



E-ISSN: 2278-4136

P-ISSN: 2349-8234

[www.phytojournal.com](http://www.phytojournal.com)

JPP 2020; 9(5): 2717-2720

Received: 08-07-2020

Accepted: 18-08-2020

**Preetham R**Vice-Principal, Horticultural  
Polytechnic, Adilabad,  
Telangana State, India**Suchitra V**Senior Scientist and Head,  
Horticultural Research Station,  
Adilabad, Telangana, India**Ashwini D**Research Associate,  
Horticultural Research Station,  
Adilabad, Telangana, India

## Evaluation of *Dolichos* genotypes (*Dolichos lablab* L.) to qualitative and quantitative traits in Northern Telangana Zone

Preetham R, Suchitra V and Ashwini D

**Abstract**

A field trial was conducted at Horticultural Research Station, Adilabad of Northern Telangana Zone in Telangana State, India for two consecutive years of 2017 and 2018 with sixteen genotypes of dolichos bean. The study was initiated to study the qualitative and quantitative traits of different genotypes. The experiment was laid by adopting Randomized Block Design with two replications. Significant variations were noticed in the qualitative and quantitative traits among the germplasm. Significant higher leaf length was noticed in ADP-13, highest leaf width and leaflet length in RND-1, raceme length was significantly higher in Pusabeej, no. of flower buds per raceme and no. of nodes per raceme in RND-1, no. of buds per node was highest in ADP-4 and ADP-7. Flower bud length was highest in ADP-3 and ADP-11, flower bud width was highest in ADP-1, no. of pods per plant was highest in ADP-1. Significant higher pod length was observed in RND-1, pod width in Pusabeej, no. of locules per pod was highest in ADP-10, followed by RND-1 and no. of seeds per pod was highest in ADP-10 followed by RND-1. Significant higher pod yield per plant was recorded by RND-1, followed by ADP-7 which was on par with Pusabeej.

**Keywords:** *Dolichos* bean, qualitative characters, quantitative characters

**Introduction**

*Dolichos* bean (*Dolichos lablab* L.) commonly known as field bean, hyacinth bean, kidney bean, garden bean, Indian bean, Egyptian bean, Bonavist bean, Sem etc (Shivashankar and Kulkarni, 1989) [13] belongs to family fabaceae with  $2n=22$  chromosomes (Goldblatt, 1981) [7] is an important leguminous vegetable grown throughout the country and is distributed in Madhyapradesh, Maharastra, Telangana, Tamilnadu, Karnataka and North eastern states. It occupies a unique position as a vegetable among the legume crops due to its high nutritious value (Basu *et al.*, 2002) [3]. It has anti-diabetic property and is good for natural cure of bladder burns and cardiac problems, diarrhoea, sciatica and tenesmus. It is intercropped with maize, finger millet and sorghum in south India under rainfed conditions. In Telangana, it occupies an area of 6050 ha with a production of 63306 MT and a productivity of 1046 kg/ha (Anonymous, 2017) [2]. Despite the wide range of adaptability and diversity, it remains as an underutilized crop in many of these regions (Engle and Altoveris, 2000) [6]. However, its potential as a vegetable, pulse, forage, cover and green manure crop (Adebisi and Bosch, 2004) [1] and suitability to tropical agricultural production systems (Ebert, 2014) [5] was reported. Great range of variation exists in the plant and pod characters among the cultivars grown all over the country (Peter and Kumar, 2008) [11]. The success of any breeding programme in general and improvement of specific rate through selection depends upon the genetic variability present in the germplasm of a particular crop (Parmer *et al.*, 2013 a and b) [9, 10]. Characterization aids in meaningful grouping of accessions, development of core collection and identification of gaps and retrieval of desired accessions from germplasm data base for using crop breeding. Being easily assayable and exhibits stable and simple inheritance (Smith and Smith, 1992) [16] they serve as diagnostic markers of germplasm accessions for their maintaining their identity and purity. The present study was initiated with the objective of understanding the extent of variability for pod yield and pod colour in the germplasm recently collected from different sources.

**Materials and Methods**

The investigation was carried out during 2017 and 2018 at Horticultural Research Station, Adilabad (79° 56' 03" E longitude and 19° 08' 09" N latitude) in Northern Telangana region of Telangana state. The experimental soil was sandy clay loam in texture, neutral in reaction, medium in available nitrogen, phosphorous and potassium.

**Corresponding Author:****Preetham R**Vice-Principal, Horticultural  
Polytechnic, Adilabad,  
Telangana State, India

The experiment was laid out in randomized block design with two replications in 2017 and 2018. The seeds of 16 germplasm brought from Vegetable Research Station, Hyderabad, local collections from Adilabad and Warangal districts and IARI, Pusa, New Delhi (Table-1) were sown on 16<sup>th</sup> June, 2017 and 26<sup>th</sup> June, 2018 by dibbling three seeds per hill at a distance of 1m with-in the row and 2 m between rows. The plots were irrigated immediately after sowing. Thinning and gap filling was taken up at 10 days after germination. Need based plant protection measures were taken up by spraying neem oil @ 5ml/litre of water for control of aphids and plethora (Novaluron 5.25% + Indoxycarb 4.5%) @ 2ml/litre of water for control of pod borers. The observations were recorded from 10 randomly selected plants from each genotype in each replication. The data recorded on qualitative traits (Leaf colour, shape, flower bud colour, standard petal, wing petal and keel petal colour, pod colour, pod fragrance, pod attachment, pod constriction, fresh and dry seed colour, and seed shape) and quantitative characters (Leaf length, leaf width, leaflet length, raceme length, no. of flower buds per raceme, no. of nodes per raceme, no. of buds per node, flower bud length, flower bud width, no. of pods per plant, pod length, pod width, no. of locules per pod, no. of seed per pod and pod yield per plant) were recorded as per standard procedures in vogue characterization and evaluation

descriptors and their states are described and presented in Table-2 depicted from 1.01 to 1.12 for qualitative traits and 2.01 to 2.15 for quantitative traits. The data was analyzed statistically using *F*-test following Gomez and Gomez (1984)<sup>[8]</sup>. LSD values at  $p < 0.05$  were used to determine the significance of difference between treatment means.

**Table 1:** Source of germplasm/ genotype/ accessions

Genotype	Source
ADP-1	Mavala, Adilabad
ADP-2	Rythubazar, Adilabad
ADP-3	Mavala, Adilabad
ADP-4	Teachers Colony, Adilabad
ADP-5	Dasnapur, Adilabad
ADP-6	KRK Colony, Adilabad
ADP-7	Ankoli, Adilabad
ADP-8	Boath, Adilabad
ADP-9	Boath, Adilabad
ADP-10	Boath, Adilabad
ADP-11	Mediguda, Adilabad
ADP-12	Vegetable Research Station, Rajendranagar, Hyd
ADP-13	Boath, Adilabad
ADP-14	Warangal
RND-1	Vegetable Research Station, Rajendranagar, Hyderabad
Pusa Beej	IARI, Pusa, New Delhi

**Table 2:** Plant data based descriptors of Dolichos bean (*Dolichos lablab* L.)

Sl No.	Descriptor	Descriptor states/ scale
<b>1. Qualitative traits</b>		
1.01	Leaf colour	1=Pale green, 3=Green, 5=Dark green 7=Purple, 9=Dark purple
1.02	Leaf shape	1=Round, 3=Ovate, 5=Ovate lanceolate, 7=Lanceolate, 9=Linear lanceolate
1.03	Flower bud colour	1=White, 2=Cream, 3=Light Yellow, 4=Pink, 5=Purple
1.04	Standard Petal Colour	1=White, 2=Cream, 3=Light Yellow, 4=Pink, 5=Purple
1.04	Wing Petal Colour	1=White, 2=Cream, 3=Light Yellow, 4=Pink, 5=Purple
1.05	Keel Petal Colour	1=White, 2=Cream, 3=Light Yellow, 4=Pink, 5=Purple
1.06	Pod Colour	1=White, 2=Cream, 3=Green, 4=Green with purple suture, 5=Purple, 6=Dark purple, 7=Red
1.07	Pod fragrance	0=Absent 1=Low, 2=Medium, 3=High
1.08	Pod attachment	1=Erect, 2=Intermediate, 3=Pendent
1.09	Pod constriction	0=No constriction, 3=Slightly constricted, 5=Constricted
1.10	Fresh Seed Colour	1=Green, 2=Cream, 3=Purple, 4=Brown, 5=Black
1.11	Dry seed colour	1=White, 2=Green, 3=Cream, 4=Purple, 5=Brown, 6=Black
1.12	Seed Shape	1=Round, 2=Oval, 3=Flat, 4=Others (specify)
<b>2. Quantitative traits</b>		
2.01	Leaf length	Measured on the terminal leaflet of third trifoliate leaf (Middle portion of the leaf) from 10 plants (cm)
2.02	Leaf width	Measured on the terminal leaflet of third trifoliate leaf (Middle portion of the leaf) from 10 plants (cm)
2.03	Leaflet length	Measured on the terminal leaflet of third trifoliate leaf (Middle portion of the leaf) from 10 plants (cm)
2.04	Raceme length	Average of 10 randomly chosen plants (cm)
2.05	No. of flower buds per raceme	Average of 10 randomly chosen racemes
2.06	No. of nodes per raceme	Average of 10 randomly chosen racemes
2.07	No. of buds per node	Average of 10 randomly chosen racemes
2.08	Flower bud length (just before opening)	Average of 10 randomly chosen buds (mm)
2.09	Flower bud width (just before opening)	Average of 10 randomly chosen buds (mm)
2.10	No. of pods per plant	Average number of pods from 10 randomly chosen plants
2.11	Pod length	Average of 10 randomly chosen pods (cm)
2.12	Pod width	Average of 10 randomly chosen pods (cm)
2.13	No. of locules per pod	Average of 10 randomly chosen pods
2.14	No. of seeds per pod	Average of 10 randomly chosen pods
2.15	Pod yield per plant and	Average of 10 randomly chosen plants (g)

Byregowda *et al.*, 2015<sup>[4]</sup>

## Results and Discussion

### Performance of various germplasm to qualitative traits:

**Leaf traits (Leaf colour and leaf shape):** Wide variation was observed in the leaf colour of different germplasm. It was pale green (ADP-3, ADP-8 & ADP-11), green (ADP-9) and dark green in rest of the germplasm. The leaves were round in ADP-5, ovate lanceolate in ADP-4, ADP-7, ADP-8 and ADP-14 and ovate in rest of the germplasm (Table-3).

**Floral traits (Flower bud colour, standard, wing and keel petal):** The flower bud colour was purple in case of ADP-10 and RND-1 and cream in rest of the germplasm. The standard, wing and keel petals were purple in case of ADP-10 and RND-1 and white in rest of the germplasm.

**Pod traits (Pod colour, pod fragrance, pod attachment and pod constriction):** The pod colour varied among the germplasm. It was white in case of ADP-7 and ADP-13, green with purple suture in ADP-10 and RND-1 and green in rest of the germplasm. Pod fragrance was absent in ADP-7 and ADP-13, medium in pusa beej, high in ADP-12 and low in rest of the germplasm. Pod attachment was erect in ADP-13 pendant in ADP-2, ADP-3, ADP-7, ADP-8 and ADP-11. Pod constriction was absent in ADP-1 and ADP-13 constricted in ADP-12 and slightly constricted in rest of the germplasm.

**Seed traits (Fresh and dry seed colour and dry seed shape):** Fresh seed colour was cream in ADP-1, green in eight germplasm and purple in seven germplasm. Dry seed was white in ADP-2 and ADP-5, black in ADP-10 and RND-1 and brown in twelve germplasm. Dry seed was round in six germplasm and oval in ten germplasm (table-3).

### Performance of various germplasm to quantitative traits

A wide range of variations were observed for vegetative, floral, pod and seed traits among the various germplasm.

#### Vegetative traits

Leaf length varied from 10.75 cm (ADP-12) to 17.55 cm (ADP-13), leaf width varied from 14.90 cm in ADP-11 to

20.85 cm in RND-1. Leaf let length varied from 6.85 cm in ADP-14 to 11.40 cm in RND-1 (table-4), ADP-13 recorded significantly higher leaf length, RND-1 higher leaf width and leaf let length over other germplasm.

#### Floral traits

Raceme length varied from as small as 7.05 cm in ADP-9 to 30.05 cm in Pusa beej, no. of flower buds per raceme varied from 16.30 in ADP-2 to 63.85 in RND-1, no. of nodes per raceme range between 5.10 (ADP-9) to 18.05 (RND-1), no. of buds per nodes ranged between 3.30 (ADP-11) to 5.65 (ADP-4), flower bud length ranged between 1.65 (ADP-9 and ADP-12) to 2.95 (ADP-3 and ADP-11) and flower bud width ranged between 0.75 (ADP-14) to 2.35 (ADP-1). Significantly higher raceme length was noticed in Pusa beej, no. of flower buds per raceme, no. of nodes per raceme in RND-1. No. of buds per raceme was maximum in ADP-4 and ADP-7 which was at par with ADP-8. Maximum flower bud length was noticed with ADP-3 and ADP-11 but was at par with ADP-2. Significantly higher flower bud width was observed in ADP-1. The results are in conformity with the findings of Parmar *et al.*, (2013 a and b)<sup>[9, 10]</sup> and Priyanka *et al.*, (2014)<sup>[12]</sup>.

#### Pod and seed traits

No. of pods per plant ranged between 63 (ADP-14) to 1013 (ADP-1), pod length 6.11 (ADP-14) to 17.07 cm (RND-1), pod width 1.25 cm (ADP-9) to 2.79 cm (RND-1), no. of locules per pod 5.0 (ADP-1) to 6.9 (ADP-10 and ADP-12), no. of seeds per pod 5.0 (ADP-1 and ADP-3) to 6.2 (ADP-10) and pod yield per plant ranged between 338 g (ADP-14) to 5344 g (RND-1). Significantly higher no. of pods per plant were noticed in ADP-1, pod length in RND-1, pod width in Pusa beej, no. of locules per pod and no. of seeds per pod in ADP-10 and pod yield per plant in RND-1. The germplasm RND-1 recorded significantly higher pod yield per plant (5.344 kg) over rest of the treatments followed by ADP-7 (4.321 kg) which was at par with Pusa beej (4.226 kg) which is in conformity with the studies of Dilbag Singh *et al.*, (2004), Upadhyay and Mehta (2010) and Singh *et al.*, (2000).

**Table 3:** Performance of Dolichos bean germplasm for qualitative characters at HRS, Adilabad (Northern Telangana Zone)

Germplasm	Leaf colour	Leaf shape	Flower bud colour	Standard petal colour	Wing petal colour	Keel petal colour	Pod colour	Pod fragrance	Pod Attachment (Unripe)	Pod constriction	Fresh seed colour	Dry seed colour	Dry seed shape
ADP-1	5	3	2	1	1	1	3	1	2	0	2	5	1
ADP-2	5	3	2	1	1	1	3	1	3	3	1	1	1
ADP-3	1	3	2	1	1	1	3	1	3	3	1	5	2
ADP-4	5	5	2	1	1	1	3	1	2	3	3	5	2
ADP-5	5	1	2	1	1	1	3	1	2	3	1	1	1
ADP-6	5	3	2	1	1	1	3	1	2	3	1	5	1
ADP-7	5	5	2	1	1	1	1	0	3	3	1	5	2
ADP-8	1	5	2	1	1	1	3	1	3	3	3	5	2
ADP-9	3	3	2	1	1	1	3	1	2	3	3	5	1
ADP-10	5	3	5	5	5	5	4	1	2	3	1	6	2
ADP-11	1	3	2	1	1	1	3	1	3	3	3	5	2
ADP-12	5	3	2	1	1	1	3	3	2	5	3	5	2
ADP-13	5	3	2	1	1	1	1	0	1	0	1	5	2
ADP-14	5	5	2	1	1	1	3	1	2	3	3	5	1
RND-1	5	3	5	5	5	5	4	1	2	3	1	6	2
Pusa beej	5	3	2	1	1	1	3	2	2	3	3	5	2

**Table 4:** Performance of Dolichos bean germplasm for quantitative characters at HRS, Adilabad (Northern Telangana Zone)

Germplasm	Leaf length (cm)	Leaf width (cm)	Leaf let length (cm)	Raceme length (cm)	No. of Flower buds per raceme	No. of Nodes per raceme	No. of Buds per node	Flower bud length (cm)	Flower bud width (cm)	No. of pods per plant	Pod length (cm)	Pod width (cm)	No. of locules per pod	No. of Seeds per pod	Per plant pod yield (kg)
ADP-1	13.20	16.65	8.65	28.55	19.35	9.10	5.15	2.15	2.35	1,013	7.56	1.44	5.0	5.0	4.024
ADP-2	14.60	20.95	11.15	17.20	16.30	6.45	4.85	2.85	1.75	657	9.57	2.35	5.7	5.2	3.440
ADP-3	12.45	16.35	8.15	16.60	20.90	5.10	4.75	2.95	1.35	658	8.56	1.81	5.1	5.0	2.500
ADP-4	13.25	16.60	9.40	15.15	46.90	11.30	5.65	2.60	1.45	609	9.18	1.36	5.4	5.3	2.641
ADP-5	14.15	19.60	10.80	8.20	29.90	5.35	5.35	2.05	0.95	422	9.84	2.23	5.2	5.2	1.860
ADP-6	11.40	17.15	8.50	16.25	38.10	9.45	5.30	1.70	1.15	692	8.12	1.73	6.0	5.1	2.605
ADP-7	14.05	20.05	10.35	15.35	29.25	8.05	5.65	2.45	1.65	892	10.45	1.86	6.1	5.5	4.321
ADP-8	12.50	17.85	9.70	24.90	32.30	11.00	5.55	2.20	1.35	334	14.97	1.51	6.2	5.7	2.438
ADP-9	11.10	16.35	8.40	7.05	20.55	5.10	3.75	1.65	1.45	968	8.04	1.25	6.3	5.8	3.226
ADP-10	14.30	18.25	10.00	12.35	20.95	6.10	3.55	2.35	1.85	615	16.34	1.73	6.9	6.2	3.972
ADP-11	11.55	14.90	8.00	19.35	20.10	10.05	3.30	2.95	1.95	325	9.33	1.61	5.8	5.2	1.692
ADP-12	10.75	16.25	8.45	14.55	27.05	6.65	4.05	1.65	1.35	302	11.12	1.27	6.9	5.5	1.125
ADP-13	17.55	16.20	7.55	26.45	18.85	8.25	4.85	1.85	1.15	175	14.00	2.47	5.3	5.1	0.618
ADP-14	15.05	15.75	6.85	14.25	22.45	7.05	5.05	1.85	0.75	63	6.11	1.53	5.1	5.0	0.338
RND-1	15.10	20.85	11.40	24.10	63.85	18.05	4.05	1.75	1.25	724	17.07	1.45	6.6	5.9	5.344
Pusa beej	14.30	20.25	9.95	30.05	28.45	7.25	5.25	2.45	1.15	412	15.01	2.79	6.0	5.4	4.226
	0.08	0.07	0.08	0.07	0.07	0.12	0.06	0.06	0.05	8	0.02	0.01	0.1	0.1	0.060
	0.25	0.20	0.25	0.21	0.20	0.30	0.18	0.19	0.15	26	0.07	0.03	0.2	0.2	0.190

Pooled mean data of two years (2017 and 2018)

### Conclusion

From the present investigation it can be concluded that the difference in yield may be attributed to no. of flower buds per raceme, no. of nodes per raceme, no. of pods per plant, pod length, no. of locules per pod and no. of seeds per pod. Among the sixteen genotypes tested the highest pod yield was recorded in RND-1 this might be due to improved a growth habit like larger leaf width, leaf let length, better yield attributes like more no. of flower buds per raceme, more no. of nodes per raceme, maximum pod length, higher no. of locules per pod and no. of seeds per pod.

### References

- Adebisi AA, Bosch CH. *Lablab purpureus* (L.) sweet. In: Grubben GJH and Denton OA (eds) Plant Resources of Tropical Africa (PROTA), Vegetables. Wageningen, The Netherlands: PROTA Foundation. 2004; 2:343-348.
- Anonymous. Advance Estimates, Department of Horticulture, Government of Telangana, India, 2017.
- Basu AK, Samantha SK, Sasmala AC. Genetic analysis for some seed parameters in Lablab bean. *Vegetable Science*. 2002; 32(2):129-132.
- Byregowda M, Girish G, Ramesh S, Mahadevu P, Keerthi CM. Descriptors of Dolichos bean (*Lablab purpureus* L.) *Journal of Food Legumes*. 2015; 28(3):203-214.
- Ebert AW. Potential of underutilized traditional vegetables and legume crops to contribute to food and nutritional security, income and more sustainable production systems. *Sustainability*. 2014; 6:319-335.
- Engle LM, Altoveris NC. Collection, conservation and utilization of indigenous vegetables. In: Proceedings of a workshop, Asian Vegetable Research and Development Centre (AVRDC), Shanhua, Taiwan, 1999, 142. Evaluation of dolichos (*Lablab purpureus* L.)  
Evaluation of dolichos (*Lablab purpureus* L.)  
Evaluation of dolichos (*Lablab purpureus* L.)  
Evaluation of dolichos (*Lablab purpureus* L.)  
Evaluation of dolichos (*Lablab purpureus* L.)  
Evaluation of dolichos (*Lablab purpureus* L.)  
Evaluation of dolichos (*Lablab purpureus* L.)  
Evaluation of dolichos (*Lablab purpureus* L.)
- Goldblatt P. Cytology and phylogeny of leguminosae. In: Polhill RM and Raven (Eds), *Advances in legume* systematic, Royal Botanical Gardens, Kew, 1981, 427-463.
- Gomez KA, Gomez AA. *Statistical procedures for Agricultural Research*. A Wiley International Publication, John Wiley and Sons, NEWYORK, U.S.A, 1984.
- Parmer AM, Singh AP, Dhillon NPS, Jamwal M. Genetic variability of morphological and yield traits in Dolichos bean (*Lablab purpureus* L.). *African Journal of Agricultural Research*. 2013a; 8(12):1022-1027.
- Parmer AM, Singh AP, Dhillon NPS, Jamwal M. Genetic variability studies for morphological and yield traits in Dolichos bean (*Lablab purpureus* L.). *World Journal of Agricultural Sciences*. 2013b; 9(1):24-28.
- Peter KV, Kumar PT. *Genetics and Breeding of Vegetable Crops*. Indian Council of Agricultural Research, New Delhi, 2008, 231-234.
- Priyanka KM, Pugalendhi L, Nirmalakumar A. Evaluation of dolichos bean (*Dolichos lablab* L.) for yield and quality, *National Seminar on Challenges and Innovative Approaches in Crop Improvement*, Tamil Nadu Agricultural University, Coimbatore, T.N. (India), 2014.
- Shivashankar G, Kulkarni RS. Field bean (*Dolichos lablab* L. var. *Lignosus* Prain). *Indian Horticulture*. 1989; 34:24-27.
- Singh BK, Singh BP, Ram HH. Variability and correlation studies in bush type french bean (*Phaseolus vulgaris* L.) in relation to green pod yield. *Progressive Horticulture*. 2000; 32(2):176-182.
- Singh D, Dillon NPS, Singh G, Dhaliwal HS. Evaluation of semphali (*Dolichos lablab* L.) germplasm under rainfed condition. *Haryana Journal of Horticultural Science*. 2004; 33(3-4):267-268.
- Smith JSC, Smith OS. Finger printing crop varieties. *Advances in Agronomy*. 1992; 47:85-140.
- Upadhyay D, Mehta N. Biometrical studies in Dolichos bean (*Dolichos lablab* L.) for Chhattisgarh plains. *Research Journal of Agricultural Science*. 2010; 1(4):441-447.