J. Hortl. Sci.
Vol. 4 (1): 50-53, 2009

Evaluation of Dolichos (*Lablab purpureus* L.) germplasm for pod yield and pod related traits

N. Mohan, T.S. Aghora and Devaraju
Division of Vegetable Crops
Indian Institute of Horticultural Research
Hesarghatta Lake Post, Bangalore - 560 089, India
E-mail: nmohan@iihr.ernet.in

ABSTRACT

Fifty seven pole type vegetable dolichos bean (*Lablab purpureus* var. *typicus*) germplasm lines collected from Tamil Nadu, Karnataka and Pondicherry were evaluated in a replicated experiment at Indian Institute of Horticultural Research, Bangalore, for pod yield and pod -related traits during 2006-08. Significant differences were recorded for all traits studied. IIHR 177 was the earliest to flower in 43 days and pods matured in 65 days. IIHR 6 recorded maximum pod length (16.5 cm) , and, ten-pod weight was maximum in IIHR 7 (122 g). Pod width was high in IIHR 11 (4.05 cm). Number of pods per plant ranged from 10 to 91, with the maximum in IIHR 159. Maximum pod-yield was recorded in IIHR 150 and IIHR 159 (576.0 g/plant). Six different pod-colors (green, light green, purple, purple green, pink and creamy- white) were recorded. Maximum number of lines (52.63%) had green pod. The present study indicates existence of a wide range of variability for pod characters, namely, pod-maturity, pod -length, ten-pod weight, number of pods per plant and pod- colour. High yielding lines with different pod types can serve as potentially useful parents in further breeding.

Key words: Dolichos, germplasm, variability

INTRODUCTION

Dolichos bean (*Lablab purpureus* L.), also known as lablab bean or Indian bean, is one of the important indigenous legume vegetables of India, grown for its tender green pods. Besides fresh pods, immature green seeds are also used as vegetable and dry seeds as pulse. Both pods and seeds of dolichos are a rich source of protein, minerals, vitamins and fiber. India is one of the primary centers of origin and diversity of pole-type vegetable dolichos bean (*Lablab purpureus* var. *typicus*). The present study was initiated with the objective of understanding extent of variability for pod-yield and pod-colour in the germplasm recently collected from different sources.

MATERIAL AND METHODS

Fifty seven germplasm lines of dolichos bean collected from different geographical regions of Tamil Nadu, Pondicherry and Karnataka were evaluated during 2006-08 (between September-February) in the experimental farm at Indian Institute of Horticultural Research, Bangalore. The experimental design was RBD with three replications, with each of the lines in a row of three meter length, with a spacing of 15 cm between plants and 1.5 m between rows. The crop was staked and supported and recommended package of practices was followed to raise the crop. Five plants were randomly labeled in each line and data were recorded on seven characters, namely, days to 50% flowering, days to pod maturity, pod-length, pod-width, 10 pod-weight, and, number of pods and pod-yield per plant. The mean value from five plants of each line for each trait in three replications, was computed. The replicated mean data was subjected to statistical analysis. Pod-colour was recorded for all 57 accessions by visual observation.

RESULTS AND DISCUSSION

Analyzed mean data, and, range for the 57 accessions with respect to seven characters (along with place of collection and pod-colour) are given in Table 1. Significant differences were observed in all the characters studied. Days to 50% flowering ranged from 43 to 83 days. IIHR 177 was the earliest to flower in 43 days, followed by

Table 1. Source of collection, pod-yield and pod-related traits in 57 germplasm accessions in Dolichos

Sl. No.	Line	Place from which collected	Days to 50% flowering	Days to pod-maturity	Pod-length (cm)	Pod-width (cm)	10-pod weight (g)	No.of pods per plant	Yield per plant (g)	Pod colour
1.	IIHR-1	Tirchy, Tamil Nadu	61.5	81.5	9.0	3.9	92.0	15.5	141.5	Light green
2.	IIHR 2	Dindigul, Tamil Nadu	63.0	82.0	5.9	2.5	93.0	33.5	306.0	Green
3.	IIHR 3	Coimbatore, Tamil Nadu	76.0	93.0	5.8	2.2	54.0	41.0	210.5	Green
4.	IIHR 4	Trichy, Tamil Nadu	65.5	84.5	5.8	1.8	72.0	21.0	150.6	Green
5.	IIHR 5	Dindigul, Tamil Nadu	83.0	100.0	10.0	1.7	62.0	31.5	192.7	Light green
6.	IIHR 6	Dindigul, Tamil Nadu	65.0	83.0	16.5	2.9	91.0	30.5	270.5	Green
7.	IIHR 7	Dindigul, Tamil Nadu	63.0	83.5	14.5	3.5	122.0	18.5	230.5	Purple
8.	IIHR 8	Siva gangai, Tamil Nadu	63.5	84.5	10.5	3.7	92.5	38.5	364.0	Green
9.	IIHR 9	Pollachi, Tamil Nadu	54.0	74.5	6.0	2.3	53.0	45.5	236.9	Green
10.	IIHR 10	Dindugal, Tamil Nadu	58.5	78.5	16.0	3.2	112.0	25.5	278.0	Green
11.	IIHR 11	Kumbakonam, Tamil Nadu	64.0	83.5	11.5	4.1	111.0	13.5	155.0	Green
12.	IIHR 12	Trichy, Tamil Nadu	63.5	83.5	11.5	1.5	61.0	27.0	172.5	Purple
13.	IIHR 13	Lalgudi, Tamil Nadu	64.0	84.0	11.0	3.4	82.0	20.5	171.5	Green
14.	IIHR 14	Madurai, Tamil Nadu	69.5	89.5	11.0	3.5	81.5	20.0	167.0	Green
15.	IIHR 15	Madurai, Tamil Nadu	64.0	83.5	12.5	2.5	83.0	22.5	188.5	Purple
16.	IIHR 16	Thiruvarur, Tamil Nadu	54.5	75.0	14.5	1.3	65.5	24.0	161.7	Purple green
17.	IIHR 17	Madurai, Tamil Nadu	64.0	84.5	10.3	3.8	102.5	18.5	185.5	Green, broad
18.	IIHR 18	Sivagangai, Tamil Nadu	61.5	82.5	12.5	2.2	76.0	27.5	199.5	Green
19.	IIHR 19	Thiruvarur, Tamil Nadu	55.5	75.0	12.5	1.4	73.0	31.5	320.0	Purple
20.	IIHR 139	Vellore, Tamil Nadu	62.5	80.0	11.5	3.0	79.0	25.5	198.3	Green
21.	IIHR 140	Kancheepuram, Tamil Nadu	65.0	79.5	6.5	1.9	80.5	23.5	185.2	Green
22.	IIHR 141	Kancheepuram, Tamil Nadu	59.5	78.0	12.5	1.5	82.0	18.5	148.4	Green
23.	IIHR 142	Pondicherry	64.5	82.0	6.5	1.5	59.0	73.5	429.4	Purple
24.	IIHR 143	Pondicherry	53.5	73.5	13.5	1.7	92.5	34.0	308.1	Green
25.	IIHR 144	Pondicherry	63.5	82.0	9.8	3.0	83.5	26.5	211.3	Green
26.	IIHR 145	Thiruvannamalai, Tamil Nadu	62.5	80.0	10.5	2.0	69.5	34.0	228.2	Green
27.	IIHR 146	Thiruvannamalai, Tamil Nadu	61.5	80.0	11.0	1.7	74.5	42.0	241.5	Creamy-white
28.	IIHR 147	Kancheepuram, Tamil Nadu	63.5	83.5	11.5	1.9	71.5	25.0	177.5	Creamy-white
29.	IIHR 148	Villupuram, Tamil Nadu	61.5	81.0	14.5	1.7	49.5	31.5	153.8	Purple
30.	IIHR 149	Kancheepuram, Tamil Nadu	66.5	85.5	9.3	2.0	92.5	41.5	380.5	Purple
31.	IIHR 150	Villupauram, Tamil Nadu	66.5	85.0	9.8	2.2	105.0	57.5	576.9	Creamy-white
32.	IIHR 151	Pondicherry	62.0	81.5	7.5	2.3	66.0	23.5	147.5	Green
33.	IIHR 152	Salem, Tamil Nadu	60.0	80.0	13.5	1.4	73.0	29.5	207.7	Purple green
34.	IIHR 153	Thiruvannamalai, Tamil Nadu	62.5	82.0	14.5	1.9	69.5	34.5	232.4	Purple
35.	IIHR 154	Thiruvannamalai, Tamil Nadu	60.5	80.5	16.0	1.9	108.0	36.5	387.1	Purple
36.	IIHR 155	Chidambaram, Tamil Nadu	63.0	82.0	16.0	2.5	109.5	37.5	398.8	Green
37.	IIHR 156	Chidambaram, Tamil Nadu	67.5	86.5	11.5	2.7	82.5	57.5	471.2	Green
38.	IIHR 157	Chennai, Tamil Nadu	62.5	82.5	12.5	2.7	104.0	51.0	515.2	Green
39.	IIHR 158	Villupuram, Tamil Nadu	58.5	87.5	13.5	1.6	73.0	37.5	269.4	Green
40.	IIHR 159	Pondicherry	60.0	80.5	9.5	1.8	64.0	91.0	576.2	Green
41.	IIHR 160	Kancheepuram, Tamil Nadu	62.0	80.0	9.0	4.0	83.5	26.5	211.3	Green
42.	IIHR 161	Chidambaram, Tamil Nadu	64.0	84.5	10.0	3.1	83.0	24.5	194.2	Pink
43.	IIHR 162	Chidambaram, Tamil Nadu	55.5	75.5	8.5	1.6	54.5	44.5	239.9	Green
44.	IIHR 163	Nelamangala, Kanataka	64.0	83.5	15.5	2.3	73.0	51.5	370.5	Green
45.	IIHR 164	Dobbsspet, Karnataka	61.5	81.0	11.0	2.0	72.5	25.5	183.1	Purple
46.	IIHR 165	Tumkur, Karnataka	62.0	82.0	14.5	2.0	64.0	25.5	156.6	Purple
47.	IIHR 167	Tumkur, Karnataka	58.5	78.5	10.0	1.9	52.5	53.0	275.5	Light green
48.	IIHR 168	Tumkur, Karnataka	64.5	84.0	8.5	3.3	92.0	18.0	160.3	Light green
49.	IIHR 169	Nelamangala, Karnataka	58.5	78.5	7.0	1.2	64.0	10.0	69.5	Light green|
50.	IIHR 170	Nelamangala, Karnataka	65.5	83.5	7.5	1.8	62.0	82.5	501.0	Creamy-white
51.	IIHR 171	Nelamangala, Karnataka	62.0	81.5	7.5	1.8	54.5	67.5	365.5	Creamy-white
52.	IIHR 172	Nelamangala, Karnataka	64.5	83.0	14.5	2.4	92.5	43.5	397.5	Creamy-white
53.	IIHR 173	Nelamangala, Karnataka	65.5	83.5	7.5	2.1	57.0	38.5	210.0	Light green
54.	IIHR 174	Tumkur, Karnataka	63.0	83.5	15.8	2.5	111.0	32.5	355.5	Creamy-white
55.	IIHR 175	Tumkur, Karnataka	63.5	83.5	8.2	2.4	62.0	25.5	151.5	Green
56.	IIHR 176	Tumkur, Karnataka	57.0	76.0	10.5	2.0	63.5	76.5	486.5	Green
57.	IIHR 177	Tumkur, Karnataka	43.0	65.0	9.0	1.8	71.5	75.0	535.0	Green
	Mean	-	62.4	81.9	11.0	2.3	78.6	36.1	270.4	-
	Range	-	43.0	65.0	5.75	1.15	49.5	10.0	69.5	-
			–83.0	-100	-16.5	- 4.1	-122.0	-91.0	-576.9	
	CD *(P=0.05)*	-	2.2	2.57	1.32	0.59	5.19	3.21	34.08	-
	CV %	-	1.8	1.6	6.19	13.07	3.37	4.54	6.45	-

Table 2. Grouping of dolichos germplasm for pod maturity, yield and pod related traits

Traits	Germplasm	No. of Lines
Early maturity (65-75 days)	IIHR 9, IIHR 16, IIHR 19, IIHR 143, IIHR 177	5
Pod length (>15 cm)	IIHR 6, IIHR 10, IIHR 154, IIHR 155, IIHR 163, IIHR 174	6
Pod width (> 3.0 cm)	IIHR 1, IIHR 7, IIHR 8, IIHR 10, IIHR 11, IIHR 13, IIHR 14, IIHR 17, IIHR 144, IIHR 160, IIHR 161, IIHR 168	12
Ten pod weight (> 100 g)	IIHR 7, IIHR 10, IIHR 11, IIHR 17, IIHR 150, IIHR 154, IIHR 155, IIHR 157, IIHR 174	9
Pod number /plant (>65)	IIHR 142, IIHR 159, IIHR 170, IIHR 171, IIHR 176, IIHR 177	6
Pod yield per plant (>400 g)	IIHR 142, IIHR150, IIHR 156, IIHR 157, IIHR 159, IIHR 170, IIHR 176, IIHR 177	8

Fig 1. IIHR-150 (pod-yield 576.9 g /plant)

Fig 2. IIHR-159 (pod-yield 576.2 g/plant)

Fig 3.Variation in podin some germplasm lines of dolichos

IIHR 143 (53.5 days). Pod-maturity ranged from 65 to 100 days. IIHR 177 was early to pod maturity in 65.0 days, followed by IIHR 143 (73.5 days). Pod-length ranged from 5.75 to 16.5 cm and IIHR 6 recorded maximum pod length. Pod-width ranged from 1.15 to 4.05 cm with maximum pod-width recorded in IIHR 11. Pods were narrow in IIHR 169. Ten pod weight ranged from 49.5 -122 g and maximum ten-pod weight was recorded in IIHR 7. Number of pods per plant ranged from 10 to 91, with maximum pod number in IIHR 159. Pod-yield per plant ranged from 69 to 576.9 g and maximum pod-yield was recorded in IIHR 150 and IIHR 159 with 576.9 and 576.2 g/plant, respectively (Fig.1 and 2). The results indicated existence of wide variability for each of the seven traits studied. Similar findings were reported (Baswana *et al*, 1980; Desai *et al*, 1996; Anon. 2000; Singh *et al*, 2004; Bendale *et al*, 2004; Nahar and Newaz, 2005). Lines found promising for six of the characters are shown in Table 2. There are five lines for earliness; six lines for pod-length; 12 for pod-width; nine for high pod-weight; six for high pod-number and eight lines for high pod-yield. Wide variations were recorded for pod-colour with six types, namely, green, light-green, purple, purple-green, pink and creamy-white. Details for pod-colour are presented in Table 3. In 30 lines (52.63%), pod colour was green. 11 lines (19.3%) had purple pods, seven lines cream-white pods and six lines had light-green pod-colour (Fig. 3). Two lines had purple- green pods and one line with deep pink pods, indicating wide variation for pod-colour. Similar variation in pod-colour was observed in dolichos germplasm collected by AVRDC in Bangladesh (Anon, 2000).

The present study on 57 lines of dolichos revealed occurrence of wide variability for pod-yield, pod-maturity, pod-length, ten-pod weight, number of pods per plant and pod-colour. High-yielding germplasm lines and lines with different pod-types can be utilized further in breeding programmes. Lines with colour variation can be used as phenotypic markers in genetic and hybridization studies.

Table 3. Grouping of Dolichos germplasm based on pod-colour

	Pod colour					
	Green	Light-green	Purple	Purple-green	Deep pink	Creamy-white
No. of germplasm lines	30	6	11	2	1	7
Per cent	52.63	10.53	19.30	3.51	1.75	12.28

REFERENCES

Anonymous, 2000. Annual Report, AVRDC, World Vegetable Center, Tainan, Taiwan, p. 82

Baswana, K.S., Pandita, M. L., Dhankhar, B.S. and Partap, P. S. 1980. Genetic variability and heritability studies on Indian bean (*Dolichos lablab* var. *lignosus* L.) *Haryana J. Hortl. Sci.,* **9**:52-55

Bendale, V.W., Topare, S.S., Bhave, S.G., Mehta, J.K. and Madav, R.R. 2004. Genetic analysis of yield and yield components in lablab bean [*Lablab purpureus* (L.) Sweet]. *Orissa. J. Hort.,* **32:**99-101

Desai, N.C., Tikka, S.B.S and Chauhan, R.M. 1996. Genetic variability and correlation studies in Indian beans (*Dolichos lablab*. var. *lignosus*). *New Botanist*, **23**:197-204

Nahar, K and Newaz, M.A. 2005. Genetic variability, character association and path analysis in lablab bean (*Lablab purpureus* L.) *Intl. J. Sustain. Agril. Tech.,* **1**:35-40

Singh, D., Dhillon, N.P.S., Singh, G.J and Dhaliwal, H.S. 2004. Evaluation of semphali (*Dolichos lablab* L.) germplasm under rainfed conditions. *Haryana J. Hortl. Sci.,* **33:**267-268

(MS Received 6 October, 2008 Revised 15 June 2009)