



SCREENING OF DOLICHOS BEAN (*LABLAB PURPUREUS* L. (SWEET)) GENOTYPES FOR GROWTH AND YIELD IN COASTAL REGION OF TAMILNADU

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Abstract

Dolichos bean [*Lablab purpureus* L. (Sweet)] is consumed as vegetable in several parts of Asia including India due to its high nutritive value. The present study was carried out in Annamalai University with twenty genotypes of dolichos bean to screen high yielding genotype suitable for coastal region of Tamilnadu. Among the twenty genotypes eight genotypes viz., Cuddalore local, Goldy-24, Coimbatore local, Arka Jay, Co (Gb) 14, Ankure goldy, Arka Vijay and Chidambaram local have recorded higher growth and yield attributes than the mean performance. The highest single pod weight (3.95 g), number of pods per plant (54.25), yield per plant (214.02g) and yield per hectare (11.77 t ha⁻¹) were observed in genotype Arka Jay was followed by Ankure goldy. As genotype Arka Jay has expressed early flowering and highest values in growth, flowering and yield parameters it was considered as the best among the tested genotypes.

Key words: *Dolichos* bean, *Dolichos lablab*, Genotypes, Arka Jay, Screening.

Introduction

Dolichos bean (or) garden bean which is botanically called as *Lablab purpureus* L. (Sweet) [syn. *Dolichos lablab* (Roxb.) L. var. *typicus*] is an important leguminous vegetable of Indian or South East Asian origin. It occupies a unique position as vegetable among the legume crops due to its high nutritive value (Pridv *et al.*, 2001). It is rich in protein (1.7g), calcium (132 mg), thiamine (0.08 mg) and vitamin C (24 mg per 100g of edible pods). In India, the major garden bean growing states are Tamil Nadu, Karnataka and Andhra Pradesh. In Tamil Nadu, field bean occupies an area of 0.70 lakh hectares with production of 0.35 lakh tonnes and productivity of 0.5 tonnesha⁻¹ (Anonymous, 2008). Though, this crop is grown at commercial scale in almost all vegetable growing districts of Tamilnadu its productivity is markedly low. Low productivity might be due to the reason that the farmers by and large use local cultivars and seeds of traditional farmer collections. Crop improvement in any programme is aimed at developing high yielding variety with quality parameters of consumer preference. Selection of high yield dolichos genotype with

good quality parameters is one of the most important tools in enhancing productivity at selected locations. The efforts of improving the crop by utilizing indigenous and exotic germplasm have been useful in breaking the yield barriers (Shivashankar *et al.* 1993) resulting in developing compact plant type with reduced duration and photo-insensitivity. Hence, the present study was conducted to screen different genotypes of *Lablab purpureus* L. (Sweet) for growth and yield in coastal region of Tamilnadu, where soil salinity and clay are major problems.

Materials and methods

The experiment was conducted in RBD (Randomized block design) with three replications during the year 2010-2011 at the vegetable unit, Department of Horticulture, Annamalai University. Dolichos bean seeds of twenty bush type genotypes were collected from different places of Tamilnadu, Karnataka and Kerala. Dolichos bean seeds were sown in a spacing of 60 × 30cm. In each replication, five plants were selected randomly for recording observations. The growth and yield characters viz., plant height, number of branches per plant, number of leaves per plant, leaf area, chlorophyll content, days to first

Table 1: Mean performance of Dolichos bean [*Lablab purpureus* L. (Sweet)] genotypes on growth and flowering attributes.

Accession number	Genotypes	Plant height at 90 DAS (cm)	No. of branches per plant	No. of leaves/plant (90 DAS)	Leaf area (cm ²)	Chlorophyll content (mg g ⁻¹)	Days to first flowering (d)	Days to 50 % flowering (d)	No. of racemes per plant	Raceme length (cm)	No. of flower buds /raceme	No. of flower buds /plant
DB1	Cuddalore local	69.45	4.89	37.20	14.58	1.85	41.65	44.85	6.40	33.85	24.10	154.24
DB2	Goldy-24	68.26	4.60	39.18	14.00	1.50	45.85	48.30	5.18	32.00	24.58	127.32
DB3	Trichy local	62.13	4.15	32.15	12.05	1.05	49.70	52.25	3.82	27.00	18.50	70.67
DB4	Coimbatore local	68.00	4.56	36.60	14.23	1.76	40.45	43.75	5.98	33.42	23.45	140.23
DB5	Co(Gb) 14	68.48	4.88	38.96	14.30	1.51	44.25	47.50	5.45	29.40	23.51	128.13
DB6	Thiruvannamalai local	69.27	4.50	35.16	14.18	1.52	45.45	48.75	5.26	31.96	23.28	122.45
DB7	Vadalore local	65.20	4.00	34.45	12.30	1.30	46.00	49.00	4.52	29.30	21.60	97.63
DB8	Vellayani local	65.00	3.38	33.89	12.15	1.26	48.00	51.50	4.01	29.18	21.26	85.25
DB9	Arka Jay	75.25	6.86	44.18	17.45	2.28	39.45	43.54	6.98	35.10	26.40	184.27
DB10	Ankuregoldy	76.15	5.12	42.92	15.17	2.20	40.65	44.75	6.52	35.18	25.36	165.35
DB11	Nandini	67.80	4.66	37.00	14.30	1.78	41.35	45.75	6.18	33.00	23.15	143.07
DB12	Andhra local	67.00	4.80	35.66	14.15	1.64	43.65	48.75	5.60	32.26	22.85	127.96
DB13	Arka Vijay	67.85	4.68	36.92	14.25	1.73	41.70	45.50	6.06	31.84	23.40	141.80
DB14	Panruti local	69.00	4.34	35.00	13.38	1.46	43.50	46.25	5.00	29.45	21.53	107.65
DB15	Vilupuram local	69.78	4.72	35.88	14.20	1.60	42.25	45.85	5.75	31.90	22.70	130.53
DB16	Dhoni	68.17	4.54	35.54	13.48	1.48	43.75	46.50	5.10	31.00	22.40	114.24
DB17	Kumbakonum	65.35	4.36	34.78	13.00	1.35	46.50	49.25	4.96	33.56	23.85	118.30
DB18	Kallakurichi local	67.56	4.27	33.65	12.27	1.28	44.75	47.85	4.48	29.27	21.85	97.89
DB19	Salem local	66.00	4.58	34.60	12.55	1.32	44.50	47.50	4.60	29.20	21.73	99.96
DB20	Chidambaram local	68.20	4.70	36.78	14.45	1.89	46.50	49.25	6.38	31.28	22.85	145.78
	General mean	68.20	4.63	36.53	13.82	1.59	44.00	47.33	5.41	31.46	22.92	125.14
	SED	2.03	0.36	0.53	0.39	0.18	0.38	0.45	0.37	0.51	0.34	2.18
	CD(P=0.05)	3.79	0.67	0.99	0.73	0.34	0.71	0.84	0.69	0.95	0.63	4.07

Table 2: Mean performance of Dolichos bean [*Lablab purpureus* L. (Sweet)] genotypes on yield and quality attributes

Accession number	Genotypes	No. of pods per raceme	No. of pods per plant	Pod length (cm)	Pod width (cm)	Single Pod weight (g)	Pod yield per plant (g)	Pod yield per plot (kg)	Pod yield per hectare (t)	No. of seed per pod	Protein content (%)	Fibre content (%)
DB 1	Cuddalore local	7.99	51.15	7.72	2.33	3.55	181.33	3.99	9.97	4.55	3.15	1.31
DB 2	Goldy-24	8.69	45.00	6.89	2.31	3.42	154.04	3.39	8.47	4.48	3.00	1.24
DB 3	Trichy local	9.21	35.19	4.81	1.68	2.71	95.51	2.10	5.25	4.00	2.17	1.03
DB 4	Coimbatore local	8.02	47.95	7.30	2.30	3.48	166.96	3.67	9.18	4.50	3.11	1.26
DB 5	Co (Gb) 14	9.45	45.56	6.94	2.24	3.46	157.82	3.47	8.68	4.43	2.93	1.13
DB 6	Thiruvannamalai local	8.63	45.38	7.00	2.26	3.35	151.89	3.34	8.35	4.36	3.04	1.25
DB 7	Vadalore local	8.88	40.13	6.13	2.17	3.20	128.42	2.83	7.06	4.40	2.85	1.09
DB 8	Vellayani local	9.34	37.44	5.86	2.80	3.01	112.69	2.48	6.20	4.38	2.78	1.07
DB 9	Arka Jay	7.77	54.25	8.92	2.40	3.95	214.02	4.71	11.77	4.63	3.75	1.30
DB 10	Ankuregoldy	8.20	53.45	8.00	2.35	3.62	193.38	4.25	10.64	4.58	3.32	1.32
DB 11	Nandini	8.17	50.52	7.53	2.23	3.52	177.98	3.92	9.79	4.46	3.18	1.28
DB 12	Andhra local	8.11	45.40	7.10	2.20	3.35	152.09	3.35	8.36	4.37	3.05	1.21
DB 13	Arka Vijay	7.95	48.18	7.42	2.34	3.49	168.24	3.70	9.25	4.35	3.17	1.23
DB 14	Panruti local	8.57	42.85	6.66	2.23	3.32	142.05	3.13	7.81	4.44	2.94	1.17
DB 15	Villupuram local	8.22	47.27	7.20	2.28	3.47	163.79	3.60	9.01	4.38	3.06	1.20
DB 16	Dhoni	8.79	44.82	6.78	2.25	3.40	152.39	3.35	8.38	4.45	2.95	1.18
DB 17	Kumbakonum	8.42	41.76	6.39	2.24	3.25	135.59	2.98	7.46	4.33	2.87	1.15
DB 18	Kallakurichi local	8.90	39.85	6.00	2.10	3.06	122.06	2.69	6.71	4.30	2.79	1.10
DB 19	Salem local	8.95	41.19	6.26	2.20	3.23	132.84	2.92	7.31	4.22	2.70	1.12
DB 20	Chidambaram local	7.84	50.01	7.63	2.32	3.58	179.04	3.94	9.85	4.52	2.82	1.29
	General mean	8.50	45.37	6.93	2.26	3.37	154.11	3.39	8.48	4.41	2.98	1.20
	SED	0.42	0.47	0.13	0.28	0.17	4.06	0.26	0.54	0.05	0.35	0.25
	CD(P=0.05)	0.78	0.88	0.24	0.52	0.31	7.58	0.49	1.01	0.09	0.65	NS

flowering, days to 50% flowering, number of racemes per plant, raceme length, number of flower buds per raceme, pod length, single pod weight, number of pods per plant, yield per plant, yield per hectare, protein content and fiber content were observed. The genotype Co (Gb) 14 was considered as standard check. Mean and critical difference for each character was computed and analysis of data was carried out as per the procedure given by the Panse and Sukhatme (1967).

Results and discussion

Results of present study revealed that all growth attributes of dolichos bean varied significantly among the twenty genotypes. Among the twenty genotypes eight genotypes viz., Cuddalore local, Goldy-24, Coimbatore local, Arka Jay, Co (Gb) 14, Ankure goldy, Arka Vijay and Chidambaram local have recorded higher growth attributes than the mean performance (table 1.). The highest plant height recorded in Ankure goldy (76.15cm) was on par with Arka Jay (75.25 cm) and the plant height was recorded lowest in Trichy local (62.13 cm). The

highest number of branches per plant (6.86), number of leaves per plant (44.13), leaf area (17.45 cm²) and chlorophyll content (2.28 mg g⁻¹) were recorded in Arka Jay followed by Ankure goldy. Performance of these genotypes were found better than Co (Gb) 14. These growth parameters were recorded lowest in genotypes viz., Trichy local, Vadalur local, Vellayani local and Kallakuruchi local which were on par with each other. Significant differences observed in all the growth characters among the genotypes indicated the presence of sufficient amount of variation between genotypes that gives scope for selection of superior one with respect to growth attributes. Similar variation in growth attributes of dolichos bean among different genotypes were observed by Ganesh (2005), Lal *et al.* (2005), Rai *et al.* (2008), Patil and Lad (2007) and Ajay Kumar *et al.* (2014).

Flowering attributes were also significantly varied among the genotypes. Significantly early flowering (39.45 days to first flowering and 43.54 days to 50% flowering)

Table 3: Correlation between growth and yield parameters of Dolichos bean [*Lablab purpureus* L. (Sweet)] genotypes.

	Plant height	No. branches per plant	No. of leaves per plant	Leaf area	Days to first lowering	Days to 50 % flowering	No. of racemes per plant	Raceme length	No. of flower buds per raceme	No. of pods per plant	Pod length	Pod weight	Pod yield /plant
Plant height	1												
Number of branches per plant	0.7609	1											
Number of leaves per plant	0.8794	0.8242	1										
Leaf area)	0.8417	0.9068	0.8857	1									
Days to first flowering	-0.7565	-0.6793	-0.6694	-0.7446	1								
Days to 50 % flowering	-0.7435	-0.6582	-0.6498	-0.7065	-0.9715	1							
Number of racemes per plant	0.7778	0.7677	0.7870	0.9149	-0.8083	-0.7745	1						
Raceme length	0.7250	0.6403	0.7219	0.7877	-0.7263	-0.6858	0.8367	1					
Number of flower buds per raceme	0.8081	0.7305	0.8740	0.8397	-0.6934	-0.6796	0.8081	0.8859	1				
Number of pods per plant	0.8186	0.7376	0.7842	0.8904	-0.8178	-0.7889	0.9759	0.8715	0.8126	1			
Pod length	0.8429	0.7886	0.8182	0.9299	-0.8223	-0.7862	0.9620	0.8660	0.8662	0.9741	1		
Pod weight	0.8099	0.7695	0.7866	0.8900	-0.8012	-0.7911	0.9235	0.8493	0.8522	0.9519	0.9824	1	
Pod yield per Plant	0.8304	0.7797	0.8079	0.9120	-0.8149	-0.7914	0.9663	0.8701	0.8320	0.9920	0.9877	0.9783	1

observed in genotype Arka Jay was followed by Ankure goldy (40.65 days to first flowering and 44.75 days to 50% flowering). Number of racemes per plant, number of flower buds per raceme and number of flower buds per plant were also significantly differed between genotypes. The highest number of racemes per plant (6.98), number of flower buds per raceme (26.40) and number of flower buds per plant (184.27) were recorded in Arka Jay followed by Ankure goldy. The least values were recorded in Trichy local. Correlation of data on growth and yield attributes revealed that there exist a linear negative correlation between days to first flowering and yield parameters (table 3.). Occurrence of early flowering (days to 50 % flowering) contributed to the increased number of racemes per plant and flower buds per racemes. It could be opined from the results that earliness in flowering and higher number of racemes per plant must be considered as the important growth attributes while selecting a genotype for high yielding. The present results are in line with the reports of Anburani and Baby Shalini (2013) with respect to earliness in flowering and increased number of racemes per plant.

Results on yield attributes revealed that, among the twenty genotypes ten genotypes viz., Cuddalore local, Goldy-24, Coimbatore local, Arka Jay, Co (Gb)14, Ankure goldy, Nandhini, Villupuram local, Arka Vijay and Chidambaram local have recorded higher yield attributes than the mean performance (table 2.). The highest single pod weight (3.95 g), number of pods per plant (54.25), yield per plant (214.02g), yield per hectare (11.77 t ha⁻¹) observed in genotype Arka Jay was followed by Ankure goldy. The least values in yield parameters were recorded in Trichy local (5.25 t ha⁻¹ of pod yield). The present results are in line with the reports of Shivashankar *et al.* (1993); Rai *et al.* (2008); Chattopadhyay and Dutta (2010) and Upadhyay and Mehta (2010). In quality parameters, protein content was significantly varies among the genotypes, however, fiber content was not significant.

The correlation studies suggested that earliness in flowering and increased leaf area, number of racemes per plant, number of pods, pod length and pod weight are to be considered as vital parameters to choose a variety for high yielding. The present result on correlation study is in line with the work done by Anburani and Baby Shalini (2013) in dolichos bean.

The genotype Arka Jay has expressed early flowering and highest values in the parameters contributing for yield. Hence, it could be concluded that the growth and yield performance of the genotype Arka Jay was the best suitable genotype. Under the coastal region of Tamilnadu.

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