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Study of Different Qualitative Traits 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 germplasm lines were evaluated for different qualitative traits at Vegetable Research Station, Agriculture Research Institute, Rajendranagar, Hyderabad during August, 2016 to March, 2017. Quality traits revealed that there is a considerable variability in dolichos bean germplasm for most of the traits like stem colour (green, dark green and purple), leaf vein colour (light green and green, purple), leaf density (sparse and intermediate), flower colour (purple, white and dark purple), growth habit (pole and bush), pod shape (straight, curved and intermediate), pod colour dark purple in IC-446584, pod beak (long, short and medium), pod suture (green, dark green and purple), pod curvature (straight and curved), pod surface (smooth and wrinkled), seed colour (black, brown and cream) and seed shape (flat, round and oblong). Whereas there was no variability observed in traits like leaf vein colour, pod suture and pod beak colour. These characters can be utilized as morphological markers in selections and breeding programmes.

Introduction

Dolichos bean (*Dolichos lablab* L. var. *typicus* Prain) (2n=2x=22) belongs to family Leguminaceae sub-family Faboideae, tribe Phaseoleae and sub-tribe Phaseolinae which is commonly known as Indian bean, Hyacinth bean, sem, Egyptian kidney bean, bonavist bean, avarai and avari chikkudu is one of the most popular traditional vegetables extensively cultivated in India. 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. Among the legumes, dolichos bean

constituents an important source of therapeutic agents used in the modern as well as traditional system of medicine (Morris, 2009). In fact it is considered as a multipurpose crop since it is used for forage, soil improvement, soil protection and weed control (Mass, 2005).

Materials and Methods

Thirty five dolichos bean germplasm lines along with the three checks were grown in Randomized Block Design with two replications.

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 data on qualitative characters were recorded as per minimal descriptors of NBPGR (Srivastava *et al.,* 2001). Qualitative data on 13 traits were recorded on ten randomly selected plants in each genotype and the details of trait, classification and stage of scoring are presented in Table 1.

Results and Discussion

Thirty five genotypes of dolichos bean germplasm under present investigation were characterized based on 13 qualitative traits (Table 2) and (Plate 1.1 and 1.2). The present observations are similar with the findings of Chattopadhyay and Dutta (2010) and Chaitanya *et al.,* (2014). Stem colour revealed that one genotype exhibited dark green stem colour, four genotypes showed purple stem colour and 30 genotypes showed green stem colour. Leaf vein colour of 28 genotypes exhibited light green in colour, five genotypes showed purple colour and 2 genotypes are green in colour. Leaf density of 30 genotypes was found to be intermediate and the remaining five genotypes showed sparse leaf density. Plant growth habit revealed that 33 genotypes were pole type plant growth habit and remaining two genotypes were found to be bush type plant growth habit.

Flower colour revealed that 25 genotypes exhibited white flower colour, nine genotypes showed purple flower colour and one genotype showed dark purple flower colour. Pod colour of 25 genotypes was found to be green in colour, three genotypes showed dark green in colour, five genotypes showed light green in colour, one genotype showed purple colour and remaining one genotype showed dark purple colour. Pod shape of six genotypes was straight, two genotypes were curved and remaining 27 genotypes were intermediate with respect to it.

Pod surface of 28 genotypes had smooth pod surface and remaining seven genotypes had wrinkled pod surfaces. Pod curvature of thirty genotypes showed curved pod curvature and remaining five genotypes showed straight pod curvature. Pod beak revealed that 19 genotypes were with short pod beak, 13 genotypes had medium pod beaks and remaining three genotypes with long pod beaks. Pod suture colour of thirty genotypes showed green colour pod suture and remaining five genotypes showed cream colour pod suture. Seed colour of sixteen genotypes seeds were found to be brown in colour, eight genotypes showed black colour seeds and remaining 11 genotypes seeds were cream in colour. Seed shape of 25 genotypes was found oblong, five genotypes were round in shape and remaining five genotypes were flat in shape.

Plate.1 Variations in pods of 35 genotypes of dolichos bean including checks

Plate.2 Variations in seeds of 35 genotypes of dolichos bean including checks

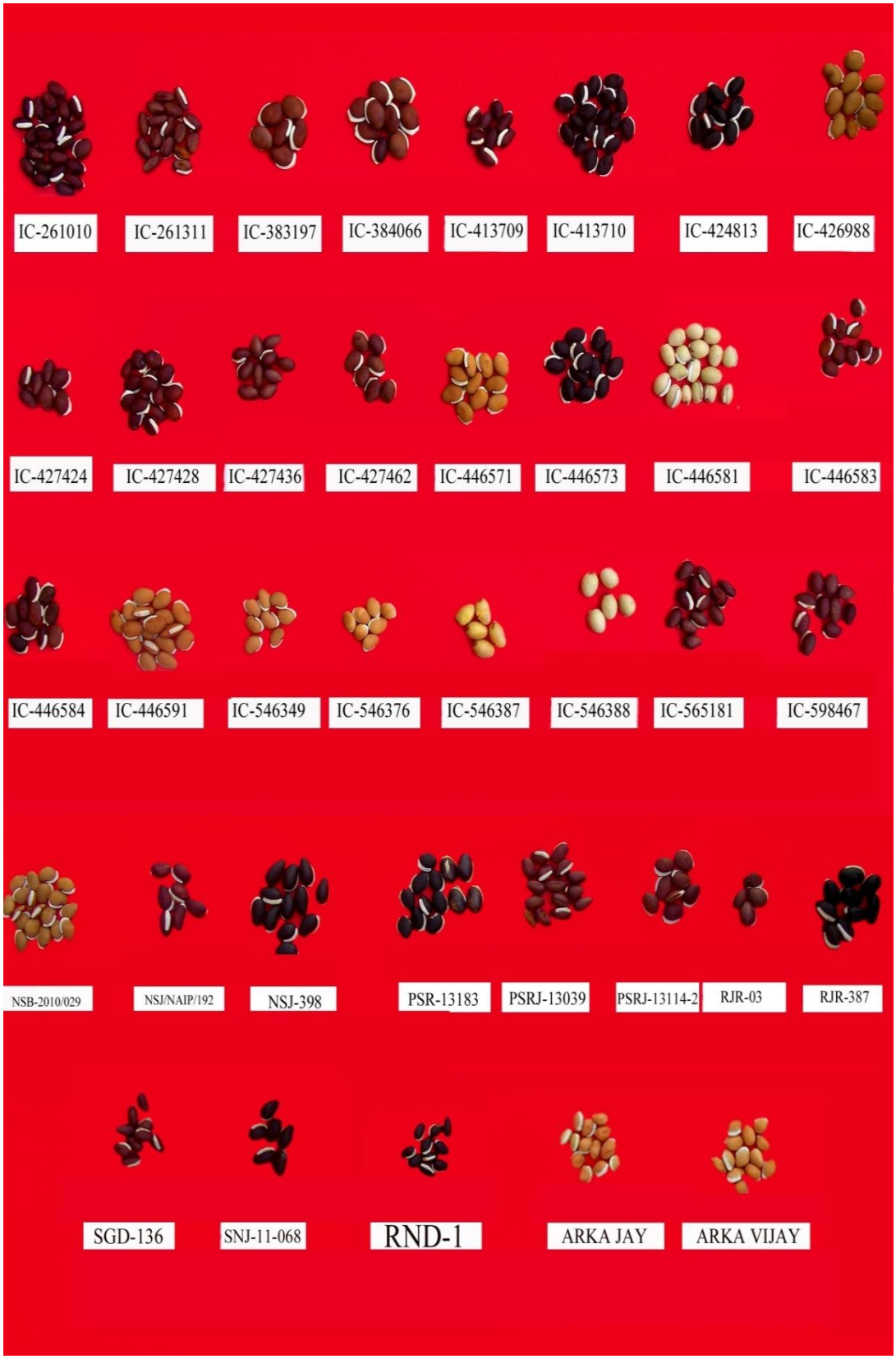

Table.1 Classification and stage of scoring of 13 qualitative traits in dolichos bean

S. No.	Qualitative trait	Classification	Stage of scoring
1.	Plant growth habit	Bush, Semi pole and Pole	At flowering stage
2.	Leaf vein colour	Light Green, Green and Purple	Fully developed primary leaves on inner surface
3.	Leaf density	Sparse, Intermediate and Dense	Vegetative growth stage
4.	Stem colour	White, Light green, Green, Dark green, Purple, Dark purple and Greenish purple	Vegetative growth stage
5.	Flower colour	White, Cream, Purple, Dark purple and Blue	Fully developed flower bud before it start anthesis
6.	Pod shape	Straight, Intermediate and Curved	Fresh matured pod
7.	Pod colour	White, Cream, Light green, Green Dark green, Light purple, Purple and Dark purple	Fresh matured pod
8.	Pod beak	Short, Medium and Long	Fresh matured pod
9.	Pod curvature	Straight, Curved and Highly curved	Fresh matured pod
10.	Pod suture colour	White, Cream, Green and Purple	Fresh matured pod
11.	Pod surface	Smooth and Wrinkled	Fresh matured pod
12.	Seed colour	Black, Brown, Cream, Yellow, Purple, Brick red, Brown yellow and Mottled	Dry matured pod
13.	Seed shape	Cylindrical, Round, Flat, Square, Oblong and Elliptical	Dry matured pod

Table.2 Qualitative traits of 35 genotypes of dolichos bean

ACCESSION NO	Stem colour	Leaf vein color	Leaf density	Plant growth habit	Flower colour	Pod colour	Pod shape	Pod surface	Pod curvature	Pod beak	Pod suture colour	Seed colour	Seed shape
IC-261010	Green	Light green	Intermediate	Pole	Purple	Dark green	straight	Smooth	straight	Long	Green	Black	Oblong
IC-383197	Green	Light green	Intermediate	Pole	White	Green	Curved	Wrinkled	Curved	Short	Green	Brown	Flat
IC-384066	Green	Light green	Intermediate	Pole	White	Green	Curved	Wrinkled	Curved	Short	Green	Brown	Flat
IC-413709	Green	Light green	Intermediate	Pole	White	Light green	Intermediate	Smooth	Curved	Long	Cream	Black	Oblong
IC-413710	Purple	Purple	Intermediate	Pole	Dark purple	Purple	Intermediate	Smooth	Curved	Medium	Cream	Black	Flat
IC-424813	Green	Light green	Intermediate	Pole	Purple	Green	Intermediate	Smooth	Curved	Short	Green	Black	Oblong
IC-426988	Green	Light green	Sparse	Pole	White	Green	Intermediate	Wrinkled	Curved	Medium	Green	Cream	Oblong
IC-427424	Green	Light green	Intermediate	Pole	White	Green	Straight	Wrinkled	Curved	Short	Green	Brown	Oblong
IC-427428	Green	Light green	Intermediate	Pole	White	Dark green	Intermediate	Smooth	Curved	Short	Green	Brown	Oblong
IC-427436	Green	Light green	Intermediate	Pole	White	Green	Straight	Wrinkled	Straight	Medium	Green	Brown	Oblong
IC-427462	Green	Light green	Intermediate	Pole	White	Light green	Intermediate	Wrinkled	Curved	Short	Green	Brown	Round
IC-446571	Green	Light green	Intermediate	Pole	White	Green	Intermediate	Smooth	Curved	Short	Cream	Cream	Flat
IC-446573	Green	Purple	Intermediate	Pole	Purple	Green	Intermediate	Smooth	Curved	Medium	Green	Black	Round
IC-446581	Green	Light green	Intermediate	Pole	White	Light green	Straight	Smooth	Straight	Medium	Green	Cream	Round
IC-446583	Green	Light green	Sparse	Pole	White	Green	Straight	Smooth	Straight	Medium	Green	Brown	Oblong
IC-446584	Purple	Purple	Intermediate	Pole	Purple	Dark purple	Intermediate	Smooth	Curved	Short	Cream	Brown	Oblong
IC-446591	Green	Light green	Intermediate	Pole	White	Green	Intermediate	Smooth	Curved	Short	Green	Cream	Round
IC-546349	Green	Light green	Sparse	Pole	White	Green	Intermediate	Smooth	Curved	Medium	Green	Cream	Oblong
IC-546376	Green	Light green	Intermediate	Pole	White	Green	Intermediate	Smooth	Curved	Short	Green	Cream	Oblong
IC-546387	Green	Light green	Intermediate	Pole	White	Light green	Intermediate	Smooth	Curved	Short	Cream	Cream	Round
IC-546388	Green	Light green	Intermediate	Pole	White	Green	Intermediate	Smooth	Curved	Short	Green	Cream	Oblong
IC-565181	Green	Light green	Intermediate	Pole	White	Green	Intermediate	Smooth	Curved	Short	Green	Brown	Oblong
IC-598467	Green	Light green	Intermediate	Pole	White	Green	Intermediate	Smooth	Curved	Medium	Green	Brown	Oblong
NSB-2010/029	Green	Light green	Intermediate	Pole	White	Green	Intermediate	Smooth	Curved	Short	Green	Cream	Oblong
NSJ/NAIP/192	Green	Light green	Intermediate	Pole	White	Light green	Intermediate	Smooth	Curved	Short	Cream	Brown	Oblong
ACCESSION NO	**Stem colour**	**Leaf vein colour**	**Leaf density**	**Plant growth habit**	**Flower colour**	**Pod colour**	**Pod shape**	**Pod surface**	**Pod curvature**	**Pod beak**	**Pod suture colour**	**Seed color**	**Seed shape**
PSR-13183	Purple	Purple	Intermediate	Pole	Purple	Green	Intermediate	Wrinkled	Curved	Medium	Green	Black	Oblong
PSRJ-13039	Green	Light green	Intermediate	Pole	White	Dark green	Intermediate	Smooth	Curved	Medium	Green	Brown	Flat
PSRJ-13114-2	Green	Light green	Intermediate	Pole	White	Green	Intermediate	Smooth	Curved	Medium	Green	Brown	Oblong
RJR-03	Green	Light green	Intermediate	Pole	White	Green	Intermediate	Smooth	Curved	Short	Green	Brown	Oblong
RJR-387	Purple	Purple	Intermediate	Pole	Purple	Green	Intermediate	Smooth	Curved	Medium	Green	Black	Oblong
SGD-136	Green	Light green	Intermediate	Pole	White	Green	Straight	smooth	Straight	Short	Green	Brown	Oblong
SNJ-11-068	Dark green	Green	Intermediate	Pole	Purple	Green	Intermediate	Smooth	Curved	Long	Green	Brown	Oblong
RND-01©	Green	Green	Intermediate	Pole	Purple	Green	Intermediate	Smooth	Curved	medium	Green	Black	Oblong
ARKA JAY ©	Green	Light green	Sparse	Bush	Purple	Green	Intermediate	Smooth	Curved	Short	Green	Cream	Oblong
ARKA VIJAY©	Green	Light green	Sparse	Bush	White	Green	intermediate	Smooth	Curved	Short	Green	Cream	Oblong

Quality traits revealed that there is a considerable variability in dolichos bean germplasm for most of the traits like stem colour (green, dark green and purple), leaf vein colour (light green and green, purple), leaf density (sparse and intermediate), flower colour (purple, white and dark purple), growth habit (pole and bush), pod shape (straight, curved and intermediate), pod colour (green in IC-383197, IC-384066, IC-424813, IC-426988, IC-427424, IC-427436, IC-446571, IC-446573, IC-446583, IC-446591, IC-546349, IC-546376, IC-546388, IC-565181, IC-598467, NSB-2010/029, PSR-13183, PSRJ-13114-2, RJR-03, RJR-387, SGD-136, SNJ-11-068, RND-01, ARKA JAY and ARKA VIJAY); light green in IC-413709, IC-427462, IC-446581, IC-546387 and NSJ/NAIP/192, dark green in IC-261010, IC-427428 and PSRJ-13039, purple in IC-413710, dark purple in IC-446584, pod beak (long, short and medium), pod suture (green, dark green and purple), pod curvature (straight and curved), pod surface (smooth and wrinkled), seed colour (black, brown and cream) and seed shape (flat, round and oblong). Whereas there was no variability observed in traits like leaf vein colour, pod suture and pod beak colour. Dolichos bean genotypes exhibited high variability for all traits like plant growth characters, leaf characters, flower characters, pod characters, seed characters and quality characters.

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