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Mean Performance of Genotypes for Protein and Fiber Content in Dolichos Bean (*Dolichos lablab* L. var. *typicus* Prain) Germplasm

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A B S T R A C T

Thirty five genotypes of dolichos bean (*Dolichos lablab* L. var. *typicus* Prain) germplasm lines were evaluated for nutritive value of protein and fiber content in pods at Vegetable Research Station, Agriculture Research Institute, Rajendranagar, Hyderabad during August, 2016 to March, 2017. Genetic improvement in dolichos bean crop is a continuous demand for protein content of pods for different agro-climatic regions. From this study analysis of variance revealed that there is significant differences between genotypes indicating presence of sufficient amount of variability in two qualitative characters studied. Protein content (18.241) and fiber content (48.272) in pod showed maximum variability indicating the scope for selection of initial breeding material for further improvement. Among 35 genotypes studied, performance of PSRJ-13039 (25.09%) showing maximum protein content in pods (25.09%), while the lowest protein content in pods was recorded in IC-546388 (15.41 %). Lowest fiber content was recorded in IC-427424 (10.52%). Considering protein content and fiber content in pods the selected germplasm may be used as parental source for the development of superior dolichos bean varieties for commercial cultivation and may be released as a variety.

Introduction

Dolichos bean (*Dolichos lablab* L. var. *typicus* Prain) (2n=2x=22) belongs to family Leguminaceae. It is one of the important indigenous legume vegetables grown in India for its tender green pods, mature fresh green seeds and dry seeds. It occupies a unique position among the legume vegetables with the consumption of the immature green pods as a vegetable and dry seed as a pulse.

The crop prefers relatively cool season, starts flowering in August-September and fruiting in winter (October) and continues indeterminately in spring (February) (Savitha,

2008). The pods are naturally rich in carbohydrates, proteins, fat and fibers, as well as minerals which include Ca, P and Fe (Naeem *et al.*, 2009). The protein content of pods and seeds ranges from 10-19% and 15-25% respectively.

Genetic improvement in dolichos bean crop is a continuous demand for protein content of pods for different agro-climatic regions. Keeping the above points, the present investigation is taken up to study protein and fiber content of pods in dolichos bean genotypes.

Materials and Methods

Thirty five dolichos bean germplasm lines along with the three checks were grown in Randomized Block Design with two replications were evaluated. Thirty five genotypes *viz*, IC-261010, IC-383197, IC-384066, IC-413709, IC-413710, IC-424813, IC-426988, IC-427424, IC-427428, IC-427436, IC-427462, IC-446571, IC-446573, IC-446581, IC-446583, IC-446584, IC-446591, IC-546349, IC-546376, IC-546387, IC-546388, IC-565181, IC-598467, NSB-2010/029, NSJ/NAIP/192, PSR-13183, PSRJ-13039, PSRJ-13114-2, RJR-03, RJR-387, SGD136, SNJ-11-068, RND-1 (check), Arka Jay (check) and Arka Vijay (check).

The crude protein content of the sample was estimated according to the micro Kjeldhal method AOAC. (2005) calculated as protein nitrogen product and multiplied with 6.25 to obtain the protein content.

The fiber content of samples was determined by boiling with 1.25% dilute H_2SO_4, washed with water, further boiled with 1.25% dilute NaOH and the remaining residue after digestion was taken as crude fiber AOAC. (1990).

The mean replicated data collected on 19 quantitative traits was subjected to analysis of variance by the methods outlined by Panse and Sukhatme (1985) using the mean values of five random plants in each replication from all genotypes to find out the significance of genotypes effect.

Results and Discussion

Analysis of variance

The analysis of variance (Table 1) revealed significant differences between genotypes for the characters indicating presence of sufficient amount of variability in the characters studied. Variability was observed for protein content (18.241) and fiber content (48.272) indicating the scope for selection of initial breeding material for further improvement based on these characters.

Protein content (%)

Protein content in dolichos bean genotypes (Table 2) was ranged from 15.41 % to 25.09 % with a grand mean of 19.51 %. The highest protein content 25.09 % was recorded in PSRJ-13039, while the lowest was recorded in IC-546388 (15.41 %). Three genotypes namely IC-427462 (24.15 %), RND-01 (24.28 %), IC-427428 (24.76 %) recorded statistically at par values with the PSRJ-13039 (25.09 %).

Out of 35 dolichos bean genotypes, sixteen genotypes produced significantly highest protein content as compared to the grand mean. Two genotypes IC-427428 (24.76 %) and PSRJ-13.39 (25.09 %) recorded significantly highest protein content over the check variety RND-1 (24.28 %). These results are in concurrence with the findings of those reported by Parmar *et al.*, (2013), Chaitanya *et al.*, (2014) and Verma *et al.*, *(*2015).

Table.1 Analysis of variance for two qualitative traits in 35 genotypes of dolichos bean

Sl. no	Character	Mean sum of squares		
		Replication (df=1)	Treatments (df=34)	Error (df=34)
1.	Protein content (%)	2.662	18.241**	0.888
2.	Fiber content (%)	1.037	48.272**	1.237

*and ** significant at P=0.05 and P=0.01 level of significance respectively

Table.2 Mean values of 35 genotypes for protein and fiber content in dolichos bean genotypes

Sl.no	Genotype	Protein content (%)	Fiber content (%)
1.	IC-261010	20.91	17.91
2.	IC-383197	16.72	21.15
3.	IC-384066	21.78	15.26
4.	IC-413709	20.09	24.91
5.	IC-413710	21.11	13.82
6.	IC-424813	18.97	13.06
7.	IC-426988	18.75	25.68
8.	IC-427424	17.53	10.52
9.	IC-427428	24.76	15.83
10.	IC-427436	13.93	14.79
11.	IC-427462	24.15	15.49
12.	IC-446571	17.11	19.92
13.	IC-446573	15.80	13.17
14.	IC-446581	17.88	27.12
15.	IC-446583	17.93	15.49
16.	IC-446584	20.06	17.92
17.	IC-446591	18.14	25.32
18.	IC-546349	18.47	23.70
19.	IC-546376	17.13	28.35
20.	IC-546387	16.75	17.66
21.	IC-546388	15.41	21.48
22.	IC-565181	16.41	20.46
23.	IC-598467	17.20	16.44
24.	NSB-2010/029	15.74	13.67
25.	NSJ/NAIP/192	22.82	19.89
26.	PSR-13183	22.94	22.26
27.	PSRJ-13039	25.09	28.02
28.	PSRJ-13114-2	16.70	25.53
29.	RJR-03	23.00	26.14
30.	RJR-387	18.77	18.29
31.	SGD-136	19.84	14.64
32.	SNJ-11-068	22.26	15.53
33.	RND-01 ©	24.28	21.87
34.	ARKA JAY ©	22.22	15.17
35.	ARKA VIJAY ©	22.30	18.49
	MEAN VALUES	**19.51**	**19.28**
	S.E of mean	**0.66**	**0.78**
	C.D 5%	**1.91**	**2.26**
	C.D 1%	**2.57**	**3.03**

Fiber content (%)

Fiber content in dolichos bean genotypes (Table 2) was ranged from 10.52 % to 28.35 % with a grand mean of 19.28 %. The highest fiber content was recorded in RDG-25 (28.35 %), while the lowest fiber content was recorded in RDG-13 (10.52 %). None of the genotypes recorded statistically at par values with RDG-13 (10.52 %). Out of 35 dolichos bean genotypes, 15 genotypes produced significant and highest fiber content compared to the grand mean. Ten genotypes *i.e.* IC-413709 (24.91 %), IC-426988 (25.68 %), IC-446581 (27.12 %), IC-446591 (25.32 %), IC-546349 (23.70 %), IC-546376 (28.35 %), PSR-13183 (22.26 %), PSRJ-13039 (28.02 %), PSRJ-13114-2 (25.53 %) and RJR-03 (26.14 %) recorded significantly highest fiber content over the check variety RND-1 (21.87 %).

In conclusion, protein content (18.241) and fiber content (48.272) in pods showed variance among the qualitative characters indicating the scope for selection of initial breeding material for further improvement. Among 35 genotypes, PSRJ-13039 showing maximum protein content (25.09%). Lowest fiber content was recorded in IC-427424 (10.52%). Hence these genotypes tested for their stable performance in different locations by pedigree and released for commercial cultivation after multilocation trials. The selected germplasm may be as parental source for the development of superior dolichos bean varieties for commercial cultivation.

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