

Original Research Article

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Mean Performance of Cluster Bean Genotypes for Yield, Yield Parameters and Quality Traits

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ABSTRACT

The present investigation was carried out with 51 genotypes along with one check variety of cluster bean during *summer*, 2017 using Randomized Block Design with three replications. Significant variations were recorded among genotypes for growth, yield and quality parameters. Among the fifty one genotypes, three genotypes IC-200680 (121.50cm) and IC-140777 (114.50cm) were taller and two genotypes IC-140791 (36.90cm) and IC-140792 (40.90cm) were shorter. Two genotypes IC-200680 (11.50) and IC-140774 (11.00) recorded the higher number of branches. As revealed from the mean data, the genotypes IC-200696 (28.00) and IC-200711 (28.00) were found to be the earliest with respect to days to first flowering. The number of pods per plant, an important yield contributing trait, was the higher in the genotype IC-200680 (96.70) followed by IC-34344 (96.00). In respect of pod yield per plant, the genotypes IC-103295 (198.40g) and IC-34344 (177.60g) showed higher values. As far as pod characters are concerned, the genotype IC-140777 (11.50cm) recorded the highest pod length followed by IC-103295 (10.50cm), while two genotypes IC-140777 (10.80mm) and IC-140774 (10.60mm) exhibited higher pod girth and IC-39989 (2.05g) and IC-103295 (2.18g) recorded the higher pod weight. The number of seeds per pod was found to be the highest in the genotype IC-10323(9.00) and IC-34344 (9.00) followed by 140777 (8.50). The quality analysis exhibited a wide range for protein content, fiber content in pod and gum content in endosperm of the seed. The protein content was found to be the higher in the genotypes IC-28287 (24.50%) and IC-28795 (24.50%). The fibre content was found to be the higher in the genotypes IC-28795(9.03%) and IC-34344 (8.60%). The gum content was found to be the higher in the genotypes IC-9203 (33.10%) and IC-103295 (33.06%) in cluster bean. Hence, these germplasm can be considered for inclusion in further breeding programmes besides their release after extensive yield trials.

Keywords

Cluster bean, Mean performance, Yield, Yield parameters, Gum, Protein, Fibre content.

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Introduction

Cluster bean (*Cyamopsis tetragonoloba* (L.) Taub) crop with a chromosome number of $2n=2x=14$ which is popularly known as guar, chavli kayi, guari, khutti. It is a self-pollinated

crop belongs to the family Fabaceae. Cluster bean originated in India and Pakistan and is characterized as a short day erect or bushy annual plant (Purseglove, 1981). It is a

drought tolerant, warm season legume crop with deep and well developed root system, cultivated mainly as rain fed crop in arid and semi-arid regions during rainy (*khari*) season for vegetable, galactomannan gum, forage and green manure. Cluster bean is mainly cultivated for food, feed and fodder. Its young pods are used as vegetables, which also known for cheap source of energy (16 Kcal), protein (3.2g), fat (1.4 g), carbohydrate(10.8 g), vitamin A (65.3 IU), vitamin C (49 mg), calcium (57 mg) and iron (4.5 mg) for every 100 g of edible portion.

India is the major guar producer accounting for 80% of the world's production. In India, guar is being grown mainly in arid and semiarid regions of North Western states of Rajasthan, Gujarat, Haryana, Punjab, parts of Uttar Pradesh, Madhya Pradesh and Tamil Nadu covering about 3.34 million hectares with a production of 0.4 million tonnes of guar seed. Rajasthan occupies the largest area under guar cultivation (82.1%), followed by Haryana (8.6%), Gujarat (8.3%) and Punjab (1%) which in turn produced 64, 22, 12 and 2% guar seeds, respectively (Pathak *et al.*, 2010). Rajasthan is the largest producer accounting for 70% of total guar production followed by Gujarat, Haryana and Punjab. The productivity of cluster bean ranges from 474 kg/ha in Rajasthan to 1200 kg/ha in Haryana (Ahlawat *et al.*, 2013). Thus, the total area of cluster bean in India is 4.25 million hectare and production is 2.41 million tones with productivity of 0.57 million tones/ha in 2014.

Cluster bean is a mainly grown for its tender fruits for use as vegetable. It is also used as a nutritious fodder for livestock. Mucilaginous seed flour is used for making guar gum (galactomannan) utilized in textile, paper, cosmetic and oil industries throughout the world and is a useful absorbent for explosives (Smith, 1976). However, cluster bean

varieties with high yield potential coupled with high protein and gum content are need of the hour to recommend to rainfed community for its exploitation. Keeping the above in mind, the present investigation was taken up to study the mean performance of the genotypes for identification of high yielding varieties possessing high gum content.

Materials and Methods

The present investigation was carried out at College of Horticulture, Sri Konda Laxman Telangana State Horticultural University, Rajendra nagar, Hyderabad, Telangana state with 51 genotypes of cluster bean during *summer*, 2017. The experiment was laid out in Randomized Completely Block design with three replications. Each genotype was sown at 60cm x 15 cm row to row and plant to plant distance, respectively. Recommended fertilizer dose and cultural practices including need-based plant protection measures were followed to raise a good crop. Observations from five randomly selected plants of each genotype in each replication were recorded on sixteen quantitative traits *viz.*, plant height (cm), number of branches per plant, days to first flowering, days to 50 % flowering, number of clusters per plant, number of pods per cluster, number of pods per plant, pod length (cm), pod width (mm), pod weight(g), pod yield per plant (g), pod yield per hectare (q/ha), protein content (%), gum content(%) and fibre content(%). Data were subjected to the analysis of variance using RBD ANOVA (Panse and Sukhatme, 1978).

Results and Discussion

Analysis of variance (Table 1) revealed significant differences among the genotypes with respect to all the characters studied at one percent and five percent level of significance. It also revealed significant differences between genotypes for all the

characters indicating presence of sufficient amount of variability in all the 16 characters studied. Wide range of variability was observed for pod yield per plant (3827.64), plant height (1049.31) and number of pods per plant (666.74) indicating the scope for selection of initial breeding material for further improvement based on these characters.

The mean values (Table 2) for plant height exhibited a range from 36.90 cm to 121.90 cm with a grand mean of 65.02cm. Significantly highest plant height was recorded in IC-200680 (121.50 cm) and minimum plant height (36.90 cm) was recorded in IC-140791 among the 51 genotypes. IC-140777 (114.50cm) recorded statistically at par values with the higher value IC-200680 (121.50 cm). Twenty one genotypes were significantly taller than the grand mean of 65.02 cm. Twelve genotypes were significantly higher values than best check variety Pusa Navabahar (71.17 cm). These results are in concurrence with the findings of those reported by Rai *et al.*, (2012) and Girish *et al.*, (2013). The mean values for days to first flowering were ranged from 28.00 days to 38.00days with a mean of 32.21. The earliest flowerings were recorded in genotypes IC-200696 (28.00) and IC-200711 with 28.00 days, while late flowering were observed in IC-9203 (38.00) and IC-28287 with 38.00 days. Twenty two genotypes were found to flower later than the grand mean of 32.21days. Six genotypes were recorded earlier flower than best check variety Pusa Navabahar (30.00) days. The mean values for days to 50% flowering ranged from 38.00days to 48.00days with a grand mean of 43.25. The genotype IC-28795 had the 50% flower earlier in 38.00 days, whereas the genotype IC-9233p₃ recorded late days to 50% flowering in 48.00 days. Twenty five genotypes were found to flower earlier than the grand mean of 43.25 days. Twenty five

genotypes were recorded earlier 50% flowering than best check variety Pusa Navabahar (43.00) days. The data pertaining to this trait are in accordance with the studies conducted by Rai *et al.*, (2012).

The mean values for number of branches exhibited a range from nil to 11.50 with a grand mean of 7.26. The genotype Pusa Navabahar recorded minimum number of branches nil, while genotype IC-200680 recorded maximum number of 11.50 branches. Seven genotypes *viz.*, IC-140774 (11.00), IC-140777 (10.60), IC-28795 (10.60), IC-34344 (10.60), IC-10323 (10.50), IC-9052 (10.40) and IC-10333(10.20) recorded statistically at par values with the higher value IC-200680 (11.50). Twenty six genotypes were recorded significantly higher values than the grand mean of 7.26. The results pertaining to this trait are in accordance with the studies conducted by Anandhi and Oommen (2007) and Kapoor (2014). Number of clusters per plant exhibited a range from 9.60 to 24.80 with a grand mean of 16.92. The genotype IC-200680 recorded more number of clusters per plant 24.80, while the genotype 9233p₃ recorded lowest number of clusters per plant 9.60. Three genotypes *viz.*, IC-140777 (23.80), IC-140774 (22.80) and IC-200679 (23.60) were statistically at par values with highest number of clusters per plant IC-200680 (24.80). Twenty seven genotypes were recorded more clusters per plant than grand mean of 16.90. Thirty nine genotypes were showed higher number of clusters per plant than best check variety Pusa Navabahar (14.00). These results are in concurrence with the findings of those reported by Vir and Singh (2015) and Vikas and Ram (2015).

The mean values for number of pods per cluster were ranged from 3.10 to 5.60 with a grand mean of 4.35. The genotype IC-103295

recorded highest number of pods per cluster 5.60, while the genotype IC-10334 recorded lowest number of pods per cluster 3.10. Two genotypes IC-34344 (5.20) and IC-102829 (5.20) were statistically at par values with value of IC-103295 (5.60). Twenty nine genotypes were recorded more pods per cluster than mean (4.45). Forty four genotypes were showed significantly higher values than check variety Pusa Navabahar (3.60).

The results of this study collaborate with the results of Rai *et al.*, (2012) and Vikas and Ram (2015). Number of pods per plant ranges from 44.00 to 96.70 with a grand mean of 70.59. The genotype IC-200680 showed highest number of pods per plant 96.70, while the genotype IC-140787 showed lowest number of pods per plant (44.00). Nine genotypes *viz.*, IC- 9052 and IC-140777 (85.00), IC-177844 (85.10), IC-200679 (86.00), IC-10323 (88.00), IC-28795 (89.00),

IC -140774 (90.00), IC-103295 (91.00) and IC-34344 (96.00) were statistically at par with IC-200680 (96.70). Twenty nine genotypes showed the more number of pods per plant than mean value (70.59). The data pertaining to this trait are in accordance with the studies conducted by Anandhi and Oommen (2007) and Jitender *et al.*, (2014). The mean values for pod length exhibited a range from 4.00 cm to 11.50 cm with a grand mean of 6.20 cm. The genotype IC-140777 showed maximum pod length 11.50cm, while the genotype IC-200717 showed minimum pod length 4.00cm. No genotype was statistically at par with value of IC-140777 (11.50 cm). Sixteen genotypes were produced significantly more lengthy pods when compared to grand mean 6.20cm. Ten genotypes were produced significantly more lengthy pods when compared to check variety Pusa Navabahar (8.00 cm). These results are similar to the findings with and Rai *et al.*, (2012).

Table.1 Analysis of variance for 16 characters in 51 cluster bean genotypes

Traits	Mean Sum of Squares		
	Replication (df=2)	Genotype (df=50)	Error (df=100)
Plant height (cm)	1.377	1049.311**	66.706
Number of branches per plant	1.437	18.532**	0.931
Days to first flowering	0.020	20.198**	4.78
Days to 50 % flowering	0.314	18.461**	7.674
Number of clusters per plant	0.505	40.887**	1.724
Number of pods per cluster	0.028	16.101**	0.13
Number of pods per plant	3.444	666.746**	34.075
Pod length (cm)	0.005	12.21.**	0.209
Pod girth(mm)	0.025	4.975**	0.223
Pod weight (g)	0.000	0.296**	0.008
Number of seeds per pod	0.037	3.236**	0.337
Pod yield per plant(g)	20.520	3827.641**	1161.84
Pod yield per hectare (q/ha)	15.927	2898.136**	122.58
Protein content (%)	0.000	17.876**	1.023
Gum content (%)	0.032	56.990**	1.584
Fibrecontent (%)	0.005	4.930**	0.096

* and ** significant at P = 0.05 and P = 0.01 level of significance respectively

Table.2 Mean performance of 51 genotypes of cluster bean in terms of growth, yield and its related characters

S. No.	Genotype	Plant height (cm)	No. of branches per plant	Days to first flowering	Days to 50% flowering	Number of clusters per plant	Number of pods per cluster	Number of pods per plant	Pod length (cm)	Pod girth(mm)	Pod weight(g)	Number of seeds per pod	Pod yield per plant(g)	Pod yield per hectare (q/ha)	Protein content (%)	Gum content (%)	Fibre content (%)
1	IC-8446	83.50	9.2	30.00	40.00	17.80	3.44	61.20	5.10	7.10	1.27	7.00	77.76	67.66	17.43	20.70	4.80
2	IC-9042P2	46.46	8.8	33.00	43.00	18.60	5.00	80.00	4.50	6.60	1.76	6.30	140.80	122.50	21.30	23.70	5.20
3	IC-9052	76.03	10.4	30.00	41.00	21.60	5.10	85.00	9.70	9.00	1.95	8.00	165.76	144.20	23.60	27.26	5.50
4	IC-9077	54.46	8.9	29.00	40.00	16.26	4.86	79.00	8.00	8.50	1.14	5.40	90.00	78.30	18.00	20.86	4.00
5	IC-9077P1	58.40	7.8	31.00	42.00	21.60	3.94	62.00	5.80	7.40	1.37	7.90	84.90	73.90	15.60	33.10	3.90
6	IC-9203	64.26	8.0	38.00	44.00	18.00	4.84	56.00	4.60	8.30	1.11	7.70	62.16	54.10	16.93	21.10	4.80
7	IC-9229P3	48.40	4.8	36.00	40.00	18.30	4.74	83.00	5.80	7.53	1.41	5.40	117.03	101.80	21.03	26.00	4.80
8	IC-9230P2	52.60	9.8	34.00	45.00	17.53	4.04	74.40	6.30	8.40	1.08	6.50	80.36	69.90	17.16	27.70	5.80
9	IC-9233P3	43.30	8.5	31.00	48.00	12.10	4.64	65.00	5.60	8.90	1.35	5.30	87.76	76.33	21.30	20.70	6.90
10	IC-9431P2	55.40	7.2	34.00	44.00	18.20	4.60	77.00	5.30	6.50	1.30	6.80	100.10	87.06	17.20	18.90	6.50
11	IC-9777P1	55.23	5.6	34.00	48.00	19.10	4.60	55.00	6.20	6.50	1.32	8.20	72.60	63.16	21.30	21.80	7.03
12	IC-10323	71.50	10.5	30.00	40.00	20.50	5.10	88.00	9.20	9.20	1.82	9.00	160.16	139.33	22.30	32.90	6.90
13	IC-10333	65.60	10.2	36.00	43.00	17.26	4.80	72.90	4.70	6.80	1.25	6.50	91.20	79.33	21.03	19.10	5.80
14	IC-10334	61.80	9.8	35.00	47.00	18.03	3.10	60.80	4.40	5.80	1.20	7.20	72.96	63.50	18.10	22.40	5.03
15	IC-10520	41.80	9.0	37.00	44.00	16.40	4.20	75.00	5.80	5.70	1.03	6.10	77.26	67.20	21.73	26.40	7.30
16	IC-11376	49.60	4.1	34.00	46.00	18.20	4.10	80.00	5.50	7.00	1.26	6.50	100.80	87.70	20.40	20.00	6.80
17	IC-13348	54.40	4.8	33.00	44.00	13.80	3.30	45.50	4.60	5.90	1.35	8.00	61.50	53.50	23.16	16.86	7.60
18	IC-13365	57.80	6.5	32.00	39.00	11.20	4.40	54.00	5.20	7.40	1.32	7.50	71.26	62.03	20.96	23.46	7.80
19	IC-28269	67.40	3.8	37.00	47.00	9.60	4.60	44.10	5.03	8.50	1.41	8.40	62.26	54.20	18.00	20.76	8.10
20	IC-28278	62.66	4.1	32.00	42.00	12.56	4.00	50.20	4.63	6.90	1.15	7.40	57.76	50.26	21.40	24.50	4.80
21	IC-28280	57.40	5.9	36.00	45.00	18.26	4.30	78.50	5.10	7.60	1.09	6.10	85.53	74.40	22.66	29.46	4.40
22	IC-28283	40.30	3.9	33.00	42.00	13.86	3.50	48.60	7.60	8.60	1.15	5.80	55.90	48.60	18.70	20.70	4.60
23	IC-28285	50.00	4.2	31.00	44.00	16.23	4.60	74.60	5.20	7.60	1.34	6.00	100.00	87.03	17.10	24.40	4.80
24	IC-28286	67.90	5.1	34.00	41.00	13.70	4.00	54.80	5.30	7.30	1.34	7.80	73.40	63.90	21.06	21.80	6.50
25	IC-28287	63.00	7.6	38.00	43.00	10.00	4.56	45.60	6.00	7.60	1.40	5.30	63.83	55.53	24.50	19.60	6.20
26	IC-28289	69.10	3.6	34.00	39.00	19.00	4.10	77.90	6.20	6.70	1.15	7.40	89.56	77.93	17.10	24.50	5.70
27	IC-28795	80.80	10.6	28.00	38.00	19.80	5.00	89.00	10.00	10.20	1.96	8.30	174.43	151.80	24.50	28.40	9.03
28	IC-34344	79.60	10.6	30.00	40.00	20.40	5.20	96.00	10.20	9.80	1.85	9.00	177.60	154.53	21.40	31.20	8.60
29	IC-39989	63.90	8.9	34.00	45.00	14.90	4.23	63.10	8.80	7.40	2.25	6.80	142.06	123.63	18.00	25.23	7.60
30	IC-39990	86.60	7.8	33.00	46.00	21.60	4.00	76.00	4.63	7.53	1.32	7.90	100.33	87.30	21.60	20.50	8.10
31	IC-102829	87.60	8.2	30.00	42.00	18.20	5.20	84.00	4.90	7.30	1.49	6.40	125.16	108.90	17.90	25.53	5.90

32	IC-103295	104.50	9.0	32.00	41.00	20.00	5.60	91.00	10.60	10.00	2.18	8.40	198.40	172.60	21.70	33.06	6.10
33	IC-120910	88.50	9.4	29.00	43.00	15.00	5.10	81.30	5.80	8.60	1.19	6.40	96.80	84.20	17.36	19.50	6.80
34	IC-140764	80.00	6.6	31.00	45.00	17.80	4.20	74.70	4.83	6.30	1.16	7.80	86.70	75.4	17.36	22.10	6.90
35	IC-140774	99.30	11.0	29.00	46.00	22.80	4.80	90.00	10.50	10.60	1.96	8.20	176.40	153.50	18.16	31.80	5.30
36	IC-140777	114.50	10.6	31.00	42.00	23.8	4.40	85.00	11.50	10.80	1.82	8.50	154.70	134.56	21.73	21.80	5.90
37	IC-140786	72.90	4.7	34.00	44.00	16.4	4.60	75.40	5.40	6.90	1.21	8.00	91.26	79.40	22.56	23.60	6.00
38	IC-140787	68.90	5.9	30.00	42.00	10.00	3.10	44.00	6.20	6.40	1.43	7.60	62.90	54.73	21.70	19.50	6.90
39	IC-140788	68.60	4.9	33.00	45.00	15.80	4.90	82.10	6.50	8.3	1.11	6.90	91.20	79.33	17.20	21.13	7.30
40	IC-140789	50.60	6.9	32.00	46.00	12.00	4.30	67.20	4.20	7.4	1.17	7.00	78.63	68.40	20.30	24.80	7.50
41	IC-140790	57.90	5.4	30.00	41.00	17.20	4.20	72.20	4.90	6.80	1.13	5.80	61.60	71.00	21.70	19.36	7.90
42	IC-140791	36.90	6.4	32.00	47.00	13.50	3.50	47.20	5.20	8.00	1.97	6.30	93.10	81.00	17.80	31.23	7.03
43	IC-140792	40.90	8.4	33.00	45.00	14.50	4.10	79.70	4.70	5.50	1.14	7.20	90.90	79.10	18.06	18.50	6.30
44	IC-177844	52.80	8.6	30.00	41.00	18.50	4.60	85.10	5.90	6.20	1.18	8.10	100.43	87.36	18.40	25.60	5.60
45	IC-200679	60.60	8.5	32.00	43.00	23.60	4.10	86.00	5.20	7.53	1.24	7.90	120.00	104.40	16.30	20.50	5.40
46	IC-200680	121.50	11.5	31.00	44.00	24.80	4.20	96.70	10.30	9.60	1.43	8.50	122.96	107.00	14.53	32.00	4.60
47	IC-200696	49.60	4.9	28.00	41.00	16.13	4.00	64.50	7.30	6.50	1.42	7.80	91.60	79.70	21.26	21.63	4.30
48	IC-200711	67.80	6.5	28.00	44.00	12.53	5.00	56.00	4.60	6.90	1.37	6.30	76.70	66.73	17.03	24.63	5.90
49	IC-200715	41.80	7.8	30.00	46.00	14.80	4.20	62.10	4.40	7.53	1.08	5.10	67.13	58.40	20.46	29.16	4.50
50	IC-200717	50.63	4.8	31.00	45.00	15.60	4.50	70.20	4.00	6.50	0.94	8.00	66.00	57.40	22.30	26.00	5.60
51	Pusa Nava Bahar	71.17	0.0	30.00	43.00	14.00	3.60	48.40	8.00	8.73	1.60	7.00	80.26	69.56	17.76	26.50	4.40
	Grand mean	5.024	7.2622	2.21	43.25	6.92	4.35	70.599	6.200	7.66	1.39	7.15	99.02	86.14	21.73	24.157	6.09
	SEm ±	4.715	0.557	1.26	1.59	0.75	0.158	3.37	0.26	0.27	0.05	0.05	7.344	6.392	0.584	0.726	0.178
	CD (P=0.005)	13.230	1.563	3.54	4.48	2.12	0.438	12.51	0.73	0.76	0.14	0.14	20.60	17.93	1.638	2.038	0.501

Pod girth exhibited a range of 5.50 mm to 10.80 mm with a grand mean of 7.66 mm. The genotype IC-140777 recorded the maximum pod girth 10.80 mm, while the genotype IC-140792 recorded minimum pod girth 5.50mm. Two genotypes IC-28795 (10.20 mm) and IC-140774 (10.60 mm) were significantly at par with IC-140777 (10.80mm). Seventeen genotypes were recorded significantly higher values than the grand mean of 7.66 mm. nine genotypes were significantly higher values than check variety Pusa Navabhar (8.73 mm). The data pertaining to this trait are in accordance with the studies conducted by Rai *et al.*, (2012).

The mean value for average pod weight exhibited a range from 0.94 g to 2.25 g with a grand mean of 1.39 g. The genotype IC-39989 (2.25g) recorded the maximum average pod weight, while the genotype IC-200717 (0.94g) recorded significantly minimum average pod weight. One genotype IC-103295 (2.18) was statistically at par with maximum pod weight IC-39989 (2.25g). Eighteen genotypes were recorded significantly higher values than the grand mean of 1.39 g. Ten genotypes recorded significantly higher values than check variety Pusa Navabhar 1.60 gm. These results are similar to earlier findings of Anandi and Oomen (2007). Number of seeds per pod exhibited a range of 5.10 to 9.00 with a grand mean of 7.15. Two genotypes *viz.*, IC-10323(9.00) and IC-140777 (9.00) recorded significantly higher number of seeds per pod, whereas the genotype IC-200715 (5.10) recorded the lower number of seeds per pod. No genotype was statistically at par with IC-10323 (9.00) and IC-140777 (9.00). Twenty four genotypes were recorded significantly higher number of seeds per pod than grand mean of 7.15. Twenty seven genotypes were recorded significantly higher number of seeds per pod than check variety Pusa Navabhar 7.00. The results of this study collaborate with

the results of Rai *et al.*, (2012) and Jitender *et al.*, (2014).

The mean value for pod yield per plant exhibited a range from 55.90 g to 198.40g with a grand mean of 99.02 g. The genotype IC-103295 (198.40g) exhibited maximum pod yield per plant, while the genotype IC-28283 (55.90g) recorded the minimum pod yield per plant. No genotype was statistically at par with maximum pod yield per plant IC-103295 (198.40g). Eighteen genotypes were recorded significantly higher pod yield per plant than the grand mean of 99.02 gm. Thirty one genotypes were recorded higher values than check variety Pusa Navabhar (80.26 g). These results are similar to earlier findings of Rai *et al.*, (2012) and Girish *et al.*,(2013).

The mean value for pod yield per hectare exhibited a range from 48.60 q to 172.6 q with a grand mean of 86.14 q/ha. The genotype IC-103295(172.60q) recorded the maximum pod yield per hectare, while the genotype IC-28283 (48.60q) recorded the minimum pod yield per hectare. No genotype was significantly at par with maximum pod yield per hectare IC-103295(172.6q). Eighteen genotypes were recorded significantly higher values than the grand mean of 86.14 q. Thirty four genotypes were recorded higher values than check variety Pusa Navabhar (69.50 q/ha).

Protein content exhibited a range from 14.53 % to 24.50 % with a grand mean of 21.73 %. Two genotypes *viz.*, IC-28287 (24.50%) and IC-28795 (24.50%) recorded significantly high protein content, whereas the genotype IC-200680 (14.50%) recorded the lowest protein content. Two genotypes *viz.*, IC-9052 (23.60%) and IC-13348 (23.16) were statistically at par with protein content IC-28287 (24.50%) and IC-28795 (24.50%). Ten genotypes were recorded significantly higher values than the grand mean of 21.73%. Thirty

six genotypes were recorded higher values than check variety Pusa Navabhar (17.19). The data pertaining of this trait are accordance with the studies conducted by Chaudhary *et al.*, (2013) in dolichos bean, Girish *et al.*, (2013), Malaghan *et al.*, (2013) and Kapoor (2014) in cluster bean. The mean value for gum content exhibited a range of 16.86 % to 33.10% with a grand mean of 24.15%. The genotype IC-9203 (33.10%) recorded significantly higher gum content, while the genotype IC-13348(16.86) recorded significantly lower gum content of 16.86%. Four genotypes *viz.*, IC-140774 (31.80%), IC-200680 (32.00%), IC-10323 (32.90%) and IC-103295 (33.06%) were statistically at par with IC-9203 (33.10%). Twenty four genotypes were recorded significantly higher values than the grand mean of 24.15 %. Ten genotypes were recorded higher gum content than check variety Pusa Navabhar (26.50%). These results are similar to earlier findings of Girish *et al.*, (2013), Malaghan *et al.*, (2013) and Jitender *et al.*, (2014). The mean values for fibre content exhibited a range from 3.90 % to 9.03% with a grand mean of 6.09%. The genotype IC-28795 (9.03%) recorded significantly higher fibre content, while the genotype IC-9077 p₁ (3.90%) recorded significantly lower fibre content. one genotype IC-34344 (8.60%) was statistically at par with high fibre content IC-28795 (9.03%). Twenty four genotypes were significantly higher fibre content than grand mean of 6.09%.

In any selection programme, the mean performance of the genotypes for individual character serves as an important criterion for discarding the undesirable types. The results of the present study revealed significant differences for growth, yield and quality parameters in fifty one genotypes of cluster bean and showed similarity with earlier findings of Anandi and Oomen *et al.*, (2007),

Rai *et al.*, (2012), Girish *et al.*, (2013), Jitender *et al.*, (2014) and Vikas and Ram (2015). This indicated that germplasm studied may act as a potential source and offer scope for selection of high yielding genotypes with desirable horticultural attributes. The mean performance of the genotypes revealed the superiority of the genotype IC-103295 (198.40g) with the highest pod yield per plant. The genotype IC-34344 was the next best in respect of pod yield per plant (177.60g), number of branches per plant (10.60), number of pods per plant (96.00), Hence, the two germplasm should be utilized extensively in further breeding programmes for exploitation of desirable traits. After extensive yield trials should be released for commercial cultivation for yield. Hence, they may be recommended to farmers for cultivation after multilocational trials.

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