2001), Bhatt (1970), Kabir and Subir (1987), Vashi *et al* (1999) and Lal *et al* (2005). Pandey and Dubey (1972) reported a narrow range of variation in protein content

There were narrow differences between phenotypic and genotypic coefficient of variation in all the characters studied, except mineral content, indicating a low environmental influence in expression of these characters.

This implies that phenotypic variability is a reliable measure of genotypic variability. Therefore selection for improvement in the trait is possible and effective on a phenotypic basis.

Genetic divergence

Based on D^2 values, 30 genotypes of dolichos bean grouped into eleven clusters (Table 4). Constellation of the genotypes into clusters was done as per Tocher's method (Rao, 1952). The range of D^2 values obtained in the present material was 70.95 to 27774.01. The lowest end of this D^2 range falls between SC-10 and SC-11, with the upper end in D^2 values falling between SC-25 and SC-29.

In the present study, genotypes collected from same place did not group together in the same cluster, viz., PS-2 and SC 29 (from New Delhi) grouped into Cluster III and VII, respectively. Genotype PS-2 (from New Delhi) and SC-3 and SC-28 (from Punjab) grouped in Cluster III; genotypes SC-12, SC-13, SC-14 and SC-15, were all from Bengaluru, but grouped into different clusters. Genotypes collected from Punjab were scattered from Cluster II to VII. These findings suggest that the pattern of clustering of genotypes is independent of their geographical origin. The same findings (distribution of genotypes into different groups being independent of the place of their collection/ development) were reported by Bhatt (1970), Biju *et al* (2001), and Lal *et al* (2005). This implies that genetic material from the same geographical region may provide a substantial diversity. This also indicates that forces other than eco-geographical differentiation (such as natural and human selection-pressure) can exert a considerable influence on genetic divergence.

Table 4. Clustering pattern in 30 genotypes of dolichos bean

Cluster No.	Genotype/s	Frequency
I	SC-21, SC-23, SC-24, SC-25, SC-26	5
II	SC-2, SC-16	2
III	SC-3, PS-2, SC-28, SC-30	4
IV	SC-1, SC-15	2
V	SC-5, SC-7	2
VI	SC-17	1
VII	SC-12, SC-29	2
VIII	SC-6, SC-8, SC-14	3
IX	SC-4, SC-9, SC-18, SC-19, SC-20, SC-22	6
X	SC-13	1
XI	SC-10, SC-11	2

Inter- and intra- cluster average D^2 values and distance ($\sqrt{D^2}$ values) among 30 genotypes of dolichos bean are presented in Table 5. Maximum inter-cluster distance was recorded between Clusters VII and I (D^2 value = 518.90), indicating a wide diversity between these two clusters; while, minimum inter-cluster distance (D^2 value 119.17) was observed between Clusters IX and VIII, indicating their close relationship. Thus, Clusters VII and I were generally the most divergent from other clusters. Intra-

Table 5. Inter- and intra- cluster (underlined) average D^2 and distance ($\sqrt{D^{2)}}$ values in 30 genotypes of dolichos bean

Cluster No.	I	II	III	IV	V	VI	VII	VIII	IX	X	XI
I	337.93 (18.38)										
II	326.05 (18.06)	68.98 (8.30)									
III	181.08 (13.46)	169.99 (13.04)	215.02 (14.66)								
IV	359.96 (18.97)	165.15 (12.85)	236.94 (15.39)	110.21 (10.50)							
V	333.81 (18.27)	122.72 (11.08)	168.24 (12.97)	128.96 (11.36)	50.72 (7.12)						
VI	384.64 (19.61)	186.23 (13.65)	215.50 (14.68)	293.51 (17.13)	173.72 (13.18)	0.00					
VII	518.90 (22.78)	255.61 (15.99)	374.78 (19.36)	164.28 (12.82)	222.42 (14.91)	348.47 (18.67)	70.34 (8.39)				
VIII	243.25 (15.60)	175.81 (13.26)	125.22 (11.19)	140.07 (11.83)	119.30 (10.92)	260.22 (16.13)	287.30 (16.95)	141.65 (11.90)			
IX	188.28 (13.72)	169.79 (13.03)	124.53 (11.16)	183.95 (13.56)	192.47 (13.87)	297.00 (17.23)	341.69 (18.48)	119.17 (10.92)	382.42 (19.55)		
X	468.08 (21.63)	280.76 (16.76)	383.90 (19.59)	194.16 (13.93)	309.61 (17.60)	450.69 (21.23)	221.08 (14.87)	305.76 (17.49)	290.45 (17.04)	0.00	
XI	326.52 (18.07)	238.93 (15.46)	187.65 (13.70)	223.31 (14.95)	132.81 (11.52)	213.08 (14.60)	312.43 (17.68)	145.80 (12.07)	250.42 (15.82)	413.18 (20.33)	51.81 (7.20)

cluster values ranged from 382.42 (19.55) for Cluster IX, to zero for Cluster VI and X. Of the clusters comprising more than one genotype, minimum intra-cluster value of 50.72 (7.12) was recorded for Cluster V.

Genotypes SC-17, SC-2, SC-3, SC-11 and SC-5 had a high pod-yield potential and other desirable economic traits, and thus, need to be tested extensively. However, a high expression of various characters was seen in different genotypes. Maximum expression for pod yield and protein content was seen in SC-17, while, that for number of branches per plant and number of pods per plant was maximum in SC-11, SC-10, SC-12, SC-7 and SC-15. Genotype SC-2 outnumbered all the others in respect of green-pod weight, while, SC-9 was rated as the best on the basis of pod length and pod breadth. Genotype SC-29 was the earliest to mature and of a bushy type, followed by SC-12, SC-13 and SC-14; while, SC-19, SC-20 and SC-25 were late-maturing genotypes. This indicated that a high expression of all these characters in a single genotype can be achieved through hybridization and selection.

Among the genotypes tested, SC-5, SC-7, SC-11, SC-16 and SC-17 were the best in terms of traits related to yield, over the Check, PS-2.

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