

Title of the experiment

Collection and characterization of Indian bean
(*Dolichos lablab* L.) genotypes from Jharkhand

WELCOME

By

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Key words: Indian bean, *Dolichos*, characterization, exploration, genotype, variability.

Introduction

- Dolichos bean (*Lablab purpureus* L.) is also known as Indian bean.
- A wide range of variability exists in the Indian bean in Jharkhand.
- Western plateau region of the state is the most suitable region for the exploration and collection of *Dolichos* germplasm.
- Considering these points a programme for collection, characterization and maintenance of diverse genotypes from different districts of western plateau region of Jharkhand was carried out at Zonal Research Station, Chianki with the following objectives:
 - To collect diverse genotypes of Dolichos bean for breeding purpose.
 - Characterization and selection of promising genotypes of Dolichos bean for zone-V of Jharkhand state.

Materials and methods

- **Collection of seeds/pods started from 2012 at ZRS, Chianki and a total of 40 genotypes were collected and sowing in the corresponding *Kharif* season.**
- **Most of the accessions were collected during *spring-summer* season (24 acc.) followed by late winter season (16 acc.) and maintained over the years.**
- **First experiment was laid out during *Kharif* 2012-13 at ZRS, Chianki with 35 genotypes.**
- **Number of entries increases over the years and 40 genotypes during *Kharif*, 2014-15.**
- **39 genotypes collected from farmers field and one from HARP, Plandu (ICAR, Research Centre for Eastern Region, Ranchi Centre) altogether 40 genotypes.**
- **Recommended package of practices were followed to grow normal crops.**
- **Replicated trials were conducted during *Kharif* 2012-13, 2013-14 and 2014-15 at Chianki for its morphological characterization and evaluation.**

Observation recorded on

- Morphological characters
- Floral and fruiting characteristics
- Pod and seed characteristics
- Yield and its attributing characters

Pod colour of Dolichos bean genotypes

S. No.	Colour	No. of genotypes
1	Green	22
2	Purple	2
3	Purple green	5
4	Purple red	2
5	Whitish green	4
6	Light purple	1
7	Whitish purple	2
8	White	1
9	Light green	1
	Total	40

A photograph of a field of Dolichos G.P. plants. In the foreground, a white sign with a green border is mounted on a silver post. The sign contains the text: "ZRS, Chianki", "Expt. - Dolichos G.P.", and "Year - 2012-13". The plants are tall and green, with some purple flowers visible. The field extends into the distance under a clear blue sky.

ZRS, Chianki

Expt. - *Dolichos* G.P.

Year - 2012-13



Seed coat colour of Dolichos genotypes

S. No.	Colour	No. of genotypes
1	Brown	10
2	Black	17
3	White	12
4	Spotted	1
	Total	40

Table 1: Morphological characters and Performance of different genotypes of Dolichos bean during *Kharif* 2014-15

S. No.	Germplasm	Leaf & Stem colour	Flower colour	Pod colour tender stage	Mature Seed coat colour	Ist flowering DAS	No of flower bud per bunch	Bunch length (cm)	No. of pod per Bunch	No. of Bunch per plant
1	AMAD-1	Green	White	Green	Brown	87.00	12.13	26.80	3.93	22.53
2	AMAD-2	Purple	Purple	Purple	Black	92.67	10.40	22.13	4.73	17.97
3	AMAD-3	Green	White	Green	White	94.33	10.20	21.07	4.67	14.60
4	AMAD-4	Purplish green	Purple	Purple green	Black	93.00	14.20	33.93	4.20	16.47
5	AMAD-5	Green	White	Green	White	91.33	12.53	19.53	4.53	23.67
6	AMAD-6	Purple	Purple	Purple red	Black	93.00	11.53	18.27	3.07	18.60
7	AMAD-7	Green	White	Green	White	91.67	9.27	21.73	3.20	20.33
8	AMAD-8	Green	White	Green	White	102.67	7.57	27.73	4.13	18.87
9	AMAD-9	Green	White	White	Black	102.00	9.40	30.47	3.27	21.13
10	AMAD-10	Purple	Purple	Green	White	90.33	8.07	19.73	4.60	20.67
11	AMAD-11	Green	White	Green	Brown	83.33	8.33	23.13	4.40	18.53
12	AMAD-12	Purple	Purple	Green	Black	93.00	8.27	22.73	6.93*	15.47
13	AMAD-13	Green	White	Green	White	103.00	10.27	21.40	4.27	17.73
14	AMAD-14	Purple	Purple	Green	Brown	84.67	7.10	14.33	4.87	23.00
15	AMAD-15	Purple	Purple	Purple red	Black	92.00	14.93*	13.20	4.00	11.40
16	AMAD-16	green	White	Whitish green	Brown	94.67	8.40	25.87	4.47	17.00
17	AMAD-17	green	White	Green	White	93.00	6.47	27.87	5.53	12.93
18	AMAD-18	green	White	Green	Black	95.33	5.67	15.60	4.47	13.80
19	AMAD-19	green	White	Green	Brown	93.00	6.87	14.07	5.00	21.27
20	AMAD-20	Purple	Purple	Light purple	White	90.00	13.20	26.40	3.87	25.60
					CD (5%)	2.11	1.92	4.82	0.77	3.26
					SE(m)	0.749	0.679	1.708	0.273	1.157
					CV%	1.41	11.51	12.49	10.72	10.09

Table 1: Cont.....

S. No.	Germplasm	Leaf & Stem colour	Flower colour	Pod colour tender stage	Mature Seed coat colour	Ist flowering DAS	No of flower bud per bunch	Bunch length (cm)	No. of pod per Bunch	No. of Bunch per plant
21	AMAD-21	Green	White	Green	Brown	82.00	<u>13.47</u>	<u>30.13</u>	3.67	34.00*
22	AMAD-22	Green	White	Green	Brown	93.67	9.47	23.53	3.67	14.40
23	AMAD-23	Green	White	Green	Brown	105.67	6.73	21.80	4.80	28.40
24	AMAD-24	Green	White	Whitish green	Brown	102.33	<u>14.47</u>	16.47	3.80	31.60
25	AMAD-25	Purple	Purple	Whitish purple	Black	96.00	10.33	27.00	4.67	23.60
26	AMAD-26	Green	White	Light green	White	105.67	6.67	25.87	3.60	19.87
27	AMAD-27	Green	White	Green	Black	106.33	<u>13.73</u>	21.20	5.80	16.53
28	AMAD-28	Purple	Purple	Whitish purple	Black	94.33	8.27	26.07	4.40	16.00
29	AMAD-29	Green	White	Green	White	83.00	9.80	24.33	4.40	20.13
30	AMAD-30	Green	White	Green	White	81.67	10.73	<u>34.53</u>	4.07	17.97
31	AMAD-31	Green	White	White	Black	83.00	10.57	22.47	4.20	20.53
32	AMAD-32	Purple	Purple	Green	Spotted	81.67	6.93	27.33	4.80	14.27
33	AMAD-33	Purple	Purple	Purple green	Black	<u>77.00</u>	8.40	18.33	4.73	13.40
34	AMAD-34	Purple	Purple	Light green	Black	<u>77.33*</u>	<u>14.20</u>	20.73	5.53	25.43
35	AMAD-35	Green	White	Purple	Black	90.67	11.33	21.13	4.20	19.40
36	AMAD-36	Purple Green	Pink	Purple Green	Black	93.00	<u>14.47</u>	34.87*	4.53	14.87
37	AMAD-37	Purple Green	Pink	Purple Green	Black	93.00	13.00	25.20	4.13	21.00
38	AMAD-38	Green	Purple	Green	White	92.00	11.67	29.87	4.13	23.80
39	AMAD-39	Purple	Purple	Purple Green	Black	88.00	10.27	23.60	4.40	23.40
40	Swarna Uttakrisht	Purple Green	Light Purple	Green	Brown	92.67	9.60	27.27	4.73	24.00
					CD (5%)	2.11	1.92	4.82	0.77	3.26
					SE(m)	0.749	0.679	1.708	0.273	1.157
					CV%	1.41	11.51	12.49	10.72	10.09

Table 2: Mean performance of different genotypes of Dolichos bean during *Kharif* 2014 -15

S. No.	Germplasm	No. of pod per plant	Weight of single pod (g)	Yield per plant (g)	Pod length (cm)	Pod width (cm)	No of seeds per pod
1	AMAD-1	120.52	17	2254.05	10.4	2.00	<u>5.4</u>
2	AMAD-2	204.63	<u>24</u>	4976.35	13.2	2.40	5.2
3	AMAD-3	328.00	13	4483.22	9.4	1.90	5.2
4	AMAD-4	226.06	17	3771.11	16.6*	1.25	5.2
5	AMAD-5	243.17	25*	6000.43*	12.2	1.95	4.8
6	AMAD-6	187.61	<u>24</u>	4314.21	12.2	2.50	4.8
7	AMAD-7	136.19	18	2542.44	11.6	2.10	4.8
8	AMAD-8	150.97	20	2865.95	12.8	1.96	6.0*
9	AMAD-9	69.63	19	1223.09	16.6*	2.30	<u>5.6</u>
10	AMAD-10	95.57	13	1361.97	10.2	1.45	5.2
11	AMAD-11	81.69	14	1168.07	9.4	1.98	4.4
12	AMAD-12	107.04	11	1072.45	9.6	2.10	4.2
13	AMAD-13	75.96	18	1289.37	11.6	1.95	<u>5.4</u>
14	AMAD-14	88.10	9	764.07	12.4	1.20	5.2
15	AMAD-15	45.24	18	751.44	10.8	2.00	<u>5.6</u>
16	AMAD-16	160.99	15	2468.71	11.6	1.30	5.2
17	AMAD-17	132.63	16	2164.90	11.0	1.85	4.8
18	AMAD-18	91.94	9	888.55	9.6	1.80	4.4
19	AMAD-19	134.92	10	1210.73	9.2	1.45	4.2
20	AMAD-20	98.40	11	1083.80	14.0	2.10	5.2
	CD (5%)	15.87	1.52	401.72	2.17	0.17	0.66
	SE(m)	5.625	0.537	142.408	0.771	0.058	0.235
	CV%	7.06	6.19	12.60	12.77	5.40	8.71

Table 2: Cont...

S. No.	Germplasm	No. of pod per plant	Weight of single pod (g)	Yield per plant (g)	Pod length (cm)	Pod width (cm)	No of seeds per pod
21	AMAD-21	124.57	16	2075.27	11.8	2.40	5.2
22	AMAD-22	52.91	11	584.03	8.6	1.10	3.8
23	AMAD-23	136.67	9	1429.53	10.0	1.60	5.0
24	AMAD-24	119.89	14	1638.48	11.4	1.90	5.0
25	AMAD-25	109.60	4	475.84	5.6	1.95	3.6
26	AMAD-26	71.33	16	1165.59	12.0	1.55	5.0
27	AMAD-27	95.47	17	1689.47	12.8	1.88	3.4
28	AMAD-28	353.02*	5	1996.35	7.0	1.96	3.6
29	AMAD-29	88.53	17	1565.08	10.4	1.95	4.2
30	AMAD-30	223.31	18	4245.64	11.4	2.10	4.6
31	AMAD-31	169.82	14	2434.56	8.6	2.00	4.4
32	AMAD-32	67.92	16	1088.05	8.2	2.10	5.2
33	AMAD-33	62.65	17	1003.21	10.8	1.20	5.0
34	AMAD-34	214.01	4	1002.92	10.6	2.20	3.6
35	AMAD-35	81.19	23	1926.49	12.2	1.60	5.0
36	AMAD-36	69.39	13	888.88	11.0	1.80	4.4
37	AMAD-37	85.61	12	1000.37	11.0	2.60*	4.8
38	AMAD-38	98.95	13	1178.13	10.6	2.20	5.0
39	AMAD-39	104.56	23	2322.16	10.2	2.30	5.8
40	Swarna Uttakrisht	113.37	16	1927.45	11.6	2.20	4.6
	CD (5%)	15.87	1.52	401.72	2.17	0.17	0.66
	SE(m)	5.625	0.537	142.408	0.771	0.058	0.235
	CV%	7.06	6.19	12.60	12.77	5.40	8.71

Table 3: Mean yield of different genotypes of Dolichos bean over the years

S. No.	Germplasm	Pod colour (Tender stage)	Yield per plant (g)		
			2012-13	2013-14	2014-15
1	AMAD-1	Green	1838.67	2506.82	2254.05
2	AMAD-2	Purple	3966.67	4544.69	4976.35
3	AMAD-3	Green	4281.33*	5218.57*	4483.22
4	AMAD-4	Purple green	3461.67	3260.31	3771.11
5	AMAD-5	Green	3158.00	3558.92	6000.43*
6	AMAD-6	Purple red	4260.67	4177.19	4314.21
7	AMAD-7	Green	2741.33	2759.09	2542.44
8	AMAD-8	Green	2188.33	2133.68	2865.95
9	AMAD-9	White	3626.33	3290.35	1223.09
10	AMAD-10	Green	741.00	904.28	1361.97
11	AMAD-11	Green	382.67	797.83	1168.07
12	AMAD-12	Green	843.33	2008.40	1072.45
13	AMAD-13	Green	772.67	662.58	1289.37
14	AMAD-14	Green	743.00	617.33	764.07
15	AMAD-15	Purple red	544.00	507.53	751.44
16	AMAD-16	Whitish green	2497.00	3085.13	2468.71
17	AMAD-17	Green	1921.67	1851.03	2164.90
18	AMAD-18	Green	922.67	621.05	888.55
19	AMAD-19	Green	1345.00	2181.59	1210.73
20	AMAD-20	Light purple	987.00	2504.58	1083.80
	CD (5%)		519.39	553.48	401.723
	CV%		18.68	18.55	12.602

Table 3: Cont...

S. No.	Germplasm	Pod colour (Tender stage)	Yield per plant (g)		
			2012-13	2013-14	2014-15
21	AMAD-21	Green	253.67	802.58	2075.27
22	AMAD-22	Green	482.00	584.72	584.03
23	AMAD-23	Green	724.00	1023.65	1429.53
24	AMAD-24	Whitish green	1325.00	3434.53	1638.48
25	AMAD-25	Whitish purple	263.00	577.24	475.84
26	AMAD-26	Light green	1372.67	1144.07	1165.59
27	AMAD-27	Green	1352.33	2640.95	1689.47
28	AMAD-28	Whitish purple	2352.00	980.82	1996.35
29	AMAD-29	Green	1572.00	369.64	1565.08
30	AMAD-30	Green	3854.67	1111.17	4245.64
31	AMAD-31	White	2109.33	934.62	2434.56
32	AMAD-32	Green	1063.67	535.30	1088.05
33	AMAD-33	Purple green	308.00	320.19	1003.21
34	AMAD-34	Light green	824.00	499.56	1002.92
35	AMAD-35	Purple	633.33	1795.95	1926.49
36	AMAD-36	Purple Green			888.88
37	AMAD-37	Purple Green			1000.37
38	AMAD-38	Green			1178.13
39	AMAD-39	Purple Green			2322.16
40	Swarna Uttakrisht	Green			1927.45
	CD (5%)		519.39	553.48	401.723
	CV%		18.68	18.55	12.602

Results and discussion

- Maximum frequency of 22 accessions of green coloured pod were collected followed by purple green pod (five acc.), whitish green pod (four acc.), purple/purple red/whitish purple (two acc. each) and light purple/white/light green (one acc. each).
- Variability in seed coat colour is also important to discriminate the genotypes during the time of exploration which has also reflected in the vegetative and reproductive characterization.
- Maximum frequency of 17 accessions of black seed coat were collected followed by white seed coat (12 acc.), brown seed coat (10 acc.) and spotted with one accessions.
- Leaves and vine/stem colour is also important for morphological characterization for knowing the variability among the genotypes/accessions in *Dolichos*.
- Out of 40 accessions, maximum frequency of 23 accessions were characterized as green colour of leaves and vine (stem) followed by 13 accessions of purple colour and four accessions of purplish green colour.
- Highest frequency of 22 accessions of white flowered genotypes were collected followed by 15 accessions of purple flowered, two accessions of pink flowers and one accessions of light purple flower.

- Directorate of Sorghum Research has collected important landraces, local genotypes and other important diverse genotypes of Sorghum during 2002-2010 (Elangovan et al., 2012).
- Wider variability was observed for plant height (vine length), number of pods per inflorescence, number of inflorescence per plant, mean pod weight, number of pod per plant, 100 seed weight, pod yield per plant and yield per hectare (Verma et al., 2014).
- The maximum mean value for grain yield per plant, days to 50% flowering and days to maturity contributed maximum towards total divergence in Dolichos genotypes (Pawar et al., 2013).

Conclusion

- These genotypes were grown mostly in the backyards of farmers house hold by providing staking or allow growing in the fencing.
- Four genotypes were found promising trial conducted over years.
- On the basis of *per se* performance, it may be concluded that accessions AMAD-2, AMAD-3, AMAD-5 and AMAD-6 may be recommended for commercial exploitation in the sub-zone-V of Jharkhand.

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Thank You