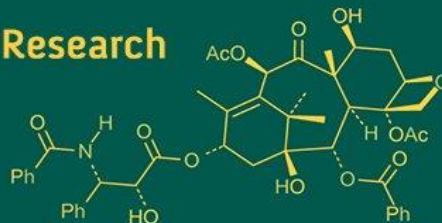
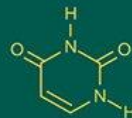
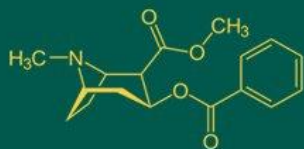


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Morphological Diversity and DUS Characterization of Brinjal (*Solanum melongena* L.) Genotypes

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Abstract

The present study was undertaken to evaluate the Distinctness, Uniformity and Stability (DUS) of 31 diverse brinjal genotypes, including the check variety 'Kashi Taru', based on 15 morphological traits. The experiment was conducted during the rabi-winter seasons of 2024-25 at the Department of Vegetable Science ANDUAT, Ayodhya, using a Complete Randomized Block Design (CRBD). Significant variability was observed across all categories; stem anthocyanin pigmentation was present in 22 genotypes, while leaf vein colour was predominantly purple (26 genotypes), with intensities ranging from light to dark. Plant growth habits varied from erect (12 genotypes) to semi-spreading (17 genotypes). Analysis of floral characters revealed that 18 genotypes produced more than three flowers per inflorescence, while purple was the most common flower colour (18 genotypes). Regarding fruit traits, the cylindrical shape was most prevalent (16 genotypes) and 25 genotypes followed a solitary fruiting pattern. At commercial harvest, 26 genotypes bore purple fruit, though most transitioned to brown at physiological maturity. Additionally, 24 genotypes possessed greenish flesh and green calyces. These findings establish a vital morphological baseline for the identification of genetic resources and the legal protection of cultivars under the PPV and FR Act, 2001.

Keywords: Anthocyanin pigmentation, Cultivar identification, DUS characterization, Genetic variability, Germplasm, Morphological traits, PPV & FR Act, *Solanum melongena*

Introduction

Brinjal (*Solanum melongena* L.) ($2n=2x=24$) is one of the most important and basic vegetable crops grown in tropical as well as temperate parts of the world. It has been known from ancient times as an indigenous Asian in India. Some varieties of the plant bear white, egg-shaped fruit, which is the source of the name 'eggplant'. The word 'brinjal' is widely used in the Indian subcontinent and derives from Arabic and Sanskrit. In Europe it is called aubergine. According to Vavilov (1931) [15], China is regarded as the secondary center of origin and India is the primary center of origin because of the wide range of variability found in the region. It is a multipurpose crop appreciated for its culinary applications, nutritional value and economic importance. Vitamins A, C and B complex, minerals calcium, phosphorus and iron, dietary fiber and antioxidants like anthocyanins, phenolics and flavonoids are all abundant in it and help to maintain good health (Chioti *et al.*, 2022; Lyngdoh *et al.*, 2025, Pohl *et al.*, 2019; Bushra *et al.*, 2022) [3, 6, 1]. White brinjal/egg plants are considered beneficial for people with diabetes because they are high in fiber and low in carbs. If consumed, fried brinjal fruit in tin oil can relieve a toothache and is a great treatment for liver problems (Kanauija *et al.*, 2020) [4]. During 2024-25, brinjal covered nearly 684.000 lakh hectares across the country, yielding about 12,886 metric tonnes. Of this, Uttar Pradesh accounted for only 13.62 lakh hectares and 514.01 metric tonnes, indicating its relatively modest share at the national level (MOA & FW, 2024).

Every crop improvement program aims to produce cultivars that are disease-free, highly productive, and widely adaptable. Morphological characterization is the first step in characterizing and classifying the cultivars. Because of interactions with the environment and primarily unknown or complex genetic regulatory mechanisms of such traits, it is well known that morphological data cannot be trusted (Camussi *et al.* 1983) [2]. India signed the TRIPS agreement in 1994, which mandated that WTO members develop and put into effect a sui generis framework to protect plant genetic resources. To safeguard the rights of farmers and breeders, the Indian government passed the PPV and FR Act in 2001. It is preferable to define the germplasm in line with the PPV and FR Authority's DUS test standards for Brinjal since the act's protection is based on varietal testing for distinctness, uniformity, and stability (DUS). Duplication can be found and avoided with the aid of genotype characterization. According to the DUS test guidelines of PPV and FRA, New Delhi,

the current study's objective was to describe the Brinjal genotypes that are currently available for both qualitative and quantitative traits.

Materials and Methods

The experimental material used for the study consisted of thirty-one genotypes of brinjal including one check. These were washed and lined and morphologically assessed for 15 DUS characteristics at Division of Vegetable Science ANDUAT, Ayodhya. Plant: Stem anthocyanin (Absent/Present), Leaf: Colour of vein (Green/Purple), Number of flower inflorescence (1-3/>3), Flower: Colour (Greenish white/Light purple/Purple/Dark purple), Fruit: General shape (Globular/Ovoid/Obovate/Pear-shaped/Club-shaped/ ellipsoid-shaped), Fruit: Length of peduncle (Short :<1.0 cm, Medium :1.0-5.0 cm, Large: >5.0 cm) Fruit: Colour of skin at commercial harvesting (White/Green/Purple), Fruit: Intensity of purple colour of skin (Light/Medium/Dark), Fruit: Size of calyx (Small/ Medium/ Large), Fruit: Colour of calyx (Green/Purple), Fruit: Colour of flesh (Whitish/ Greenish), Fruiting: Pattern (Solitary/Cluster/Mixed), Plant: Growth habit (Erect/ Semi-spreading/Spreading/ Horizontal), Fruit: Colour of skin at physiological maturity (Yellow/ Orange/Brown), Specified stage of crop growth period Two consecutive seasons (rabi-winter 2024-25) of the 15 morphological characteristics, 13 were evaluated visually and 2 were measured. All recommended package of practices were followed for raising healthy crop for DUS characterization. The list of 31 genotypes used in the present study is given in the Table 1. Seeds of 31 brinjal genotypes were sown in nurseries raised beds and transplanted in the main field with a spacing of 60 cm x 60 cm between rows and plants respectively in Completely Randomized Block Design (CRBD) with three replications. Randomly five plants of each genotype were selected for recording of observations.

Results and Discussion

The morphological characterization is an important first step for the identification and classification of the genetic resources. The wider range of variability in the germplasm available increases the likelihood of selecting better genotypes, Simmonds pointed out. All the 31 genotypes exhibited considerable variation in the present study. The 31 genotypes were categorized into different groups based on 15 morphological characters. plant (Stem anthocyanin and Plant growth habit), leaf (Leaf colour of vein and Leaf: intensity of colour of vein), Flower (Inflorescence number and Flower: colour), fruit (main colour of skin i.e. at immature fruit stags, Fruit general shape, Fruit length of peduncle, Fruit intensity of purple colour of skin, Fruit size of calyx, Fruit colour of calyx, Fruit colour of flesh, Fruiting pattern, Fruit colour of skin at physiological maturity) are included (Table 1,2,3).

Plant and Leaf Characters

The study found that stem anthocyanin pigmentation varied significantly between genotypes. Twenty-two genotypes, including Kashi Taru, contained stem anthocyanin, while nine genotypes lacked anthocyanin pigmentation on the stem.

Leaf vein colour was observed in two distinct groups:

Green and purple. Five genotypes showed green veins, while the remaining genotypes, including Kashi Taru, had purple veins. The intensity of vein colour was found to be dark in nine

genotypes, medium in eight genotypes, and light in nine genotypes (including Kashi Taru).

There was also variability in plant growth habit in the studied genotypes. Twelve genotypes including Kashi Taru had erect growth habit whereas seventeen genotypes had semispreading growth habit. Only two genotypes had spreading growth habit and none of the genotypes had horizontal growth habit (Table 1).

Patidar *et al.* (2015) [9] reported significant variation for plant growth habit, stem anthocyanin pigmentation, leaf vein colour and intensity of vein colour in brinjal.

Flower Characters

Number of flowers per inflorescence varied among genotypes studied. Eighteen genotypes had more than three flowers per inflorescence whereas Thirteen genotypes including Kashi Taru had one to three flowers per inflorescence.

There was also great variation in flower colour between the genotypes. Dark purple flower colour was observed in four genotypes while eighteen genotypes including Kashi Taru had purple coloured flowers. Light purple flower colour was found in nine genotypes and greenish white flower colour was not found in any genotype. (Table 2).

Fruit Characteristics

- **Fruit Shape:** As per the official DUS (Distinctness, Uniformity, Stability) guidelines for brinjal, fruit shape is categorized as Globular, Ovoid, Obovate, Pear-shaped, Club-Page 4

shaped, Ellipsoid or Cylindrical. In the present collection six genotypes having globular (spherical) fruits, four were obovate, one was ovoid, two were club-shaped, sixteen were cylindrical (including check 'Kashi Taru') and two were ellipsoid. None of the genotypes had pear-shaped fruit. The variety of shapes – elongate (cylindrical, ellipsoid), round (globular, ovoid, obovate) and oval (pear, club) – is in line with previous studies reporting wide fruit-shape diversity in brinjal germplasm. (See Table 3.)

The length of the fruit peduncle (stem) is classified as short (<1.0 cm), medium (1.0- 5.0 cm), or long (>5.0 cm). None of our genotypes exhibited short peduncles. Nine genotypes (e.g. NDBR-24-32, NDBL-24-40, ..., NDBR-24-58) had medium-length peduncles (1- 5 cm), while the remaining twenty-three genotypes, including 'Kashi Taru', had long peduncles exceeding 5 cm. Variation in peduncle length can have an impact on fruit spacing and harvestability; other studies have found similar diversity in brinjal fruit-stalk length.

- **Fruit Skin Colour (Harvest and Maturity):** At commercial harvest, fruit skin colour was classified as white, green, or purple. In this collection, three genotypes bore white fruit (NDBL-24-34, NDBL-24-35, NDBL-24-51), two bore green fruit (NDBR-24-50, NDBL-24-56) and the remaining twenty-six bore purple fruit (including 'Kashi Taru'). Purple is the most common colour for brinjal fruits around the world, but green and white varieties are also popular. The skin colour intensity of the purple-fruited genotypes varied: nine were dark purple (e.g. NDBL-24-33, NDBR-24-36, NDBL-24-60, including 'Kashi Taru'), eleven were medium purple, and five were light purple. This colour gradation is most likely due to anthocyanin content variations.

At full maturity (physiological maturity) the colour of fruit skin changed, six genotypes turned yellow (NDBL-24-34,

NDBL-24-35, NDBL-24-43, NDBL-24-48, NDBR-24-50, NDBL-24-51 including 'Kashi Taru'), two became orange (NDBR-24-32, NDBL-24-40) and rest turned brown. These variations are suggestive of the breakdown of chlorophyll and accumulation of carotenoids in the fruit rind with increasing maturity of brinjals.

- **Fruit Calyx Size:** The size of the fruit calyx (sepals at the fruit base) was scored as small (~ 1 cm), medium (1–2 cm) or large (>2 cm). Six genotypes had small calyces (NDBL-24-35, NDBL-24-38, NDBL-24-44, NDBL-24-48, NDBL-24-51, NDBR-24-57), nineteen had medium calyces and six had large calyces (NDBR-24-32, NDBL-24-34, NDBL-24-42, NDBL-24-52, NDBR-24-53, 'Kashi Taru'). Calyx size can influence fruit protection and market grade. Our observations of substantial variation (from 1 cm to >2 cm) align with prior reports of diversity in brinjal fruit traits. Fruit calyx colour was either green or purple. In this study, twenty four genotypes had green calyces (including 'Kashi Taru' and numerous NDBL genotype listed above) and seven genotypes bore purple calyces (NDBR-24-37, NDBR-24-39, NDBL-24-40, NDBL-24-43, NDBL-24-46, NDBL-24-59, NDBL-24-60). In brinjal green calyces are

predominant but purple calyx is a unique qualitative character for variety description. The purple colouration of the calyx (also of stems and veins) is often connected with the anthocyanin pathways of the plant.

- **Fruit Flesh Colour:** Brinjal flesh colour at harvest was classified as whitish or greenish. Seven genotypes (e.g. NDBL-24-31, NDBL-24-33, NDBR-24-50, NDBL-24-51, NDBR-24-53, NDBR-24-57 and 'Kashi Taru') had whitish flesh, while the remaining twenty-four had greenish flesh. Green flesh (due to chlorophyll) is generally dominant over white in eggplant genetics. This trait is noted for its stability and appears in prior characterizations of brinjal germplasm.
- **Fruiting pattern:** Fruit borne singly, in clusters or mixed - scored as solitary, cluster or mixed. Twenty-five genotypes gave fruits singly (solitary), one genotype (NDBL-24-38) gave fruits strictly in clusters and five genotypes gave mixed pattern (e.g. NDBL-24-35, NDBR-24-36, NDBL-24-51, NDBL-24-56, NDBL-24-60). The dominance of solitary fruiting (25/31) agrees with earlier reports that majority of brinjal varieties set single fruits. This is the normal pattern for the cultivated eggplant and makes for easier harvesting.

Table 1: Characterization of brinjal genotypes based on plant and leaf characters

Characteristics	State Of Expression	Frequency	Example Genotypes	Type of assessment
Stem: anthocyanin colouration	Present/Absent	229	NDBL-24-31, NDBR-24-32, NDBL-24-33, NDBR-24-36, NDBR-24-37, NDBL-24-38, NDBR-24-39, NDBL-24-40, NDBR-24-41, NDBL-24-42, NDBL-24-43, NDBR-24-45, NDBL-24-46, NDBL-24-48, NDBL-24-49, NDBL-24-52, NDBR-24-53, NDBR-24-57, NDBR-24-58, NDBL-24-59, NDBL-24-60, Kashi Taru, NDBL-24-34, NDBL-24-35, NDBL-24-44, NDBR-24-47, NDBR-24-50, NDBL-24-51, NDBL-24-54, NDBL-24-55, NDBL-24-56	VS
Leaf: colour of vein	Green	5	NDBL-24-34, NDBL-24-35, NDBR-24-50, NDBL-24-51, NDBL-24-56	VG
	Purple	26	NDBL-24-31, NDBR-24-32, NDBL-24-33, NDBR-24-36, NDBR-24-37, NDBL-24-38, NDBR-24-39, NDBL-24-40, NDBR-24-41, NDBL-24-42, NDBL-24-43, NDBL-24-44, NDBR-24-45, NDBL-24-46, NDBR-24-47, NDBL-24-48, NDBL-24-49, NDBL-24-52, NDBR-24-53, NDBL-24-54, NDBL-24-55, NDBR-24-57, NDBR-24-58, NDBL-24-59, NDBL-24-60, Kashi Taru	
Leaf: intensity of colour of vein	Dark	9	NDBL-24-40, NDBL-24-43, NDBR-24-45, NDBL-24-46, NDBL-24-49, NDBL-24-52, NDBR-24-57, NDBL-24-59, NDBL-24-60	VG
	Medium	8	NDBL-24-31, NDBL-24-33, NDBR-24-37, NDBL-24-38, NDBR-24-39, NDBR-24-41, NDBL-24-48, NDBR-24-53	
	Light	9	NDBR-24-32, NDBR-24-36, NDBL-24-42, NDBL-24-44, NDBR-24-47, NDBL-24-54, NDBL-24-55, NDBR-24-58, Kashi Taru	
Plant: growth habit	Erect	12	NDBL-24-31, NDBL-24-33, NDBL-24-34, NDBL-24-35, NDBR-24-39, NDBL-24-42, NDBR-24-47, NDBL-24-51, NDBL-24-52, NDBL-24-54, NDBR-24-57, Kashi Taru	VG
	Semi spreading	17	NDBR-24-32, NDBR-24-36, NDBL-24-37, NDBL-24-40, NDBR-24-41, NDBL-24-43, NDBL-24-44, NDBR-24-45, NDBL-24-46, NDBL-24-49, NDBR-24-50, NDBR-24-53, NDBL-24-55, NDBL-24-56, NDBR-24-58, NDBL-24-59, NDBL-24-60	
	Spreading	2	NDBR-24-38, NDBL-24-48	
	Horizontal	0	None	

MS: Measurement of a number of individual plants or parts of plants. VG: Visual assessment by a single observation of a group of plants or parts of plants. VS: Visual assessment by observation on individual plant or parts of plants.

Table 2: Characterization of brinjal genotypes based on flower characters

Characteristics	State Of Expression	Frequency	Example Genotypes	Type of assessment
Inflorescence: number of flower	>3	18	NDBL-24-34, NDBR-24-36, NDBR-24-37, NDBL-24-38, NDBR-24-39, NDBL-24-42, NDBL-24-43, NDBR-24-45, NDBL-24-46, NDBL-24-48, NDBL-24-49, NDBL-24-50, NDBL-24-51, NDBL-24-52, NDBL-24-55, NDBL-24-56, NDBL-24-59, NDBL-24-60	VG
	1 to 3	13	NDBL-24-31, NDBR-24-32, NDBL-24-33, NDBL-24-35, NDBL-24-40, NDBR-24-41, NDBL-24-44, NDBR-24-47, NDBR-24-53, NDBL-24-54, NDBR-24-57, NDBR-24-58, Kashi Taru	
Flower: colour	Dark purple	4	NDBR-24-39, NDBR-24-45, NDBL-24-59, NDBL-24-60	VS
	Purple	18	NDBR-24-32, NDBL-24-33, NDBR-24-36, NDBR-24-37, NDBL-24-38, NDBL-24-40, NDBR-24-41, NDBL-24-43, NDBL-24-44, NDBL-24-46, NDBL-24-48, NDBL-24-49, NDBL-24-52, NDBL-24-55, NDBL-24-56, NDBR-24-57, NDBR-24-58, Kashi Taru	
	Light purple	9	NDBL-24-31, NDBL-24-34, NDBL-24-35, NDBL-24-42, NDBR-24-47, NDBR-24-50, NDBL-24-51, NDBR-24-53, NDBL-24-54	
	Greenish white	0	None	

*MS: Measurement of a number of individual plants or parts of plants. VG: Visual assessment by a single observation of a group of plants or parts of plants. VS: Visual assessment by observation on individual plant or parts of plants.

Table 3: Characterization of brinjal genotypes based on fruit characters

Characteristics	State Of Expression	Frequency	Example Genotypes	Type of assessment
Fruit: general shape	Globular	6	NDBR-24-32, NDBR-24-37, NDBR-24-41, NDBR-24-45, NDBR-24-53, NDBR-24-58	VG
	Obovate	4	NDBR-24-36, NDBR-24-39, NDBR-24-47, NDBR-24-50	
	Ovoid	1	NDBR-24-57	
	Club	2	NDBL-24-35, NDBL-24-49	
	Cylindrical	16	NDBL-24-31, NDBL-24-33, NDBL-24-34, NDBL-24-38, NDBL-24-42, NDBL-24-43, NDBL-24-44, NDBL-24-46, NDBL-24-48, NDBL-24-52, NDBL-24-54, NDBL-24-55, NDBL-24-56, NDBL-24-59, NDBL-24-60, Kashi Taru	
	Ellipsoid	2	NDBL-24-40, NDBL-24-51	
	Pear shaped	0	None	
Fruit: length of peduncle	Short		None	MS
	Medium	9	NDBR-24-32, NDBL-24-40, NDBR-24-41, NDBR-24-47, NDBR-24-53, NDBL-24-54, NDBL-24-55, NDBR-24-57, NDBR-24-58	
	Large	22	NDBL-24-31, NDBL-24-33, NDBL-24-34, NDBL-24-35, NDBR-24-36, NDBR-24-37, NDBL-24-38, NDBR-24-39, NDBL-24-42, NDBL-24-43, NDBL-24-44, NDBR-24-45, NDBL-24-46, NDBL-24-48, NDBL-24-49, NDBR-24-50, NDBL-24-51, NDBL-24-52, NDBL-24-56, NDBL-24-59, NDBL-24-60, Kashi Taru	
Fruit: colour of skin at commercial harvesting	White	3	NDBL-24-34, NDBL-24-35, NDBL-24-51	VG
	Purple	26	NDBL-24-31, NDBR-24-32, NDBL-24-33, NDBR-24-36, NDBR-24-37, NDBL-24-38, NDBR-24-39, NDBL-24-40, NDBR-24-41, NDBL-24-42, NDBL-24-43, NDBL-24-44, NDBR-24-45, NDBL-24-46, NDBR-24-47, NDBL-24-48, NDBL-24-49, NDBL-24-52, NDBR-24-53, NDBL-24-54, NDBL-24-55, NDBR-24-57, NDBR-24-58, NDBL-24-59, NDBL-24-60, Kashi Taru	
	Green	2	NDBR-24-50, NDBL-24-56	
Fruit: intensity of purple colour of skin	Dark	10	NDBL-24-33, NDBR-24-36, NDBR-24-37, NDBL-24-40, NDBL-24-44, NDBR-24-45, NDBL-24-55, NDBL-24-59, NDBL-24-60, Kashi Taru	VS
	Medium	11	NDBR-24-32, NDBL-24-38, NDBR-24-39, NDBR-24-41, NDBL-24-42, NDBL-24-46, NDBR-24-47, NDBL-24-48, NDBR-24-53, NDBR-24-57, NDBR-24-58	
	Light	5	NDBL-24-31, NDBL-24-43, NDBL-24-49, NDBL-24-52, NDBL-24-54	
Fruit: size of calyx	Small	6	NDBL-24-35, NDBL-24-38, NDBL-24-44, NDBL-24-48, NDBL-24-51, NDBR-24-57	MS
	Medium	19	NDBL-24-31, NDBL-24-33, NDBR-24-36, NDBR-24-37, NDBR-24-39, NDBL-24-40, NDBR-24-41, NDBL-24-43, NDBR-24-45, NDBL-24-46, NDBR-24-47, NDBL-24-49, NDBR-24-50, NDBL-24-54, NDBL-24-55, NDBL-24-56, NDBR-24-58, NDBL-24-59, NDBL-24-60	
	Large	6	NDBR-24-32, NDBL-24-34, NDBL-24-42, NDBL-24-52, NDBR-24-53, Kashi Taru	
Fruit: colour of calyx	Green	24	NDBL-24-31, NDBR-24-32, NDBL-24-33, NDBL-24-34, NDBL-24-35, NDBR-24-36, NDBL-24-38, NDBR-24-41, NDBL-24-42, NDBL-24-44, NDBR-24-45, NDBR-24-47, NDBL-24-48, NDBL-24-49, NDBR-24-50, NDBL-24-51, NDBL-24-52, NDBR-24-53, NDBL-24-54, NDBL-24-55, NDBL-24-56, NDBR-24-57, NDBR-24-58, Kashi Taru	VG
	Purple	7	NDBR-24-37, NDBR-24-39, NDBL-24-40, NDBL-24-43, NDBL-24-46, NDBL-24-59, NDBL-24-60	
Fruit: colour of flesh	Whitish	7	NDBL-24-31, NDBL-24-33, NDBR-24-50, NDBL-24-51, NDBR-24-53, NDBR-24-57, Kashi Taru	VS
	Greenish	24	NDBR-24-32, NDBL-24-34, NDBL-24-35, NDBR-24-36, NDBR-24-37, NDBL-24-38, NDBR-24-39, NDBL-24-40, NDBR-24-41, NDBL-24-42, NDBL-24-43, NDBL-24-44, NDBR-24-45, NDBL-24-46, NDBR-24-47, NDBL-24-48, NDBL-24-49, NDBL-24-52, NDBL-24-54, NDBL-24-55, NDBL-24-56, NDBR-24-58, NDBL-24-59, NDBL-24-60	
	Solitary	25	NDBL-24-31, NDBR-24-32, NDBL-24-33, NDBL-24-34, NDBR-24-37, NDBR-24-39, NDBL-24-40, NDBR-24-41, NDBL-24-42, NDBL-24-43, NDBL-24-44, NDBR-24-45, NDBL-24-46, NDBR-24-47, NDBL-24-49, NDBR-24-50, NDBL-24-52, NDBR-24-53, NDBL-24-54, NDBL-24-55, NDBR-24-57, NDBR-24-58, NDBL-24-59, Kashi Taru	
	Cluster	1	NDBL-24-38	
	Mixed	5	NDBL-24-35, NDBR-24-36, NDBL-24-51, NDBL-24-56, NDBL-24-60	
Fruit: colour of skin at physiological maturity	Yellow	7	NDBL-24-34, NDBL-24-35, NDBL-24-43, NDBL-24-48, NDBR-24-50, NDBL-24-51, Kashi Taru	VS
	Orange	2	NDBR-24-32, NDBL-24-40	
	Brown	22	NDBL-24-31, NDBL-24-33, NDBR-24-36, NDBR-24-37, NDBL-24-38, NDBR-24-39, NDBR-24-41, NDBL-24-42, NDBL-24-44, NDBR-24-45, NDBL-24-46, NDBR-24-47, NDBL-24-49, NDBL-24-52, NDBR-24-53, NDBL-24-54, NDBL-24-55, NDBL-24-56, NDBR-24-57, NDBR-24-58, NDBL-24-59, NDBL-24-60	

MS: Measurement of a number of individual plants or parts of plants. VG: Visual assessment by a single observation of a group of plants or parts of plants. VS: Visual assessment by observation on individual plant or parts of plants.

Conclusion

The present study concludes that there is significant genetic variability among the 31 brinjal genotypes evaluated based on 15 morphological traits. The research successfully established a vital morphological baseline for the identification of these genetic resources by documenting distinct variations in plant growth habits, floral characters and fruit traits. Specifically, traits such as the predominance of cylindrical fruit shapes, purple skin colour at commercial harvest and the transition to

brown at physiological maturity serve as key markers for distinctness. These findings are essential for fulfilling the requirements of the DUS test guidelines and providing legal protection to cultivars under the PPV and FR Act, 2001. Ultimately, this characterization helps in avoiding the duplication of germplasm and assists breeders in selecting superior genotypes for future crop improvement programs.

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