



**Evaluation of yard long bean (*Vigna unguiculata* subsp. *sesquipedalis* (L.)
Verdcourt) genotypes for yield and quality characters under polyhouse
condition in Kerala**

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Abstract

Yard long bean is the most important vegetable grown in Kerala. Protected cultivation is one of the best methods to maximize production and to overcome biotic and abiotic stress conditions. Since the varieties suitable for polyhouse are not popular a study was conducted to identify the best accessions suitable for protected condition. Thirty yard long bean accessions were evaluated for yield and quality characters under naturally ventilated polyhouse. Super Green recorded the highest pod length (85.07 cm) and pod weight (64.77 g) whereas highest pod girth was noticed in NS -634. Neyyattinkara Local recorded highest number of pods per plant. The highest yield per plant was recorded in Anad Local (1627.12g) followed by NS-634, Githika and Hari Rani.

Keywords

Yard long bean, Kerala, polyhouse, germplasm, Yield characters

I. INTRODUCTION

Yard long bean (*Vigna unguiculata* subsp. *sesquipedalis* (L.) Verdcourt) is one of the most popular and cosmopolitan vegetable crop grown in Kerala. The traditional vernaculars viz., 'Achingapayar', 'Kurutholapayar', 'Vallipayar', 'Pathinettumaniyan', 'Asparagus bean', 'Chinese long bean' etc., used to refer yard long bean indicate that Kerala is the land of this crop. It is a rich and inexpensive source of vegetable protein. It enriches soil fertility by fixing atmospheric nitrogen. Because of its quick growth habit it has become an essential component of sustainable agriculture in marginal lands of the tropics. But the productivity and quality of the produce is low during the monsoon periods due to heavy rainfall and incidence of pests and diseases resulting in increased vegetative growth and reduction in yield and quality of the produce. To overcome this situation protected cultivation is the best alternative, which is the unique and specialized form of agriculture which offers protection from adverse climate and weather and influences the overall productivity and quality of vegetables.

Selection of suitable varieties is an important step for successful and economic cultivation of vegetables. Since the varieties suitable for polyhouse are not standardized the study was undertaken to evaluate the performance of different yard long bean accessions under polyhouse.

II. MATERIALS AND METHODS

The experiment was conducted in saw toothed type naturally ventilated polyhouse of size 1000 m² (50 m x 20 m), gutter height 5m and slope 2% located at Instructional farm, College of Agriculture Vellayani during 2014-2015. The experimental materials consisted of 30 yard long bean accessions, including 18 landraces, three KAU released varieties and nine hybrids/varieties collected from private seed firms (Table 1). The experiment was laid out in randomised block design with three replications.

The experimental area was ploughed thoroughly and raised beds of 23m long and 70cm width were prepared. Beds were mulched using silver on black plastic mulch of 30 micron thickness. Cowpea seedlings were transplanted at a spacing of 150 X 45 cm. Nutrient management as per *ad hoc* recommendation for precision farming was followed. Observations were recorded from five randomly selected plants from each plot. Vine length, days to first flowering, pod length, pod girth, pod weight, number of pods per plant, seeds per pod, 100 seed weight, yield plant, pod protein, fiber content and keeping quality were recorded during cropping period. Plot means were used for standard analysis.

III. RESULTS AND DISCUSSION

Analysis of variance (Table 2) based on quantitative characters showed that the accessions are significantly different for all the traits under study. The mean values of the treatments under polyhouse condition for yield and quality characters were given in table 3.

In the present study remarkable variation in mean performance was observed for vegetative vine length under polyhouse condition. The longest vines were observed in NS-634 (T 23) followed by Anad Local (T 5) which were the top yielders. High temperature and increased CO₂ concentration might have contributed to the increased leaf size and vine length. Better performance of growth characters under shade net as compared to open field condition was previously reported [1, 3, 8].

The variety Rani (T19) was the earliest for flowering (30.41 days) under poly house. Earliness may be due to the better and faster vegetative growth in polyhouse condition. In sprouting broccoli also earliness in flowering under protected cultivation was reported [12].

Among the accessions, Super Green (T 17) recorded the highest pod length (85.07 cm) and pod weight (64.77 g) whereas highest pod girth was noticed in NS -634 (T 23). Neyyattinkara Local (T 13) recorded highest number of pods per plant. The pods of Babli (T 24) had the maximum number of seeds (21.57) and the maximum 100 seed weight of 23.65 g was recorded in Lola (T 28). In general mean performance of accessions for pod characters was superior under polyhouse as compared to the results obtained in previous works conducted under field conditions [9, 13, 5, 10]. Number of fruits, fruit volume, fruit weight, fruit circumference and yield was higher in polyhouse condition than open field [4,8,7].

Yield is the most important character to be considered for selection. Significant variability among accessions for yield and yield attributes were observed. The highest yield per plant was recorded in Anad Local (T 5) (1627.12g) which was on par with NS-634 (T23), Githika (T 1) and Hari Rani (T64). The overall mean for 30 accessions was 1266.77g under polyhouse condition. Sivakumar (2012) reported mean yield of 774.06g on evaluation of 44 yard long bean accessions under open condition. In cauliflower [11] and in sprouting broccoli [12] higher yield was due to suitable micro climate under protected condition.

Quality characters are very important in any crop especially in vegetables because they impart nutritional quality to the produce. In the present study, different accessions showed variation in quality characters like protein content, fiber content and keeping quality. Highest protein content of 8.46 percent was recorded by T11 and lowest by T1 (4.82 percent). A range of 3.50 to 8.75 percent for protein [6] and 3.53 to 8.72 percent [2] was reported in yard long bean. In the present study keeping quality of yard long bean grown under polyhouse was 4.08 days, there was no significant difference with open condition (4.09 days) [10].

IV. CONCLUSION

On the basis of the present study the top yielders T 5 (Anad Local), T 23 (NS 643) and T1 (Githika) were identified as suitable for cultivation under naturally ventilated polyhouse.

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Table 1. Details of Yard long bean (vine type) Accessions Used for Evaluation

Treatments No.	Accession Number	Accession Name	Source
T1	VS 34	Githika	IF, College of Agriculture, Vellayani, Kerala
T2	VS 35	Periya Local	Periya, Kasargode, Kerala
T3	VS 31	Muttacadu Local	Muttacadu, Thiruvananthapuram, Kerala
T4	VS 44	Kanakakary Local	Kanakakary, Kottayam, Kerala
T5	VS 52	Anad Local	Anad, Thiruvananthapuram, Kerala
T6	VS 38	Kuttichal Local	Kuttichal, Thiruvananthapuram, Kerala
T7	VS 51	Balaramapuram Local	Balaramapuram, Thiruvananthapuram, Kerala
T8	VS 43	Ettumanoor Local	Ettumanoor, Kottayam, Kerala
T9	VS 17	Pilicode Local	Pilicode, Kasargode, Kerala
jjkkT10	VS 16	Pattom Local	Pattom, Thiruvananthapuram, Kerala
T11	VS 50	Kakamoola Local	Kakamoola, Thiruvananthapuram, Kerala
T12	VS 5	Hosdurg Local	Hosdurg, Kasargode, Kerala
T13	VS 13	Neyyattinkara Local	Neyyattinkara, Thiruvananthapuram, Kerala
T14	VS 54	Thirupuram Local	Thirupuram, Thiruvananthapuram, Kerala
T15	VS 63	Nemom Local	Nemom, Thiruvananthapuram, Kerala
T16	VS 6	Kumarapuram, Local	Kumarapuram, Thiruvananthapuram, Kerala
T17	VS 45	Super Green	F1, Tan Indo seeds, Karnataka
T18	VS 64	Hari Rani	Sakata seed India Pvt. Ld, Gurgaon
T19	VS 65	Rani	Sakata seed India Pvt. Ld, Gurgaon
T20	VS 67	Rocket -77	Pahuja seed Pvt. Ltd, Delhi
T21	VS 68	NS-620	F1, Namdhari seeds, Bangalore
T22	VS 69	NS-621	F1, Namdhari seeds, Bangalore
T23	VS 70	NS-634	F1, Namdhari seeds, Bangalore
T24	VS 66	Babli	Sakata seed India pvt.Ld, Gurgaon
T25	VS 71	FH-30	Farmhouse, Thiruvananthapuram
T26	VS 72	Palapoor Local	Palapoor, Thiruvananthapuram
T27	VS 42	Vellayani Jyothika	College of Agriculture, Vellayani
T28	VS 11	Lola	College of Horticulture, Vellanikkara
T29	VS 4	Kanjikuzhipayar	Cherthala, Alappuzha, Kerala
T30	VS 47	NKRA Local	ARS, Thiruvalla, Kerala

Table 2. Analysis of Variance for Characters in Yard long bean (mean squares are given)

Source	D.F	1	2	3	4	5
Replication	2	65.0903	0.3854	9.6248	7.8778	0.0185
Treatment	2	289.427**	0.7029**	249.821**	727.988**	1.9846**
Error	58	17.9332	0.1026	10.5861	50.4459	0.5740

Source	D.F	6	7	8	9	10
Replication	2	0.5373	7494.54	0.1254	1.2690	0.0285
Treatment	29	40.778**	152309.95**	2.351**	4.6434**	0.3316**
Error	58	1.7985	21432.48	0.0903	0.6794	0.1041

** significant at 1% level

Table 3. Mean Performance of 30 Yard long bean Accessions for Yield and Quality Characters

Treatments	Vine length (cm)	Days to first flowering	Pod length (cm)	Pod girth (cm)	Pod weight (g)	Pods plant ⁻¹	Yield g plant ⁻¹	Seeds pod ⁻¹	100 Seed weight (g)	Pod protein (%)	Keeping quality (days)
T1 Githika	463.27	33.89	46.92	2.66	26.50	89.74	1543.58	21.53	6.47	4.82	4.00
T2 Periya Local	489.22	34.00	40.82	2.73	17.63	69.49	1029.69	20.91	14.69	6.64	3.86
T3 Muttacadu Local	469.39	34.78	35.16	2.50	18.63	62.79	915.48	21.01	14.37	7.43	3.65
T4 Kanaka kary Local	485.28	33.00	52.76	3.06	20.90	72.33	1113.22	20.13	16.38	5.84	3.41
T5 Anad Local	506.61	32.97	68.44	3.53	36.43	61.91	1627.12	19.90	16.50	5.23	3.96
T6 Kuttichal Local	478.67	34.76	49.86	2.90	19.80	75.45	1111.04	20.00	18.36	5.74	3.85

T7	Balara mapura m Local	444.28	33.21	56.8	2.80	22.63	85.4 5	1310.4 8	20.2 3	17.9 8	7.08	4.29
T8	Ettuma noor Local	474.00	31.53	49.45	3.70	23.60	84.6 6	1440.8 5	18.9 0	16.5 3	7.78	4.23
T9	Pilicod e Local	467.22	34.09	57.53	3.73	26.66	82.2 4	1367.3 7	19.6 0	13.6 7	6.67	3.85
T10	Pattom Local	414.61	32.09	58.5	2.53	19.30	69.7 9	1169.7 8	19.3 0	20.4 6	7.91	4.04
T11	Kakam oola Local	413.67	34.10	62.43	3.90	25.13	64.4 5	971.21	19.7 0	16.4 0	8.46	4.25
T12	Hosdur g Local	438.28	31.65	50.10	2.76	22.03	57.6 4	919.92	19.5 7	17.3 7	7.29	3.84
T13	Neyyatt inkara Local	430.72	32.00	54.26	2.80	19.56	112. 1	1487.4 1	19.9 0	12.2 3	7.19	3.51
T14	Thirupu ram Local	436.67	34.54	66.76	3.90	32.93	56.1 2	1382.7 5	19.0 7	20.5 1	6.41	4.09
T15	Nemom Local	431.55	32.54	39.96	3.00	16.56	74.9 1	1041.3 9	18.2 1	17.6 3	5.67	3.87
T16	Kumara puram, Local	447.00	33.98	52.83	2.86	17.30	97.2 3	1266.7 1	19.8 3	21.1 3	5.86	3.75
T17	Super Green	444.72	37.11	85.06	3.46	64.76	24.8 3	1358.2 1	18.1 3	18.7 5	6.72	4.12
T18	Hari Rani	429.11	34.31	72.25	3.90	31.89	72.2 8	1528.7 5	19.8 0	16.6 3	7.48	4.06
T19	Rani	412.94	30.41	56.30	2.93	23.06	59.1 6	893.04	19.5 7	14.6 6	5.84	3.67
T20	Rocket -77	466.00	34.88	56.00	3.16	30.90	71.7 9	1481.2 0	19.1 3	21.9 2	6.76	4.50

T21	NS-620	475.28	32.55	64.03	2.96	36.43	64.9 7	1508.3 6	20.2 7	15.3 2	5.48	4.30
T22	NS-621	502.44	33.33	60.90	2.73	26.80	71.8 3	1511.7 2	20.7 7	17.5 4	7.20	4.62
T23	NS-634	510.89	33.55	60.33	4.00	31.06	80.8 2	1620.2 9	20.3 7	12.1 2	5.32	4.16
T24	Babli	498.94	32.33	52.46	2.93	29.63	75.8 7	1383.8 2	21.5 7	18.4 9	6.60	4.18
T25	FH-30	492.61	31.55	56.20	3.80	31.23	85.3 8	1400.0 3	20.7 3	18.3 2	7.31	4.40
T26	Palapoor Local	499.00	34.00	58.34	3.60	26.56	64.2 0	1147.3 5	19.5 3	10.6 2	6.21	4.53
T27	Vellayani Jyothika	485.11	34.11	57.13	3.00	24.46	67.6 2	1131.7 1	20.1 3	23.5 6	6.35	4.77
T28	Lola	469.83	34.33	54.40	2.50	20.23	67.1 2	1042.0 6	19.8 0	23.6 5	6.93	4.59
T29	Kanjikuzhi payar	471.61	32.89	49.70	2.70	24.20	55.3 3	1054.3 7	20.5 0	16.6 8	7.44	3.93
T30	NKRA Local	467.22	32.88	48.46	3.53	28.65	57.0 4	1244.2 7	19.9 0	16.5 4	7.27	4.14
S. E.		463.87	33.38	2.44	3.15	26.52	71.1 6	1266.7 7	19.9 3	16.8 5	6.63	4.08
CD(.05)		33.452	1.502	6.91	0.52	5.321	11.6 1	239.27 3	1.24 1	2.19 2	0.490	0.531

