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Assessment of genetic variability, heritability and genetic advance for yield and quality traits in brinjal (*Solanum melongena* L.)

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Abstract

An experiment was conducted to evaluate genetic variability, heritability and genetic advance for yield and quality traits among different brinjal (*Solanum melongena* L.)" genotypes during *Rabi*, 2024-2025 at the Main Experiment Station, Department of Vegetable Science, Acharya Narendra Deva University of Agriculture and Technology, Kumarganj, Ayodhya (U.P.). The experiment was laid out in a Completely Randomized Block Design (CRBD) with three replication comprising twenty-eight genotypes for nineteen qualitative and quantitative traits. The analysis of variance revealed significant differences among the genotypes for all the traits studied, indicating the existence of substantial variability. The estimates of phenotypic coefficient of variation (PCV) was higher than genotypic coefficient of variation (GCV) for all the traits. The higher PCV and GCV were observed for average fruit weight (40.65% and 40.19 %), followed by fruit diameter (36.25% and 34.85%) and number of fruits per plant (26.37% and 24.69%). Heritability estimates ranged from average fruit weight (97.77%) to days to first fruit harvest (64.63 %.) Genetic advance was highest for average fruit weight (81.86 %) to lowest in days to first fruit harvest (7.25%). Thus, the present study revealed ample scope for the improvement of yield and quality traits in brinjal through selection of superior genotypes and the exploitation of genetically diverse parents in breeding programmes.

Keywords: GCV, PCV, heritability, genetic advance, coefficient of variation

Introduction

Brinjal (*Solanum melongena* L.), also known as eggplant or aubergine or guinea squash, having chromosome number ($2n=24$), is an important vegetable crop of India. Brinjal belongs to the Solanaceae family consisting of 75 genera and over 2000 species. Brinjal is widely appreciated for its nutritional richness and therapeutic potential. Its fruits are an excellent source of dietary fibre, vitamins such as B-complex and vitamin C, essential minerals including potassium, calcium, phosphorus and iron, as well as bioactive compounds like phenolics, flavonoids, and anthocyanins. These antioxidant constituents contribute to the health-promoting properties of brinjal by protecting against oxidative damage and reducing the risk of various chronic diseases. In addition to its widespread use as a fresh vegetable, brinjal is utilized in the preparation of numerous processed and value-added products, thereby playing an important role in improving nutritional security and enhancing farmers' income (Balas *et. al.*, 2019). Brinjal is one of the most important vegetable crops, with India being the second largest producer in the world, covering an area of 688.86 thousand hectares with production of 13130.73 thousand metric tonnes. Uttar Pradesh ranks seventh in national production, with an area of 13.62 thousand hectares and a total production of 514.01 thousand metric tonnes (MoA&FW, 2024-25). The assessment of genetic variability, along with estimates of heritability and genetic advance, is fundamental for understanding the extent and nature of genetic variation available within a population. Genetic variability provides the basis for effective selection, whereas heritability measures the proportion of observed phenotypic variation that is controlled by genetic factors. Genetic advance, particularly when expressed as a percentage of the mean, estimates the expected improvement in

A trait through selection. The combined evaluation of these genetic parameters facilitates the identification of traits predominantly governed by additive gene action, thereby enhancing the efficiency of selection and supporting the development of high-yielding and superior-quality brinjal cultivars.

Materials and methods

The present experiment was conducted to evaluate genetic variability, heritability, and genetic advance as percent of mean among 28 brinjal genotypes, including one check variety (NDB-2), during *Rabi*, 2024-25 at the Main Experiment Station, Department of Vegetable Science, Acharya Narendra Deva University of Agriculture and Technology, Kumarganj, Ayodhya (U.P.). It is located between 24.47 ° and 26.56 ° N latitude and 82.12 ° and 83.98 ° E longitude at an altitude of 113 m above mean sea level. The experiment was laid out in a Completely Randomized Block Design (CRBD) with three replications, maintaining a spacing of 60×60 cm and a plot size of 3.0×1.2: m². Findings concerned fifteen quantitative and four qualitative traits *i.e.* days to 50% flowering, number of flower per cluster, days to first fruit harvest, leaf length (cm), leaf diameter (cm), fruit length (cm), fruit diameter (cm), number of primary branches per plant, average fruit weight (g), plant height (cm), plant spread (cm), number of fruits per plant, yield per plant (kg), fruit yield per plot (kg), total fruit yield (q/ha), TSS(0Brix), ascorbic acid (mg/100g), phenol content (mg/100g), dry matter content (%). Analysis of variance (ANOVA), it was performed following Panse and Sukhatme (2000) [9], Genotypic and phenotypic coefficients of variation (GCV and PCV) estimated according to Burton and De Vane (1953) [4], while broad-sense heritability was computed following Allard (1960) [1]. Genetic advance and genetic advance as percent of mean (GAM) were estimated using the methods proposed by Hanson *et al.* (1956) [5] and Johnson *et al.* (1955) [6], respectively. These genetic parameters are being used to assess the extent of variability and the effectiveness of selection among the studied brinjal genotypes. Statistical analysis was carried out using R statistical software (Tabassum *et al.*, 2024).

Results and Discussion

The observations recorded for nineteen quantitative and qualitative traits were subjected to analysis of variance (ANOVA) to determine the extent of variability among the genotypes. The analysis revealed highly significant differences among the genotypes for all the characters studied (Table 2), demonstrating the presence of substantial genetic variability within the experimental material. The significant variation observed for these traits indicates considerable diversity in the performance of the genotypes, suggesting ample opportunities for effective selection and their utilization in brinjal breeding and genetic improvement programmes.

Genetic parameters

The genotypic coefficient of variation (GCV) and phenotypic coefficient of variation (PCV) are important genetic parameters used to quantify the extent of variability existing within a population. The degree of variation among different traits can be effectively assessed by comparing the values of these coefficients. Accordingly, GCV and PCV were estimated for all the characters included in the present study. The analysis indicated that PCV values were marginally higher than the corresponding GCV values for most of the traits, suggesting that environmental effects had only a limited influence on their expression. The close correspondence between GCV and PCV further indicated that the

observed variation was largely attributable to genetic factors, implying that phenotypic selection would be reliable and effective for the genetic improvement of these traits.

The estimates of genotypic coefficient of variation (GCV) and phenotypic coefficient of variation (PCV) for the nineteen traits studied in brinjal are presented in Table 3. For all the characters, the PCV values were slightly higher than the corresponding GCV values, indicating a relatively small influence of environmental factors on the expression of these traits. High estimates (>20%) of both PCV and GCV were observed for fruit length (23.74% and 22.56%), fruit diameter (36.25% and 34.85%), average fruit weight (40.65% and 40.19%), number of fruits per plant (26.37% and 24.69%), yield per plant (24.22% and 22.64%), fruit yield per plot (23.60% and 21.48%), and total fruit yield (24.05% and 22.48%). Moderate estimates (10- 20%) of PCV and GCV were recorded for number of flowers per cluster (18.63% and 16.78%), leaf length (12.97% and 11.11%), leaf diameter (18.18% and 16.85%), number of primary branches per plant (17.62% and 14.53%), plant height (14.09% and 12.44%), plant spread (13.49% and 12.07%), TSS (12.09% and 11.57%), ascorbic acid (14.52% and 14.33%), phenol content (19.61% and 19.11%), and dry matter content (13.72% and 13.39%). In contrast, low estimates (<10%) of both PCV and GCV were recorded for days to 50% flowering (7.48% and 6.47%) and days to first fruit harvest (5.45% and 4.38%), reflecting a comparatively narrow range of genetic and phenotypic variability for these characters. Similar observations have also been reported by Yadav *et al.* (2016) [18], Samlinsujin *et al.* (2017), Srivastava *et al.* (2019) [15], Kushwaha *et al.* (2023), and Sreevandana *et al.* (2024) [14].

The estimates of heritability for the nineteen traits ranged from 64.63% to 97.77%, indicating a high degree of genetic control over all the characters studied. High heritability (>60%) was recorded for average fruit weight (97.77%), ascorbic acid (97.34%), dry matter content (95.18%), phenol content (94.91%), fruit diameter (92.45%), TSS (91.50%), fruit length (90.29%), number of fruits per plant (87.67%), total fruit yield (87.36%), yield per plant (87.34%), leaf diameter (85.90%), fruit yield per plot (82.84%), number of flowers per cluster (81.15%), plant spread (80.02%), plant height (77.95%), days to 50% flowering (74.85%), leaf length (73.34%), number of primary branches per plant (68.06%), and days to first fruit harvest (64.63%). These findings are in agreement with those reported by Arti and Sharma (2018) [2] and Sakriya *et al.* (2020) [12].

Genetic advance as per cent of mean varied considerably among the traits, with the highest value recorded for average fruit weight (81.86%) and the lowest for days to first fruit harvest (7.25%). High genetic advance (>20%) was observed for average fruit weight (81.86%), fruit diameter (69.03%), number of fruits per plant (47.63%), fruit length (44.16%), yield per plant (43.58%), total fruit yield (43.28%), fruit yield per plot (40.28%), phenol content (38.34%), leaf diameter (32.18%), number of flowers per cluster (31.14%), ascorbic acid (29.13%), dry matter content (26.91%), number of primary branches per plant (24.70%), TSS (22.79%), plant height (22.62%), and plant spread (22.24%). Moderate genetic advance was observed only for days to 50% flowering (11.54%), whereas the lowest genetic advance was recorded for days to first fruit harvest (7.25%). Similar results have also been reported by Yadav *et al.* (2016) [18] and Kushwaha *et al.* (2023).

High heritability (>60%) coupled with high genetic advance (>20%) was recorded for average fruit weight (97.77% and 81.86%), ascorbic acid (97.34% and 29.13%), dry matter content (95.18% and 26.91%), phenol content (94.91% and 38.34%), fruit diameter (92.45% and 69.03%), TSS (91.50% and 22.79%), fruit

length (90.29% and 44.16%), number of fruits per plant (87.67% and 47.63%), total fruit yield (87.36% and 43.28%), yield per plant (87.34% and 43.58%), leaf diameter (85.90% and 32.18%), fruit yield per plot (82.84% and 40.28%), number of flowers per cluster (81.15% and 31.14%), plant spread (80.02% and 22.24%), plant height (77.95% and 22.62%), and number of primary branches per plant (68.06% and 24.70%), indicating the predominance of additive gene action and the effectiveness of selection for these traits. High heritability (>60%) associated with moderate genetic advance (10-20%) was observed for days to

50% flowering (74.85% and 11.54%) and leaf length (73.34% and 19.59%), suggesting the involvement of both additive and non-additive gene effects. In contrast, days to first fruit harvest exhibited high heritability (>60%) but low genetic advance (<10%), with values of 64.63% and 7.25%, respectively, indicating a greater influence of nonadditive gene action and environmental factors on its inheritance. Similar results have been reported by Verma *et al.* (2021) [17], Rameshkumar *et al.* (2022) [10], and Rathod *et al.* (2024) [11].

Table 1: List of genotypes used in the experiment

S.No	Genotypes	Source of origin
1.	NDB-24-1	A.N.D.U.A.&T, Ayodhya (U.P.)
2.	NDBR-24-2	A.N.D.U.A.&T, Ayodhya (U.P.)
3.	NDB-24-3	A.N.D.U.A.&T, Ayodhya (U.P.)
4.	NDB-24-4	A.N.D.U.A.&T, Ayodhya (U.P.)
5.	NDB-24-5	A.N.D.U.A.&T, Ayodhya (U.P.)
6.	NDBR-24-6	A.N.D.U.A.&T, Ayodhya (U.P.)
7.	NDB-24-7	A.N.D.U.A.&T, Ayodhya (U.P.)
8.	NDBR-24-8	A.N.D.U.A.&T, Ayodhya (U.P.)
9.	NDB-24-9	A.N.D.U.A.&T, Ayodhya (U.P.)
10.	NDB-24-10	A.N.D.U.A.&T, Ayodhya (U.P.)
11.	NDB-24-11	A.N.D.U.A.&T, Ayodhya (U.P.)
12.	NDB-24-12	A.N.D.U.A.&T, Ayodhya (U.P.)
13.	NDBR-24-13	A.N.D.U.A.&T, Ayodhya (U.P.)
14.	NDB-24-14	A.N.D.U.A.&T, Ayodhya (U.P.)
15.	NDB-24-15	A.N.D.U.A.&T, Ayodhya (U.P.)
16.	NDB-24-16	A.N.D.U.A.&T, Ayodhya (U.P.)
17.	NDBR-24-17	A.N.D.U.A.&T, Ayodhya (U.P.)
18.	NDB-24-18	A.N.D.U.A.&T, Ayodhya (U.P.)
19.	NDB-24-19	A.N.D.U.A.&T, Ayodhya (U.P.)
20.	NDB-24-20	A.N.D.U.A.&T, Ayodhya (U.P.)
21.	NDB-24-21	A.N.D.U.A.&T, Ayodhya (U.P.)
22.	NDB-24-22	A.N.D.U.A.&T, Ayodhya (U.P.)
23.	NDBR-24-23	A.N.D.U.A.&T, Ayodhya (U.P.)
24.	NDB-24-24	A.N.D.U.A.&T, Ayodhya (U.P.)
25.	NDB-24-25	A.N.D.U.A.&T, Ayodhya (U.P.)
26.	NDB-24-26	A.N.D.U.A.&T, Ayodhya (U.P.)
27.	NDB-24-27	A.N.D.U.A.&T, Ayodhya (U.P.)
28.	NDB-2 (Check)	A.N.D.U.A.&T, Ayodhya (U.P.)

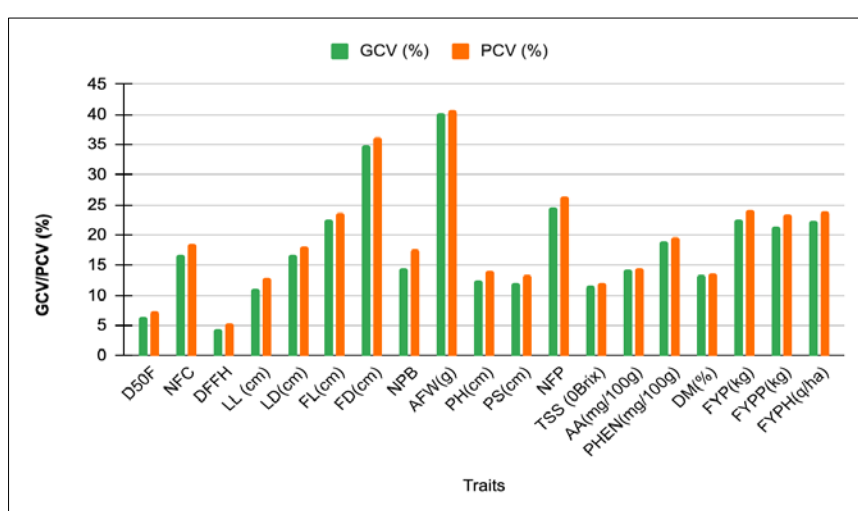
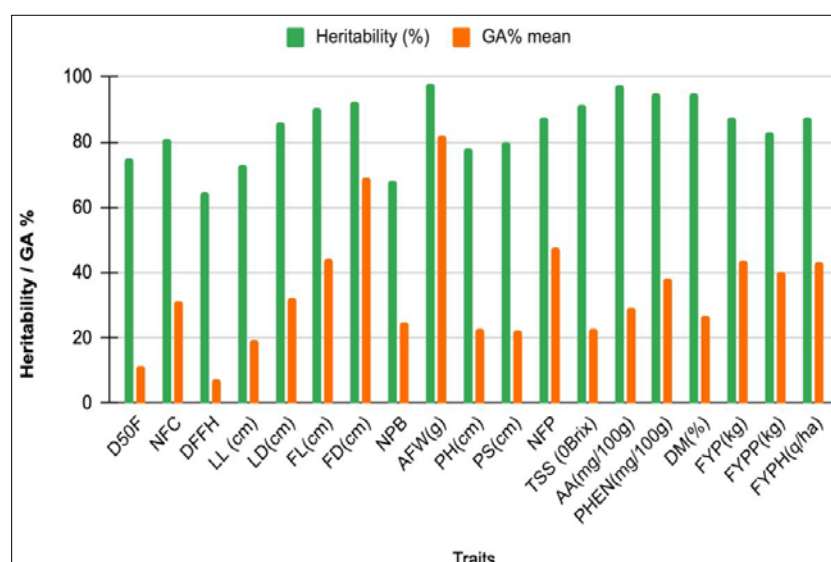
Table 2: Analysis of variance (mean squares) for nineteen quantitative and qualitative traits in brinjal genotypes

S. No.	Traits	Source of variation			
		Replication	Genotypes	Error	Total
	Degree of freedom	2	27	54	83
1.	Days to 50% flowering	6.87	45.27**	4.56	17.86
2.	Number of flower per cluster	0.23	1.50**	0.11	0.56
3.	Days to first fruit harvest	15.01	37.44**	5.78	16.30
4.	Leaf length (cm)	2.15	11.73**	1.27	4.69
5.	Leaf diameter (cm)	0.04	9.73**	0.50	3.49
6.	Fruit length (cm)	3.38	35.96**	1.24	12.59
7.	Fruit diameter (cm)	0.44	8.68**	0.23	2.98
8.	Number of primary branches per plant	1.36	4.14**	0.56	1.74
9.	Average fruit weight (g)	46.35	5538.66**	41.78	1830.03
10.	Plant height (cm)	0.11	211.03**	18.19	80.48
11.	Plant spread (cm)	31.81	245.12**	18.84	92.76
12.	Number of fruits per plant	1.05	19.92**	0.89	7.09
13.	TSS (⁰ Brix)	0.003	0.966**	0.03	0.33
14.	Ascorbic acid (mg/100 g)	0.16	9.49**	0.09	3.15
15.	Phenol content (mg/100g)	34.73	1316.91**	23.15	444.29
16.	Dry matter content (%)	0.06	4.23**	0.07	1.42
17.	Yield per plant (kg)	0.001	0.164**	0.01	0.06
18.	Fruit yield per plot (kg)	0.18	14.42**	0.93	5.30
19.	Total fruit yield (q/ha)	53.72	10062.71**	463.15	3576.03

*, ** significant at 5% and 1% level, respectively

Table 3: Range, grand mean, genotypic (GCV), phenotypic (PCV) coefficient of variation, heritability in broad sense and genetic advance in per cent of mean for nineteen traits in brinjal genotypes

Traits	Mean	Range		GCV (%)	PCV (%)	Heritability (%)	GA% mean
		Min	Max				
Days to 50% flowering	56.92	51.67	69.33	6.47	7.48	74.85	11.54
Number of flower per cluster	4.06	3.10	5.73	16.78	18.63	81.15	31.14
Days to first fruit harvest	74.19	69.33	86.67	4.38	5.45	64.63	7.25
Leaf length (cm)	16.82	13.05	21.80	11.11	12.97	73.34	19.59
Leaf diameter (cm)	10.40	7.95	14.13	16.85	18.18	85.90	32.18
Fruit length (cm)	15.08	9.54	23.17	22.56	23.74	90.29	44.16
Fruit diameter (cm)	4.82	3.37	10.89	34.85	36.25	92.45	69.03
Number of primary branches per plant	7.51	4.97	9.87	14.53	17.62	68.06	24.70
Average fruit weight (g)	106.51	63.30	243.56	40.19	40.65	97.77	81.86
Plant height (cm)	64.47	48.84	82.07	12.44	14.09	77.95	22.62
Plant spread (cm)	71.98	51.15	92.63	12.07	13.49	80.02	22.24
Number of fruits per plant	10.20	4.85	15.53	24.69	26.37	87.67	47.63
TSS (⁰ Brix)	4.83	3.61	5.74	11.57	12.09	91.50	22.79
Ascorbic acid (mg/100 g)	12.35	9.56	15.53	14.33	14.52	97.34	29.13
Phenol content (mg/100g)	108.69	83.00	146.00	19.11	19.61	94.91	38.34
Dry matter content (%)	8.80	6.29	12.28	13.39	13.72	95.18	26.91
Yield per plant (kg)	1.01	0.69	1.52	22.64	24.22	87.34	43.58
Fruit yield per plot (kg)	9.87	6.73	14.68	21.48	23.60	82.84	40.28
Total fruit yield (q/ha)	251.64	174.97	378.52	22.48	24.05	87.36	43.28

**Fig 1:** Comparison of Genotypic (GCV) and phenotypic (PCV) coefficients of variation for different Traits**Fig 2:** Heritability (%) and genetic advance as percent of mean (GA% of Mean) for different quantitative traits

Conclusion

The findings of the present experiment confirmed the existence of substantial genetic variability among the 28 brinjal genotypes for

the nineteen traits evaluated, highlighting the potential for their effective utilization in crop improvement programmes. The consistently higher PCV values than GCV values for all the

characters indicated only a slight environmental influence on trait expression, suggesting that the observed variability was predominantly genetic in nature. High heritability coupled with high genetic advance as per cent of mean for economically important traits, including average fruit weight (g), fruit diameter (cm), fruit length (cm), number of fruits per plant, yield per plant (kg), fruit yield per plot (kg), total fruit yield (q/ha), TSS ($^{\circ}$ Brix), ascorbic acid (mg/100g), phenol content (mg/100g), and dry matter content (%), suggested the predominance of additive gene effects and emphasized the effectiveness of direct selection for these characters. Among the evaluated genotypes, NDB-24-27, NDBR-24-2, and NDB-24-18 emerged as high-yielding entries, with NDBR-24-2 showing exceptional performance for average

fruit weight and yield per plant as mentioned in the supplementary table 4. Therefore, these superior genotypes may serve as valuable genetic resources for future breeding programmes and multi location testing aimed at developing high-yielding brinjal varieties with enhanced quality attributes.

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Table 4: Mean performance of twenty-eight genotypes for nineteen traits in brinjal

SN	Genotypes	D50F	NFC	DFFH	LL	LD	FL	FD	NBP	AFW	PH	PS	NFP	TSS	AA	PHEN	DM	FYP	FYPP	FYPH
1	NDB-24-1	56.33	4.17	74.33	17.45	9.85	13.61	4.38	9.53	78.93	81.65	92.63	11.88	5.03	11.52	109.33	8.52	0.94	9.08	233.04
2	NDBR-24-2	61.00	3.10	78.00	18.89	14.13	18.68	8.54	8.87	243.56	71.60	75.80	13.52	5.40	10.24	136.67	7.65	1.52	14.67	374.19
3	NDB-24-3	54.33	3.37	72.67	15.16	8.27	15.37	4.21	7.23	94.18	59.43	72.67	10.66	5.47	11.59	91.67	9.14	0.93	10.56	241.49
4	NDB-24-4	55.67	3.93	73.33	18.77	10.87	9.54	3.94	7.43	63.49	66.77	65.17	12.44	4.64	10.27	83.00	7.79	0.85	8.27	197.11
5	NDB-24-5	55.67	3.13	73.67	21.80	13.84	11.23	4.04	8.47	63.30	72.73	75.60	6.23	4.66	11.48	134.33	8.29	0.79	7.79	213.28
6	NDBR-24-6	53.33	4.80	71.33	16.17	10.59	12.76	4.55	7.87	97.87	74.40	81.54	10.50	4.94	13.22	97.33	8.24	1.03	10.16	250.60
7	NDB-24-7	53.67	5.13	69.33	17.47	10.58	15.23	3.37	9.87	78.24	55.20	81.63	11.63	5.46	10.48	84.00	8.44	0.91	8.93	225.99
8	NDBR-24-8	56.33	5.00	74.67	17.47	10.69	11.03	5.00	7.63	89.84	57.30	59.97	10.46	4.46	13.30	109.67	9.24	0.97	9.29	230.79
9	NDB-24-9	66.00	5.00	76.67	15.37	8.84	17.77	3.70	8.58	77.19	70.68	79.17	7.03	5.05	14.44	85.33	12.28	0.91	8.71	241.96
10	NDB-24-10	56.00	3.83	74.00	14.90	9.15	16.98	3.57	5.92	77.10	51.19	78.93	9.84	5.34	11.59	92.33	8.02	0.97	9.55	242.70
11	NDB-24-11	58.33	5.73	76.33	19.90	11.89	10.05	4.33	7.20	71.94	61.15	68.73	8.33	4.60	13.64	85.67	8.09	1.06	10.20	266.39
12	NDB-24-12	53.67	4.27	72.33	15.77	9.87	16.60	4.57	5.58	89.86	58.70	82.73	9.12	4.40	15.45	86.00	7.48	0.82	8.00	202.08
13	NDBR-24-13	69.33	3.37	86.67	18.37	12.90	12.17	10.89	4.97	200.87	62.12	69.17	4.85	3.61	11.58	115.00	9.07	0.97	9.60	267.21
14	NDB-24-14	53.67	4.72	70.67	16.87	11.83	11.10	5.06	8.44	102.91	70.02	79.70	10.47	4.95	11.61	85.00	9.90	1.07	10.62	240.77
15	NDB-24-15	54.33	3.72	71.33	16.50	9.83	14.50	3.92	7.13	87.67	63.63	66.70	11.33	5.74	12.24	102.00	10.54	0.99	9.81	249.41
16	NDB-24-16	54.00	4.77	72.00	18.19	12.97	14.73	4.35	6.71	84.90	65.82	78.73	9.47	5.73	10.27	125.67	7.39	0.80	7.96	200.69
17	NDBR-24-17	59.00	3.64	76.33	16.69	12.41	23.17	8.59	7.60	187.25	65.52	70.77	11.96	5.44	9.56	133.67	6.29	1.50	13.10	330.16
18	NDB-24-18	58.00	3.40	75.33	16.03	8.20	16.87	3.83	7.04	126.64	78.08	72.90	12.58	4.81	11.63	127.00	8.05	1.24	12.31	372.72
19	NDB-24-19	55.00	3.83	73.00	16.06	8.79	18.44	4.72	6.15	143.55	62.44	66.05	14.79	4.77	14.54	146.00	9.06	1.32	14.68	308.15
20	NDB-24-20	54.00	4.03	72.00	15.59	9.89	12.97	3.76	6.40	91.39	61.77	71.60	9.50	5.05	15.53	116.67	9.24	0.87	8.35	216.50
21	NDB-24-21	60.67	4.73	78.00	16.92	11.39	12.91	4.53	7.43	92.75	59.48	57.53	7.50	4.73	12.23	137.33	10.12	0.69	6.73	174.97
22	NDB-24-22	58.33	4.53	76.33	13.53	8.19	13.98	4.92	7.18	89.47	48.84	51.15	8.42	3.86	14.47	88.67	10.18	0.75	7.45	187.94
23	NDBR-24-23	58.33	3.97	75.67	18.50	11.93	10.73	4.75	6.47	135.94	59.97	68.40	5.71	3.81	10.66	123.00	10.13	0.78	7.71	195.14
24	NDB-24-24	54.33	3.35	69.33	14.74	8.45	18.91	4.80	7.43	117.93	54.18	58.06	10.44	4.19	11.48	84.33	8.99	0.98	9.71	241.70
25	NDB-24-25	59.00	3.90	76.33	15.42	9.84	15.23	3.97	9.33	91.35	62.93	68.27	8.40	5.40	12.64	142.33	8.00	0.77	7.45	246.33
26	NDB-24-26	58.67	3.83	76.00	15.49	8.25	19.01	3.93	7.80	81.86	66.33	78.80	12.14	4.34	10.51	112.00	9.04	0.99	9.83	190.69
27	NDB-24-27	55.00	3.20	72.33	13.05	7.95	20.54	3.73	7.53	138.18	61.02	65.93	10.88	5.04	14.46	117.33	8.54	1.50	13.71	378.52
28	NDB-2 (check)	51.67	3.25	69.33	19.79	9.96	18.04	4.91	8.53	84.02	82.07	76.98	15.53	4.37	15.26	92.00	8.56	1.30	12.20	325.30
	Mean	56.92	4.06	74.19	16.82	10.40	15.08	4.82	7.51	106.51	64.47	71.98	10.20	4.83	12.35	108.69	8.80	1.01	9.87	251.64
	Min	51.67	3.10	69.33	13.05	7.95	9.54	3.37	4.97	63.30	48.84	51.15	4.85	3.61	9.56	83.00	6.29	0.69	6.73	174.97
	Max	69.33	5.73	86.67	21.80	14.13	23.17	10.89	9.87	243.56	82.07	92.63	15.53	5.74	15.53	146.00	12.28	1.52	14.68	378.52
	SE(d)	1.74	0.27	1.96	0.92	0.58	0.91	0.39	0.61	5.28	3.48	3.54	0.77	0.139	0.239	3.928	0.217	0.07	0.79	17.57
	C.D.	3.51	0.54	3.95	1.85	1.17	1.83	0.79	1.23	10.61	7.00	7.12	1.55	0.28	0.48	7.897	0.435	0.14	1.59	35.33
	C.V.	3.75	8.09	3.24	6.70	6.83	7.40	9.96	9.96	6.07	6.62	6.03	9.26	3.527	2.367	4.426	3.014	8.62	9.78	8.55

D50F- days to 50% flowering, NFC-number of flower per cluster, DFFH- days to first fruit harvest, LL-leaf length, LD-leaf diameter, FL- fruit length, FD- fruit diameter,NBPnumber of primary branches per plant, AFW- average fruit weight, PH- plant height ,PS-plant spread, NFP- number of fruits per plant, TSS- total soluble solids, AA- ascorbic acid, PHEN- phenol content, DM- dry matter content, FYP- yield per plant, FYPP-fruit yield per plot, FYPH- total fruit yield

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