

# **Plant Archives**

Journal homepage: http://www.plantarchives.org DOI Url : https://doi.org/10.51470/PLANTARCHIVES.2025.v25.no.1.247

## STUDY OF YIELD AND ITS ATTRIBUTING TRAITS OF 20 GENOTYPES IN BRINJAL (SOLANUM MELONGENA L.)

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(Date of Receiving : 08-02-2025; Date of Acceptance : 14-04-2025)

ABSTRACTGenetic variation is essential for selection and more importantly it allows new alleles to enter into<br/>any particular population. In nature, the "fittest" ones succeed and go on to reproduce. Keeping<br/>theory in mind following experiment was conducted in crop Brinjal. The data was recorded for<br/>Days to 50% flowering, Days to first fruit harvest, Plant Height (cm), Number of primary branches per<br/>plant, Number of fruits per cluster, Number of fruits per plant, Average fruit weight(g), Length of<br/>pedicle (cm), Equatorial diameter (cm), Dry matter content (%), Polar diameter (cm) in 20 genotypes of<br/>brinjal. The experiment was carried with RBD design with three replications.<br/>Keywords : Genetic, brinjal, weight, variability, plant

## Introduction

Brinjal or eggplant (Solanum melongena L. 2n=24) is one of the most important cultivated vegetable, belonging to family Solanaceae having diploid chromosome number 2n = 2x = 24. Brinjal belong to sub genus Leptostemonum section Melongena, sub family Solanoideae and tribe Solaneae. Large number of diversities found in cultivars grown in country based on colour (fruit colour from light to dark purple, white and green), size (fruit length varies between 4-45 cm and thickness 2-35cm) and shape of fruits. In melongena species has three primary botanical varieties (Choudhary, 2014).

Genetic variability plays vital role in determining characteristics of brinjal hence evaluation of genotypes is importance for selection of best germplasm. Higher degree of natural variation present in various characters among the genotype shows good scope of improvement in economic traits. Variability identified by coefficient of variation, heritability and genetic advance, and degree of association among population. Phenotypic variability is affected by different environmental conditions but genetic variability remains same, thus genetic variability is more important for plant breeder.

## **Materials and Methods**

The present experiment was carried out at Bhimrao Babasaheb Ambedkar University, Lucknow during winter-spring season 2023-24 (September to March). It falls under humid subtropical region of lower Gangetic alluvial plains of Eastern Uttar Pradesh. Temperature ranges from 35°C to 42°C during summer month while it rang from 7°C to 14°C during winter months. The temperature during season of crop growth varied from 35.8 °C (max.) to 7.2 °C (min.). The average annual rainfall is 750 mm and 80% rain received during monsoon. Relative humidity is just about 60-70 percent from mid-July to end of March and afterward it consistently decreases to 50% by May. The experimental design was carried out in Randomized Block Design (R.B.D.) with three replications and twenty genotypes during winter season of 2023 collected from different places of India. The list of genotypes studied in present investigation is given below in table 1.

**Table 1 :** List of Genotypes and their source

S.No.	Genotype	Source
1.	NDB-15-1	IIVR, Varanasi
2.	NDB-3	IIVR, Varanasi
3.	2019/BRLVAR-5	IIVR, Varanasi
4.	PusaAnkur	IIVR, Varanasi
5.	PantSamrat	IIVR, Varanasi
6.	KS-224	IIVR, Varanasi
7.	NDBWhite-I	IIVR, Varanasi
8.	NDB-15-6	IIVR, Varanasi
9.	NDB-15-3	IIVR, Varanasi
10.	KS-251	IIVR, Varanasi
11.	NDB-2	IIVR, Varanasi
12.	2014/BRRVAR-4-1-1	IIVR, Varanasi
13.	MuktaKashi	IIVR, Varanasi
14.	CO-2	IIVR, Varanasi
15.	2019/BRRVAR-3	IIVR, Varanasi
16.	2019/BRRVAB-2	IIVR, Varanasi
17.	NDBsel-1	IIVR, Varanasi
18	PantRituraj	IIVR, Varanasi
19.	PusaKranti	IIVR, Varanasi
20.	Balfahva	IIVR, Varanasi

Raised bed of nursery was manually prepared to a height of 15-20 cm. The seeds of brinjal were sown on 6<sup>th</sup>September, 2023. After sowing the seed bed was covered with straw mulch and light irrigation is applied. Recommended care and plant protection measure were taken till the seedlings were ready for transplanting. Five healthy plants were randomly selected and tagged from each replication from every genotype.

## **Statistical analysis**

The experimental data was compiled by taking the mean value of the twenty genotypes of brinjal for yield and its attributing traits from all the three replications. It was subjected to the statistical analysis as per the method of Randomized Block Design (RBD).

## **Result and Dicussion**

## Days to 50% flowering

The observation recorded on days to 50% flowering revealed significance differences among

genotypes. Days to 50% flowering ranged from 50.0 to 80.65 with an overall mean of 65.09. The maximum days to 50% flowering found in Pant Samrat (80.65) followed by Pant Rituraj (79.59) and 2014/BRRVAR-4-l-1. Minimum data recorded in NDB-15-1 (50.21). The findings supported by Bansal and Mehta (2008).

## Days to first fruit harvest

The character days taken to first fruit harvest plays a very important role in identifying the early genotype and it is one of the important characters for breeding a new variety. The perusal of data for days to first fruit harvest revealed that the range for the character varied from 82.05 to 99.65. More number of days taken to first fruit harvest observed in genotype Pant Samrat (99.65) followed by 2014/BRRVAR-4-1-1 (98.63) and Pant Rituraj (97.39). Minimum days taken to first fruit harvest observed in genotype CO-2 (82.05). Sabolu (2014) also approved for same finding in eggplants.

## Plant Height (cm)

The highest plant height recorded in Pant Samrat (96.18 cm) followed by 2014/BRRVAR-4-l-1 (76.39cm) and Pusa Ankur (75.04cm). Minimum data for trait plant height recorded in CO-2 (47.55cm). The general mean for the trait is 63.02cm with the range of 47.55 -96.18 cm. Same findings supported by Angadi *et al.* (2017).

## Number of primary branches per plant

More number of primary branches is a desirable trait as greater number of branches manufacturing ample flowers there by increasing the fruit yield per plant. The genotype Pant Samrat (4.35) recorded the highest number of primary branches followed by 2014/BRRVAR-4-1-1 (4.28) and Pant Rituraj (4.08). Minimum number of primary branches found in NDB-15-6 (2.30). Number of primary branches varied from 4.35-2.30 with the general mean for character is 3.14. Such findings also observed by Banerjee *et al.* (2018) in brinjal.

## Number of fruits per cluster

More number of fruits per cluster is a desirable trait as greater number of fruits per cluster increasing the yield per plant. Number of fruits per cluster varied from 2.13 to 4.11 with an overall mean of 2.87. Among the twenty genotypes highest number of fruits per cluster observed in Pant Samrat (4.11) followed by 2014/BRRVAR-4-I-1 (3.64) and 2019/BRRVAB-2 (3.26). Least number of fruits per cluster recorded for CO-2 (2.13). Same observation reported by Patel *et al.* (2017).

#### Number of fruits per plant

Number of fruits per plant used to calculate the total yield. High value of trait observed in cultivar Pant Samrat (49.72) followed by NDB White-I (48.85) and 2014/BRRVAR-4-1-1 (45.35). Lower number of fruits per plant was observed in Balfahva (15.80). The average mean of trait is 30.34. Same findings recorded by Das *et al.*(2023).

### Average fruit weight (g)

Average fruit weight plays vital role in overall yield. The higher average fruit weight is a desirable trait in case of brinjal as it directly contributes to the higher yield and helps the farmer to increase his/her income. Average fruit weight varied from 74.16-180.60 g with an overall mean of 98.26 g. Genotype Pant Samrat (180.60g) showed highest fruit weight followed by 2014/BRRVAR-4-11 (140.65 g) and CO-2 (127.55 g). The genotype NDB White-I had the lowest average fruit weight (74.16 g). Same observations by Naik *et al.* (2009) in brinjal.

#### Length of pedicle (cm)

Higher value of character observed in genotype NDB White-I (6.99 cm) followed by 2019/BRLVAR-5 (6.74 cm) and Pant Samrat (6.67 cm). Lower value of character observed in CO-2 (4.42cm) with an overall

mean of 5.86 cm. Same observations recorded by Lokesh *et al.* (2013).

#### Equatorial diameter (cm)

Equatorial diameter ranged from 9.86 cm to 22.93 cm with an overall mean of 14.64 cm. The highest data for this character found in Pant Rituraj (22.93 cm) followed by KS-210 (19.96 cm) and NDB White-I (18.98 cm). The lowest fruit equatorial diameter found in cultivar 2019/BRRVAB-2 (9.86 cm). Same observations recorded by Sabolu *et al.* (2014).

#### **Dry matter content (%)**

Maximum dry matter content recorded for genotype Pusa Kranti (11.92%) followed by NDB-15-6 (9.07%) and 2014/BRRVAR-4-1-1 (8.44%). Minimum dry matter content observed for cultivar NDB-3 (4.97%) with an overall mean of 7.21%. Same observations recorded by Kumar *et al.* (2020).

#### Polar diameter (cm)

Polar diameter ranged from 9.25 cm to 20.07 cm with an overall mean of 14.24 cm. The highest data for this trait observed in cultivar 2019/BRLVAR-5 (20.07 cm) followed by NDB-15-1 (17.32 cm) and NDB White-I (16.75 cm). The lowest polar diameter observed in cultivar Pant Rituraj (9.25 cm). Same observations recorded by Kumari *et al.* (2022).

Table 2: Mean performance of twenty genotype for different characters

Genotypes Characters	Day to 50% flowering	Days to ïrst frui harvest	Plant height (cm)	No. of primary branches per plant	No of fruit per cluster	No of fruit per plan	Average fruit weight (g)	Length of pedicle (cm)	Equatoria diameter (cm)	Dry matter content (%)	Polar diameter (cm)
NDB-15-1	50.01	83.35	65.30	3.18	2.95	30.77	82.22	5.83	18.98	7.95	17.32
NDB-3	75.00	97.38	60.23	2.97	2.91	29.82	77.27	6.99	13.17	4.97	12.47
2019/BRLVAR-S	52.00	82.05	57.36	3.70	3.52	27.23	99.12	6.74	12.45	6.88	20.07
PUSAANKUR	70.34	96.33	75.04	3.22	3.16	27.37	76.27	6.34	12.09	7.45	14.99
PANTSAMRAT	80.65	99.65	93.18	4.35	4.11	49.72	180.60	6.67	13.87	7.56	15.08
KS-224	72.35	96.62	54.52	2.95	2.41	18.32	122.65	6.48	19.10	6.05	10.44
NDBWHTTE-1	64.68	87.05	59.67	2.48	2.67	48.85	74.16	4.66	12.42	7.81	16.75
NDB-15-6	72.05	98.63	62.22	2.30	2.30	26.35	98.22	5.46	15.72	9.07	13.75
NDB-15-3	56.70	93.65	53.18	2.37	2.73	17.95	104.97	6.45	18.96	5.87	12.95
KS-251	72.00	91.07	73.49	2.58	3.25	38.72	95.40	5.61	12.IO	8.21	16.70
NDB-2	70.68	91.35	55.09	3.17	3.10	25.17	85.04	6.54	15.79	7.05	14.27
2014/BRRVAR-4-I-I	79.05	98.38	76.39	4.28	3.64	43.35	140.65	4.73	16.67	8.44	14.47
MUKTAKASHT	53.68	90.03	51.94	2.39	2.27	35.58	75.30	4.72	13.58	6.02	15.12
CO-2	53.38	77.65	47.55	2.39	2.13	17.92	127.55	4.42	17.64	7.09	10.49
2019/BRRVAR-3	55.05	88.65	56.07	3.72	2.61	40.05	93.27	6.62	16.18	5.85	16.18
2019/BRRVAR-2	56.35	87.38	54.39	2.84	3.26	27.95	77.98	5.42	9.86	6.28	9.68
NDBscl-1	75.69	96.30	66.80	2.99	2.73	35.23	78.09	5.51	IU.22	7.04	11.79
PANTRTTURAJ	79.59	97.39	68.65	4.08	2.34	17.37	114.12	6.12	22.93	6.26	9.25
PUSAKRANTI	56.33	92.65	67.38	2.94	2.73	33.29	77.98	5.99	I1.02	11.92	16.57
BALFAHVA	56.25	82.70	61.97	3.92	2.51	15.80	84.37	5.91	9.98	6.35	16.43

Mean	65.09	91.41	63.02	3.14	2.87	30.34	98.26	5.86	14.64	7.21	14.24
Min	50.01	77.65	47.55	2.30	2.13	15.80	74.16	4.42	9.86	4.97	9.25
Max	80.65	99.65	93.18	4.35	4.11	49.72	180.60	6.99	22.93	11.92	20.07
S.E(d)±	1.25	1.47	1.10	0.01	0.04	0.53	1.47	0.10	0.21	0.13	0.23
C.D.at5%	2.54	2.98	2.23	0.03	0.09	1.08	2.98	0.20	0.43	0.27	0.47
c.v. (%)	2.35	1.97	2.13	0.54	1.84	2.15	1.83	2.01	1.79	2.22	1.99

#### Conclusion

Based on the present experiment it is concluded that, mean performance of twenty genotypes for attributing traits and their results showed that there was a very high level of variability in the genotypes. These genotypes could be utilized in other breeding programme or as a parent for hybrid production. The character showing higher direct impact on fruit yield and association to fruit yield per plant can be utilized by breeder for further crop improvement programme. Genotypes divided into different clusters can be used for production of desirable recombinant hybrids.

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