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Study of morphological descriptors in dolichos bean (*Lablab purpureus* L.) genotypes

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Abstract
The present study was conducted to know about the morphological descriptors in dolichos bean (*Lablab purpureus* L.) on 45 genotypes. It was carried out during Rabi season in the year 2021- 2022. Qualitative traits revealed that there is a considerable variability in dolichos bean germplasm for most of the traits like plant growth habit (pole and bush), stem colour (green, dark green and purple), flower colour (purple, white and dark purple), leaf vein colour (light green, green and purple), leaf density (sparse, intermediate and dense), pod colour (green, light green, white, purple, dark purple), pod curvature (straight, curved and highly curved) and pod shape (straight, intermediate and curved).

Keywords: *Lablab purpureus*, morphological descriptors

Introduction
Dolichos bean, also known as Indian bean, Hyacinth bean, sem, Egyptian kidney bean, bonavist bean, avarai, and avari chikkudu, is one of the most well- known traditional vegetables that is widely grown in India. Its scientific name is *Lablab purpureus* L., and it is a member of the tribe Phaseoleae and sub-tribe Phaseolinae. It is a great crop to grow in arid regions with little rainfall. The crop prefers a season that is moderately cool, with sowing taking place in July and August. Fruiting begins in winter. The pods are naturally abundant in minerals including Ca, P, and Fe as well as carbohydrates, proteins, fats, and fibre (Naeem *et al*., 2009) [4]. It also contains a significant amount of vitamin C (24 mg per 100 g of edible pods) and thiamin (0.08 mg). It is effective for treating bladder burns, heart issues, diarrhoea, sciatica, and tenesmus naturally. It also contains anti-diabetic properties. It may be a herbaceous perennial but is grown as an annual with races that are bushy, upright, or climbing. The foliage of the crop, is largely being farmed for its green pods, hay, silage, and green manures (Bose *et al*., 1993) [1]. White or cream-colored seeds are favoured over dark seed varieties for usage as a pulse. The long pods, big seeds, and high pod smell are the most popular vegetable characters. The majority of cultivars best suited for fodder use have large biomass yields and drought tolerance. The dried seeds are consumed as split pulse. It is mostly a crop that self-pollinates. The crop hasn't been fully utilised despite having many positive qualities because of its low output, lengthy lifespan, photosensitivity, and unpredictable growth habit. No particular variety or cultivar has dominated a sizable portion of Telangana. Only regional varieties, traditional farmer collections, and cultivars are grown. The size, shape, colour, and aroma of the pods as well as the consumers preferences vary. Breaking yield barriers through the utilisation of both native and foreign germplasm has helped to improve crop yields (Shivashankar *et al*., 1993) [6], leading to the development of compact plant types with short duration and low photosensitivity. Therefore, it is crucial to conduct an examination of the germplasm and choose genotypes that are appropriate for pure cropping/sole cropping.

Materials and Methods
The present experiment was carried out during the period from November 2021 to March 2022 at PG Research Block, College of Horticulture, Mojerla. The experimental material for this study comprised of 45 different genotypes of dolichos bean obtained from NBPGR i.e, IC-261004, IC-261005, IC-261010, IC-261311, IC-372119, IC-382830, IC-384066, IC-412977, IC-413709, IC-413710, IC-426632, IC-426957, IC-426966, IC-426970, IC-426980, IC-426983, IC-426987, IC-426988, IC-426991, IC-426694, IC-427414, IC-427417, IC-427423, IC-427424, IC-427425, IC-427428, IC-427429, IC-427436, IC-427456, IC-427462, IC-

446561, IC-446566, IC-446568, IC-446571, IC-446573, IC-446574, IC-446575, IC-446581, IC-446583, IC-446584, IC-446585,
IC-446587, IC-546387, IC-598467 including Arka Adarsh which is used as a standard check. . The plants were trained to pandal at a spacing of 0.5 m between plants and 2.0 m between rows. For each morphological character 5 random plants in each genotype were taken for recording the observations as per minimal descriptors of NBPGR (Srivastava *et al*., 2001) [7]. The details of trait, classification and stage of scoring are as follows.

1. Plant growth habit
The plant growth habit of each genotype was observed i.e. bush, semi pole, pole at flowering stage.

2. Stem color
At the vegetative growth stage, observations of stem colour included white, light green, green, dark green and purple.

3. Flower colour
Before beginning anthesis, fully developed flower buds were seen with the naked eye and were categorised into white, cream, purple, dark purple and blue.

4. Leaf vein colour
Fully developed primary leaves on inner side were observed and were recorded like light green, green, purple and others.

5. Leaf density
At vegetative growth stage the stem was examined and catogarized as sparse, intermediate, and dense.

6. Pod color
Fresh mature pods were examined to determine the colour of the pods, which ranged from white to cream to light green, green, purple.

7. Pod curvature
The morphology of fresh matured pods was observed i.e. straight, curved, highly curved and others.

8. Pod shape
The pod morphology for newly matured pods was examined and classified as straight, intermediate, and curved.

Results and Discussion
Forty five genotypes of dolichos bean germplasm under present investigation were characterized based on five morphological characters (Table1). The present observations are similar with the findings of Chattopadhyay and Dutta. (2010) [3], Chaitanya *et al*. (2014) [2] and Preetham *et al*. (2020) [5].
The observations on plant growth habit revealed that forty three genotypes were pole type plant growth habit and remaining two genotypes were found to be semipole type plant growth habit.
Stem colour study revealed that five genotypes exhibited dark green stem colour, 13 genotypes showed purple stem colour and twenty seven genotypes showed green stem colour.
The observations on flower colour revealed that thirty four genotypes exhibited white flower colour, ten genotypes showed purple flower colour and one genotype showed darkpurple flower colour.
Leaf vein colour of thirty seven genotypes exhibited light green in colour, three genotypes showed purple colour and five genotypes are green in colour.
Leaf density of thirty seven genotypes was found to be intermediate and theremaining eight genotypes showed sparse leaf density.
Pod colour of thirty three genotypes was found to be green in colour, one genotype showed white in colour, ten genotype showed purple colour and remaining one genotype showed light green colour.
Twenty seven genotypes showed curved pod curvature and remaining eighteen genotypes showed straight pod curvature.
The pod shape of twenty nine genotypes was straight, eight genotypeswere curved and remaining eight genotypes were intermediate.

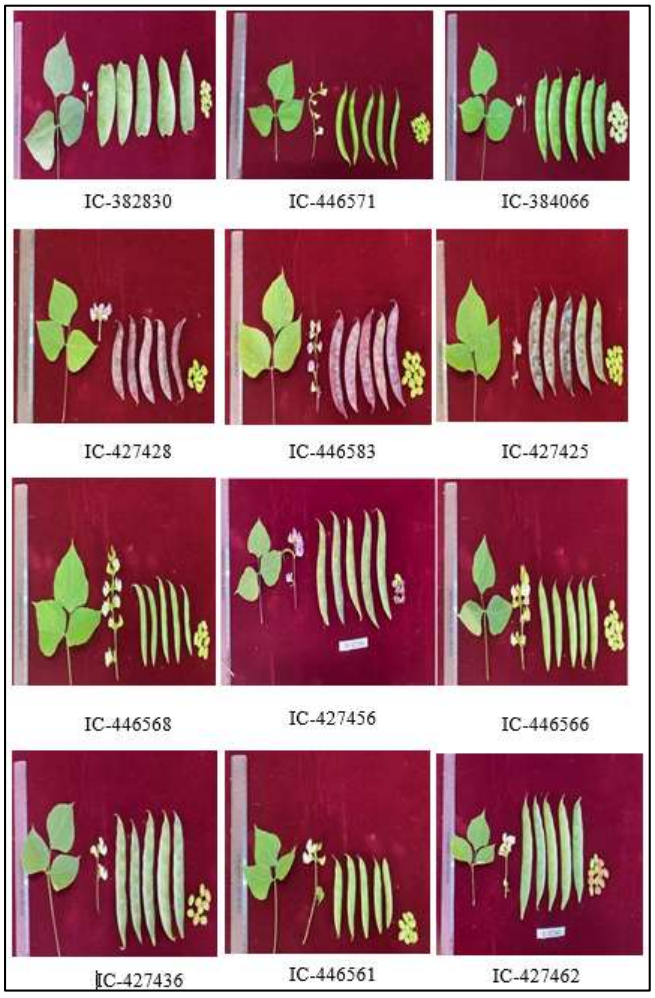

Plate 1: Phenotypic diversity of dolichos bean genotypes

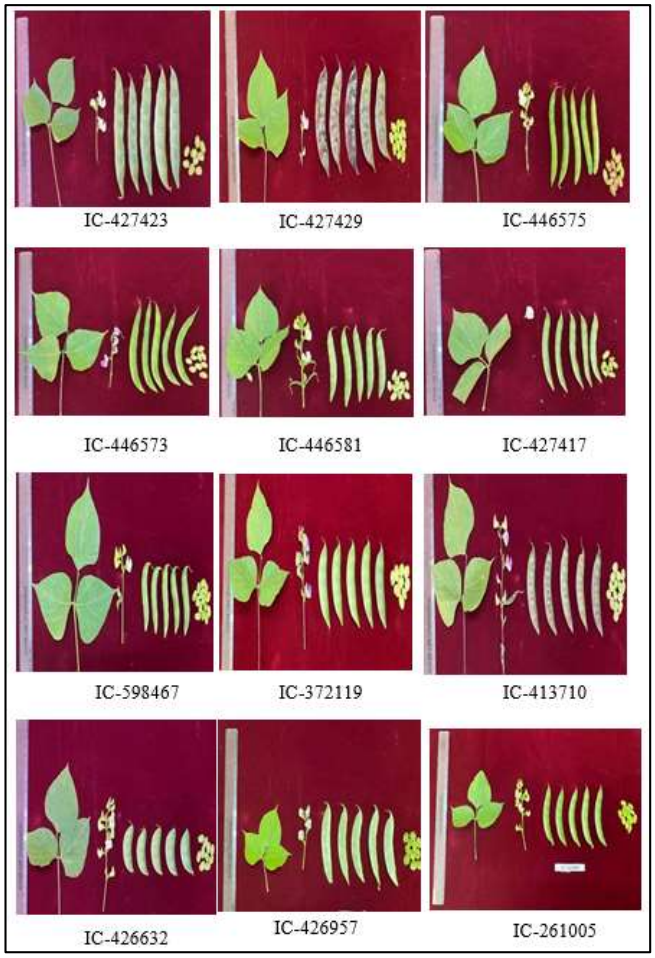

Plate 1: Phenotypic diversity of dolichos bean genotypes

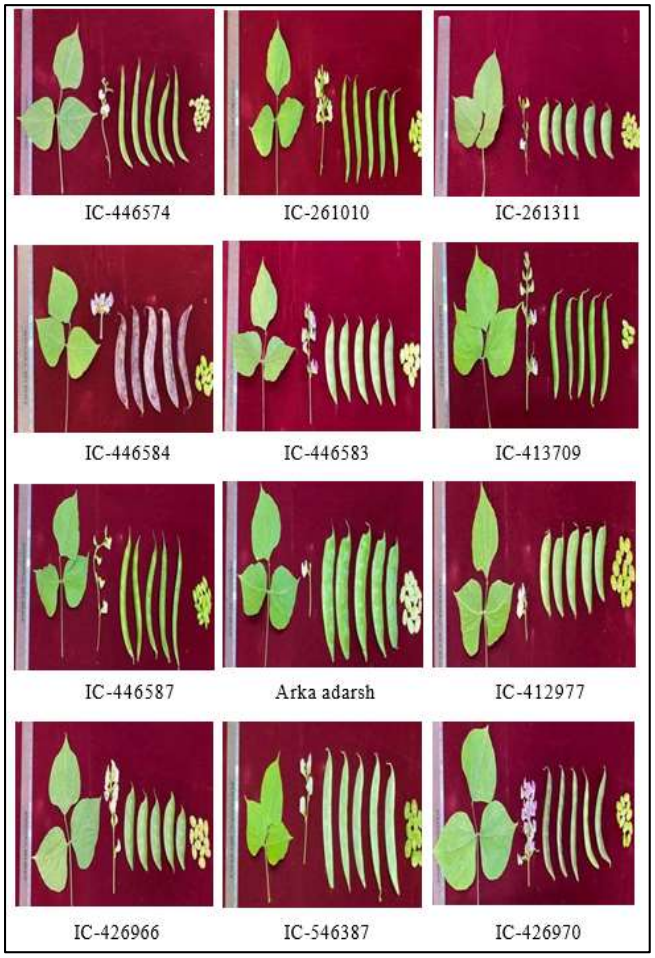

Plate 1: Phenotypic diversity of dolichos bean genotypes

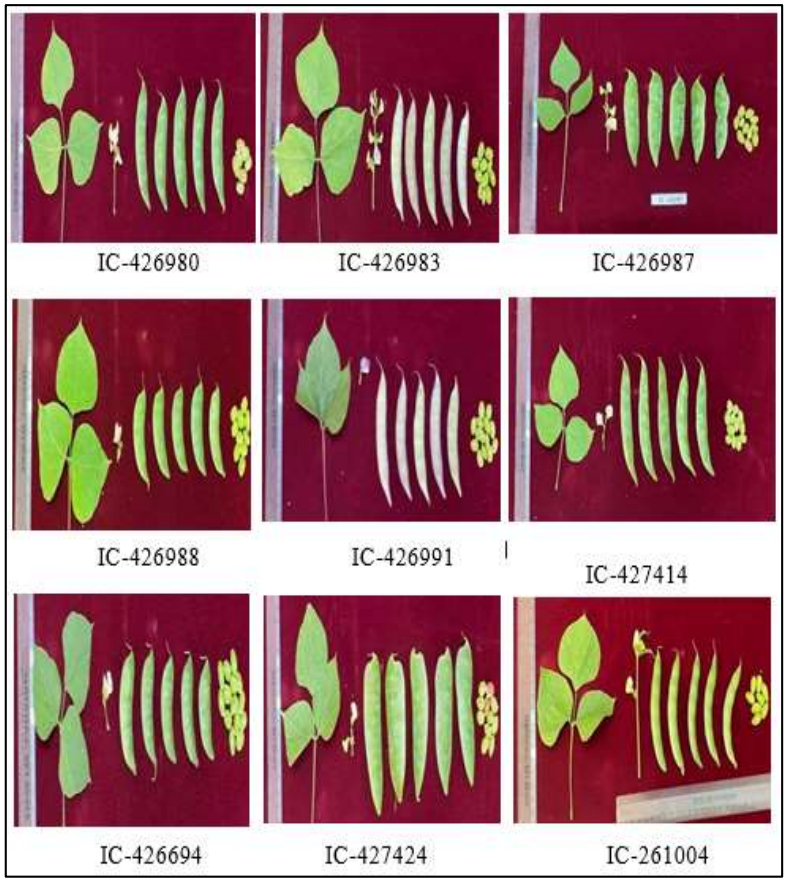

Plate 1: Phenotypic diversity of dolichos bean genotypes

Table 1: Qualitative traits of 45 genotypes of dolichos bean

Genotype	Plant growth habit	Stem colour	Flower colour	Leaf vein color	Leaf density	Pod color	Pod curvature	Pod shape
IC-261004	Pole	Green	White	Light green	Sparse	Green	Straight	Straight
IC-261005	Pole	Green	White	Light green	Intermediate	Green	Straight	Straight
IC-261010	Pole	Green	Purple	Light green	Intermediate	Green	Straight	Straight
IC-261311	Semipole	Green	White	Light green	Intermediate	Green	Curved	Intermediate
IC-372119	Pole	Purple	White	Light green	Intermediate	Purple	Curved	Intermediate
IC-382830	Pole	Green	White	Light green	Intermediate	Green	Curved	curved
IC-384066	Pole	Green	White	Light green	Intermediate	Green	Curved	Intermediate
IC-412977	Pole	Dark green	White	Light green	Intermediate	Green	Curved	Curved
IC-413709	Pole	Dark green	White	Light green	Intermediate	Green	Straight	Straight
IC-413710	Pole	Green	Dark purple	Purple	Intermediate	Purple	Curved	Curved
IC-426632	Pole	purple	White	Light green	Intermediate	Green	Curved	Intermediate
IC-426957	Pole	Green	White	Light green	Sparse	White	Curved	Curved
IC-426966	Pole	Green	White	Light green	Intermediate	Green	Straight	Straight
IC-426970	Pole	Puple	White	Light green	Sparse	Purple	Straight	Straight
IC-426980	Pole	purple	White	Light green	Intermediate	Light green	Curved	Curved
IC-426983	Pole	Puple	White	Light green	Intermediate	Purple	Straight	Straight
IC-426987	Pole	Green	White	Light green	Intermediate	Green	Straight	Straight
IC-426988	Pole	Green	White	Light green	Sparse	Green	Curved	Intermediate
IC-426991	Pole	Puple	White	Light green	Intermediate	(purple)	Straight	Straight
IC-426694	Pole	Dark green	White	Light green	Intermediate	Green	Curved	Intermediate
IC-427414	Semipole	Dark green	White	Light green	Intermediate	Green	Straight	Straight
IC-427417	Pole	Green	White	Light green	Intermediate	Green	Straight	Straight
IC-427423	Pole	Green	White	Green	Intermediate	Green	Straight	Straight
IC-427424	Pole	Green	White	green	Intermediate	Green	Straight	Straight
IC-427425	Pole	Puple	White	Light green	Intermediate	,purple	Curved	Curved
IC-427428	Pole	Green	Purple	Green	Intermediate	Green	Curved	Intermediate
IC-427429	Pole	purple	Purple	green	Intermediate	Purple	Curved	Curved
IC-427436	Pole	Green	Purple	Green	Intermediate	Green	Straight	Straight
IC-427456	Pole	Purple	Purple	Light green	Sparse	Purple	Straight	Straight
IC-427462	Pole	Green	Purple	Dark green	Intermediate	Green	Straight	Straight
IC-446561	Pole	Green	White	Light green	Intermediate	Green	Curved	Intermediate
IC-446566	Pole	Green	White	Light green	Intermediate	Green	Straight	Straight
IC-446568	Pole	Green	White	Light green	Sparse	Green	Straight	Straight
IC-446571	Pole	Green	White	Light green	Intermediate	Green	Curved	Straight
IC-446573	Pole	Purple	Purple	Purple	Intermediate	Green	Curved	Straight
IC-446574	Pole	Greenish purple	White	Light green	Sparse	Green	Curved	Curved
IC-446575	Pole	Green	White	Light green	Intermediate	Green	Straight	Straight
IC-446581	Pole	Green	White	Light green	Intermediate	Green	Straight	Straight
IC-446583	Pole	Green	Green	Light green	Sparse	green	Straight	Straight
IC-446584	Pole	Purple	Purple	Purple	Intermediate	Purple	Straight	Straight
IC-446585	Pole	Purple	Purple	Light green	Intermediate	Purple	Straight	Straight
IC-446587	Pole	Purple	White	Light green	Intermediate	Green	Straight	Straight
IC-546387	Pole	Dark green	White	Light green	Intermediate	Green	Straight	Straight
IC-598467	Pole	Green	White	Light green	Intermediate	Green	Straight	Straight
Arka Adarsh	Pole	Green	White	Light green	Intermediate	Green	Straight	Straight

Conclusion

This study reveals that there is considerable amount of variation available among the genotypes in terms of their morphological characters. These morphological descriptors can be used in selections and breeding programmes.

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