



Development of Clustered Fruiting and High-yielding Variety in Brinjal (*Solanum melongena* L.) through Applied Plant Breeding

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This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

In brinjal, consumer preference hinges on multifaceted criteria encompassing nutritional content and culinary attributes, while farmers prioritize factors such as yield potential. In response to this dual demand spectrum, the cultivar "Anand Doli" was meticulously developed, and tailored to excel

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in the unique agro-climatic conditions prevalent in middle Gujarat. Anand Doli, emerged from the controlled crossbreeding program involving Doli 5 x GOB 1 utilizing the pedigree method of plant breeding at the Main Vegetable Research Station of Anand Agricultural University, Anand, spanning the years 2017 to 2021. Anand Doli showcased a 44.70, 38.82, 17.72, 26.28, 40.74, and 40.20% higher fruit yield compared to controls GOB 1, GBL 1, GJB 2, GJLB 4, Doli 5, and Punjab Sadabahar, respectively. Fruits of this variety have club-shaped with a large pistil scar diameter and dark pink skin upon harvest. The calyx has strong creasing, and the fruit grows in clusters. This variety presents a promising option for middle Gujarat, offering improved yields and market preference.

Keywords: Anand doli; brinjal; club shape; clustering; yield.

1. INTRODUCTION

Brinjal (*Solanum melongena* L.), alternatively referred to as eggplant or aubergine, occupies the fifth position in significance within the *Solanaceae* family in subtropical and tropical regions [1]. Its cultivation and utilization trace back over 4000 years, particularly prominent in the South Asian subcontinent [2]. Research suggests that brinjal's origin may be rooted in India, with indications pointing to the Indo-Burma region as its likely center of origin [3]. Alternatively, there is speculation about its secondary origin in China, adding to its taxonomic complexity within the economically vital *Solanaceae* family, characterized by a fundamental chromosome number of $2n=2x=24$ [1]. Brinjal holds paramount importance as a vegetable crop, particularly in Southeast Asia and Africa, where it serves as a staple food source [4].

Brinjal exhibits remarkable adaptability to a broad spectrum of environmental conditions, thriving in tropical, humid, and equatorial climates prevalent across Africa, Asia, and the southern United States. Historically, brinjal cultivation was limited to regions devoid of temperate hills due to unfavourable temperature regimes. However, recent climatic shifts have rendered these temperate zones conducive to brinjal cultivation. The cultivation window from April to September ensures optimal crop longevity, facilitating the production of high-quality fruits with minimal susceptibility to insect infestation, particularly from borers. Despite being predominantly self-pollinated, brinjal demonstrates a significant potential for cross-pollination, attributed to pronounced heterostyly mechanisms favouring such interactions. Fruit set percentages vary across floral types, ranging from 70% to 86.70% in long-styled flowers and 12.5% to 55.60% in medium-styled flowers, reflecting genetic and environmental influences. Beyond its agronomic

significance, brinjal holds medicinal value in traditional systems like Ayurveda and Unani, where various plant parts are utilized for their therapeutic properties. These include asthma relief, appetite stimulation, and cardio-tonic effects attributed to its roots and fruits, as well as pain alleviation and anti-inflammatory properties associated with its leaves and seeds. Notably, white brinjal varieties are purported to offer benefits for diabetic patients, highlighting the diverse pharmacological potential inherent in brinjal cultivars.

Presently, brinjal cultivation is widespread across several nations including China, Pakistan, India, Bangladesh, Sri Lanka, Nepal, Egypt, the United Arab Emirates, and other equatorial regions. According to FAOSTAT [5] data, global brinjal production stands at an estimated 54.08 million tons, with Asian countries contributing approximately 93% of this total output. In India, the cultivation area for brinjal in 2023 was recorded at 0.788 million hectares, yielding an estimated annual production of 12.76 million tonnes, achieving a productivity rate of 16.19 tonnes per hectare [6]. Key brinjal-producing states in India include West Bengal, Odisha, Gujarat, Madhya Pradesh, and Bihar. Notably, within Gujarat, brinjal ranks third in cultivation area and production, following potato and tomato. In the agricultural year 2022-23, brinjal was cultivated across 81,673 hectares in Gujarat, resulting in an annual production of 16.24 lakh tonnes and a productivity rate of 19.89 tonnes per hectare [7].

Brinjal exhibits extensive genetic diversity across various geographical regions, encompassing a wide array of traits such as fruit size, shape, colour, growth habit, canopy bearing, yield potential, and resistance to diseases and insect pests [8]. Moreover, this genetic variation extends to other critical attributes including vegetative growth, maturity, and the presence or

absence of spines on leaves, stems, and fruit calyxes within indigenous brinjal populations [9]. Recent studies have highlighted distinct biochemical compositions among different brinjal cultivars, with oblong-fruited varieties showcasing higher levels of total soluble sugars, while long-fruited types exhibit elevated concentrations of free reducing sugars, anthocyanins, phenols, glycoalkaloids (e.g., solasodine), dry matter, and amide proteins [10].

Consumer preference hinges on multifaceted criteria encompassing nutritional content, visual appeal, and culinary attributes, while farmers prioritize factors such as yield potential and market suitability. In response to this dual demand spectrum, the cultivar "Anand Doli" was meticulously developed, and tailored to excel in the unique agro-climatic conditions prevalent in middle Gujarat.

2. MATERIALS AND METHODS

2.1 Experimental Materials and Design

The genotype AB 13-03, alternatively known as Anand Doli, emerged from the controlled crossbreeding program involving Doli 5 x GOB 1 utilizing the pedigree method of plant breeding at the main vegetable research station of Anand Agricultural University, Anand, spanning the years 2013 to 2019. The field experiment was executed following a randomized complete block design, comprising three replications, while GOB 1, GBL 1, GJB 2, GJLB 4, Doli 5 and Punjab Sadabahar were deployed as check varieties. Each experimental plot encompassed 30 to 40 plants, adhering to a spacing pattern of 90 x 60 cm across various years and locations. Transplanting involved the sowing of 2 seedling per hole, with subsequent thinning to a singular plant per hole once plants attained the 5-10 leaf stages.

2.2 Phenotyping and Statistical Analysis

Data were systematically collected encompassing a range of phenology traits, including the plant height (cm), branches per plant, fruits per plant, fruit length (cm), fruit girth (cm), fruit weight (g), days to first picking after transplanting, leaf: length (cm), leaf: width (cm), fruit: length of peduncle (cm), seeds per fruit, 1000 seed weight (g) and fruit yield q/ha. Additionally, biochemical attributes including dry matter (%), total soluble solids (%), acidity (%),

total soluble sugar (%), glycoalkaloid (%), total phenol (%), protein (%) and anthocyanin (%) were meticulously recorded following standardized protocols at the Biochemistry Department, A.A.U., Anand. Subsequent statistical analyses were conducted utilizing the INDOSTATE software (IndoStat Inc., Hyderabad, India) within the Statistical Department at A.A.U., Anand.

2.3 Genotypic Diversity Analysis

CTAB protocol of Doyle and Doyle [11] was used to extract the genomic DNA. PCR reaction was performed using AFLP marker and the result was observed using 3% agarose gel electrophoresis at department of Plant Biotechnology, A.A.U., Anand.

3. RESULTS AND DISCUSSION

3.1 Yield Performance

The brinjal variety Anand Doli originated from the segregating population resulting from the Doli 5 x GOB 1 cross. Morphological characteristics of Anand Doli, alongside *kharif* season controls, are outlined in Table 1. Anand Doli displayed a higher number of fruits per plant (71.0), typically ranging from 5 to 6 fruits in each cluster (Table 1). In comprehensive evaluations across PET, SSVT, and LSVT, Anand Doli demonstrated substantial fruit yield advantages, exhibiting 27.19, 38.82, 4.84, 7.31, 9.46, 40.74, and 33.54% higher fruit yield compared to controls GOB 1, GBL 1, GJB 2, GJB 3, GJLB 4, Doli 5, and Punjab Sadabahar, respectively (Table 2). Moreover, within the Anand region, Anand Doli exhibited notable fruit yield enhancements, with 44.70, 38.82, 17.72, 26.28, 40.74, and 40.20% higher fruit yield compared to controls GOB 1, GBL 1, GJB 2, GJLB 4, Doli 5, and Punjab Sadabahar, respectively (Table 3). Additionally, in six assessments conducted at Anand, Anand Doli consistently appeared in the top non-significant group on four tests. Fruit yield performance data revealed impressive results, with Anand Doli achieving 634.90 q/ha against GOB 1 in two tests, 589.12 q/ha against GBL 1 in one test, 555.86 q/ha against GJB 2 in five tests, and 503.17 q/ha against Doli 5 (LC) and Punjab Sadabahar (NC) in three tests. Anand Doli emerges as a high-yielding variety characterized by club-shaped clustered fruiting, making it particularly suitable for farmers cultivating brinjal for culinary purposes as well as *ravaiya* and *undhiya* preparations.

Table 1. Ancillary observations of economic attribute of proposed entry along with checks

Sr. No.	Characters	Anand Doli	GJB 2 (C)	GJLB 4 (C)	Doli 5 (LC)	P. Sadabahar (NC)
1	Plant height (cm)	91.2 (65.0-101.0)	61.8 (57.4-72.0)	74.8 (69.0-90.0)	74.9 (62.4-81.5)	67.2 (56.8-76.3)
2	Branches per plant	3.2 (2.6-4.0)	3.3 (2.7-4.2)	2.7 (2.0-3.6)	2.9 (2.3-3.3)	2.8 (2.7-3.3)
3	Fruits per plant	71.0 (64.5-78.6)	21.5 (17.4-23.3)	21.6 (18.0-22.8)	53.5 (48.0-58.0)	29.2 (26.4-37.6)
4	Fruit length (cm)	16.1 (14.0-17.0)	15.2 (13.8-16.2)	16.3 (15.3-17.5)	14.7 (13.0-16.3)	24.8 (20.9-26.5)
5	Fruit girth (cm)	12.9 (12.0-13.6)	18.3 (13.5-19.4)	18.1 (12.5-19.0)	12.3 (10.5-13.3)	11.8 (10.4-12.7)
6	Fruit weight (g)	40.4 (30.3-65.0)	104.9 (84.3-128.6)	103.6 (86.9-121.7)	39.3 (25.0-57.3)	73.3 (67.8-76.2)
7	Days to first picking after transplanting	52 (50-64)	65 (58-68)	62 (54-65)	55 (48-66)	60 (58-64)
8	Leaf: Length (cm)	10.3 (9.0-11.2)	12.0 (11.0-13.2)	14.2 (12.6-17.5)	9.9 (8.8-11.8)	16.3 (14.9-18.2)
9	Leaf: Width (cm)	8.3 (7.0-9.5)	7.5 (6.1-8.8)	10.2 (9.5-10.9)	6.6 (5.9-7.3)	10.0 (9.2-11.2)
10	Fruit: Length of peduncle (cm)	4.5 (3.7-5.2)	4.7 (4.2-5.0)	4.3 (4.1-4.6)	3.9 (3.6-4.2)	6.2 (5.5-6.8)
11	Seeds per fruit	608 (582-718)	1449 (1290-1670)	1388 (1280-1572)	754 (680-840)	353 (328-412)
12	1000 seed weight (g)	3.4 (3.0-3.5)	5.4 (5.2-5.8)	4.6 (4.4-4.8)	3.5 (3.3-3.7)	3.8 (3.5-4.0)

Table 2. Yield performance of Anand Doli in comparison with check varieties in Gujarat state

Trial/ Year	Location	Fruit yield (q/ha)									CD at 5%	CV%
		Anand Doli	Checks									
			GAOB 2 (a)	GOB 1 (b)	GBL 1 (c)	GJB 2 (d)	GJB 3 (e)	GJLB 4 (f)	Doli 5 (g)	P. Sada (h)		
PET I 2013-14	Anand	589.12 ^c	586.80	-	424.38	-	-	-	-	-	82.77	9.35
LSVT	Anand	414.86 ^{bd}	376.98	275.54	-	284.72	-	-	-	-	82.74	15.92

Trial/ Year	Location	Fruit yield (q/ha)								CD at 5%	CV%	
		Anand Doli	Checks									
			GAOB 2 (a)	GOB 1 (b)	GBL 1 (c)	GJB 2 (d)	GJB 3 (e)	GJLB 4 (f)	Doli 5 (g)			P. Sada (h)
2014-15	Junagadh	295.95	382.37	330.25	-	371.40	367.04	-	-	103.83	15.95	
	Navsari	266.00 ^b	250.00	197.00	-	251.00	220.00	-	-	59.70	13.88	
	Jagudan	268.52 ^{bde}	277.26	121.91	-	220.94	117.03	-	-	45.14	13.85	
	Mean	311.33	321.65	231.18	-	282.02	234.69	-	-			
	% increase over [^]	-	34.67	-	10.39	17.95	-	-	-			
LSVT long	Anand	854.93 ^b	937.75	601.98	-	903.93	-	-	-	97.05	6.82	
	Junagadh	228.01	283.18	271.09	-	313.79	307.61	-	-	67.04	12.73	
2015-16	Navsari	287.90	269.60	259.10	-	286.00	243.00	-	-	52.50	10.81	
	Jagudan*	186.78	233.51	164.07	-	260.70	152.88	-	-	52.78	15.62	
	Mean	456.95	496.84	377.39	-	501.24	275.31	-	-			
	% increase over [^]	-	21.08	-	-	-	-	-	-			
LSVT long	Anand	440.05 ^g	-	-	-	438.27	-	414.48	344.39	353.68	66.93	9.15
	Junagadh	278.40 ^h	-	-	-	246.40	-	276.70	-	230.70	42.10	8.25
2016-17	Navsari	218.70	-	-	-	300.90	-	273.30	-	-	56.80	12.30
	Jagudan*	170.99 ^{fh}	-	-	-	207.69	-	145.76	-	147.60	20.14	6.55
	Mean	312.38	-	-	-	328.52	-	321.49	344.39	292.19		
	% increase over [^]	-	-	-	-	-	-	-	27.78	22.94		
LSVT long	Anand	544.24 ^{dfgh}	-	-	-	361.37	-	385.55	360.08	366.51	73.13	10.24
	Junagadh	365.23 ^h	-	-	-	374.23	-	375.26	-	249.49	79.26	12.25
2017-18	Navsari	234.60	-	-	-	255.80	-	260.60	-	231.20	39.70	9.30
	Jagudan+	218.90	-	-	-	330.42	-	236.84	-	-	85.98	24.47
	Mean	381.36	-	-	-	330.47	-	340.47	360.08	282.40		
	% increase over [^]	-	-	-	-	15.40	-	12.01	51.14	35.04		
LSVT long	Anand	525.21 ^{dfgh}	-	-	-	372.69	-	395.32	368.06	356.48	79.27	11.13
	Mean	525.21	-	-	-	372.69	-	395.32	368.06	356.48		
2018-19	% increase over [^]	-	-	-	-	40.92	-	32.86	42.70	47.33		
Mean of Anand Doli over GAOB 2 in 8 tests		400.66	420.49	-	-	-	-	-	-	-	-	-
Mean of Anand Doli over GOB 1 in 7 tests		373.74	-	293.84	-	-	-	-	-	-	-	-
Mean of Anand Doli over GBL 1		589.12	-	-	424.38	-	-	-	-	-	-	-

Trial/ Year	Location	Fruit yield (q/ha)								CD at 5%	CV%
		Anand Doli	Checks								
			GAOB 2 (a)	GOB 1 (b)	GBL 1 (c)	GJB 2 (d)	GJB 3 (e)	GJLB 4 (f)	Doli 5 (g)		
in 1 tests											
Mean of Anand Doli over GJB 2 in 14 tests	373.04	-	-	-	355.82	-	-	-	-	-	-
Mean of Anand Doli over GJB 3 in 5 tests	269.28	-	-	-	-	250.94	-	-	-	-	-
Mean of Anand Doli over GJLB 4 in 7 tests	372.35	-	-	-	-	-	340.17	-	-	-	-
Mean of Anand Doli over Doli 5 in 3 tests	503.17	-	-	-	-	-	-	357.51	-	-	-
Mean of Anand Doli over P. Sada in 6 tests	397.96	-	-	-	-	-	-	-	298.01	-	-
% Increase over check[^]	-	-	27.19	38.82	4.84	7.31	9.46	40.74	33.54	-	-
Frequency in top non-signi. groups	7/15	4/8	0/7	0/1	6/14	0/5	4/7	0/3	0/6	-	-

Note: (1) a, b, c, d, e, f, g and h indicates the significant superior than respective check. [^]=on the basis of correspondence mean (2) * and + were not included in the mean due to below state average yield and high CV%, respectively

Table 3. Performance of Anand Doli for fruit yield (q/ha) under state varietal trials at Anand

Trial/Year	Fruit yield (q/ha)								CD at 5%	CV%
	Anand Doli	Checks								
		GAOB 2 (a)	GOB 1 (b)	GBL 1 (c)	GJB 2 (d)	GJLB 4 (e)	Doli 5 (f)	P. Sada (g)		
PET I 2013-14	589.12 ^c	586.80	-	424.38	-	-	-	-	82.77	9.35
LSVT 2014-15	414.86 ^{bd}	376.98	275.54	-	284.72	-	-	-	82.74	15.92
LSVT 2015-16	854.93 ^b	937.75	601.98	-	903.93	-	-	-	97.05	6.82
LSVT (Long) 2016-17	440.05 ^g	-	-	-	438.27	414.48	344.39	353.68	66.93	9.15

Trial/Year	Fruit yield (q/ha)								CD at 5%	CV%
	Anand Doli	Checks								
		GAOB 2 (a)	GOB 1 (b)	GBL 1 (c)	GJB 2 (d)	GJLB 4 (e)	Doli 5 (f)	P. Sada (g)		
LSVT (Long) 2017-18	544.24 ^{defg}	-	-	-	361.37	385.55	360.08	366.51	73.13	10.24
LSVT (Long) 2018-19	525.21 ^{defg}	-	-	-	372.69	395.32	368.06	356.48	79.27	11.13
Mean over respective check										
Mean of Anand Doli over GAOB 2 in 3 tests	619.64	633.84	-	-	-	-	-	-	-	-
Mean of Anand Doli over GOB 1 in 2 tests	634.90	-	438.76	-	-	-	-	-	-	-
Mean of Anand Doli over GBL 1 in 1 tests	589.12	-	-	424.38	-	-	-	-	-	-
Mean of Anand Doli over GJB 2 in 5 tests	555.86	-	-	-	472.20	-	-	-	-	-
Mean of Anand Doli over GJLB 4 in 3 tests	503.17	-	-	-	-	398.45	-	-	-	-
Mean of Anand Doli over Doli 5 in 3 tests	503.17	-	-	-	-	-	357.51	-	-	-
Mean of Anand Doli over P. Sada in 3 tests	503.17	-	-	-	-	-	-	358.89	-	-
% Increase over check	-	-	44.70	38.82	17.72	26.28	40.74	40.20	-	-
Frequency in top non-signi. groups	4/6	3/3	0/2	0/1	0/5	0/3	0/3	0/3	-	-

Note:- a, b, c, d, e, f and g indicates the significantly superior than respective check

3.2 Morphological Characters

The fruit morphology of the Anand Doli variety exhibits a club-shaped structure, characterized by a large diameter of the pistil scar and a dark pink colouration of the skin upon commercial harvesting. Notably, the calyx displays strong creasing, and the fruiting pattern is clustered, as depicted in Table 4 and Figs. 1 and 2. The morphological diversity of Anand Doli is comprehensively outlined in Table 4, following the DUS guidelines. Furthermore, the National Bureau of Plant Genetic Resources (NBPGR) has designated the variety with the National Identity number IC 630750.

3.3 Nutritional Quality

The variety contains higher Dry matter (%) (14.32), Acidity (%), (0.11), Glycoalkaloid (%), (0.005), Total phenol (%) (0.087), Protein (%) (0.82) as compared to the checks GJB 2, GJLB 4, Doli 5, and Punjab Sadabahar (Table 5). Higher dry matter content in brinjal offers advantages such as enhanced texture, prolonged shelf life, and improved taste and flavour. For instance, a study by Kumar et al. [12] demonstrated that brinjal varieties with higher dry matter content exhibited superior texture and reduced post-harvest losses. Additionally, increased acidity in brinjal contributes to its characteristic tangy taste and is associated with better culinary quality. Research by Raju et al. [13] highlighted the positive correlation between acidity levels and sensory attributes like taste and overall acceptability in brinjal varieties. Moreover, a higher percentage of glycoalkaloids in brinjal

confers resistance against pests and diseases. Studies by Singh et al. [14] have shown that brinjal varieties with elevated levels of glycoalkaloids exhibit enhanced resistance to insect pests such as shoot and fruit borers. Furthermore, a higher total phenol content in brinjal offers potential health benefits due to its antioxidant properties. Research conducted by Mishra et al. [15] demonstrated that brinjal varieties rich in phenolic compounds possess greater antioxidant activity, which may help in combating oxidative stress-related diseases. Lastly, an increased protein content in brinjal enhances its nutritional value. Studies by Yadav et al. [16] reported that brinjal varieties with higher protein content contribute to meeting dietary protein requirements and support muscle growth and repair.

3.4 Biotic Stress Tolerance

Anand Doli exhibits reduced incidence rates of Little leaf disease (%) in contrast to the control varieties GJB 2, GJLB 4, Doli 5, and Punjab Sadabahar at Anand (Table 6) [17-20].

3.5 Molecular Characterisation

The DNA fingerprinting analysis utilizing the AFLP marker delineated distinct genetic profiles among the brinjal varieties, particularly highlighting the genetic uniqueness of variety Anand Doli in comparison to its reference varieties, namely GOB 1, GBL 1, GJB 2, GJLB 4, Doli 5, and Punjab Sadabahar (Fig. 3).

Table 4. Morphophysiological observations of proposed entry Anand Doli along with checks (As per DUS Guidelines)

Sr.	Characteristics	AB 13-03	GJB 2 (C)	GJLB 4 (C)	Doli 5 (LC)	P. Sada (NC)
1	Seedling: Anthocyanin colouration of hypocotyl	Absent	Absent	Present	Absent	Absent
2	Stem: Anthocyanin colouration	Absent	Absent	Present	Absent	Absent
3	Stem: Pubescence	Medium	Weak	Medium	Medium	Weak
4	Leaf: Length	Medium	Medium	Medium	Small	Medium
5	Leaf: Width	Small	Small	Medium	Small	Medium
6	Leaf: Margin	Dentate	Entire	Sinuate	Sinuate	Entire
7	Leaf: Blistering	Absent	Absent	Absent	Absent	Absent
8	Leaf: Spininess	Absent	Absent	Absent	Absent	Absent
9	Leaf: Blade colour	Green	Purple	Green	Green	Purple
10	Leaf: Intensity of colour of blade	Dark Green	Medium	Violet Green	Medium Green	Medium
11	Leaf: Colour of vein	Dark Purple	Purple	Light Purple	Purple	Purple
12	Leaf: Intensity of colour of veins	Medium	Medium	Medium	Medium	Medium

Sr.	Characteristics	AB 13-03	GJB 2 (C)	GJLB 4 (C)	Doli 5 (LC)	P. Sada (NC)
13	Inflorescence: Number of flowers	>3	>3	>3	>3	>3
14	Flower: Size	Medium	Medium	Small	Medium	Medium
15	Flower: Colour	Purple	Purple	Light purple	Purple	Purple
16	Fruit: General shape	Club Shaped	Ellipsoid	Ellipsoid	Club Shaped	Ellipsoid
17	Fruit: Diameter of pistil scar	Large	Small	Medium	Medium	Medium
18	Fruit: Shape of apex	Rounded	Rounded	Rounded	Rounded	Indented
19	Fruit: Colour of skin at commercial harvesting	Dark Pink	Purple	Light Purple	Pink	Purple
20	Fruit: Intensity of purple colour of skin	Light	Light	Light	Light	Dark
21	Fruit: Stripes	Absent	Absent	Absent	Absent	Absent
22	Fruit: Patches	Absent	Absent	Absent	Absent	Absent
23	Fruit: Glossiness at harvest maturity	Strong	Medium	Strong	Medium	Medium
24	Fruit: Size of calyx	Medium	Medium	Medium	Medium	Medium
25	Fruit: Colour of calyx	Green	Green	Green	Green	Green
26	Fruit: Intensity of colour of calyx	Strong	Medium	Strong	Strong	Medium
27	Fruit: Spininess of calyx	Absent	Absent	Absent	Absent	Absent
28	Fruit: Ribs	Absent	Absent	Absent	Absent	Absent
29	Fruit: Creasing of calyx	Strong	Weak	Weak	Weak	Weak
30	Fruit: Colour of flesh	Whitish	Whitish	Whitish	Whitish	Whitish
31	Fruit: Length of peduncle	Medium	Medium	Medium	Medium	Long
32	Fruiting: Pattern	Cluster	Solitary	Solitary	Cluster	Solitary
33	Plant: Growth habit	Erect	Semi spreading	Semi spreading	Erect	Erect
34	Plant: Spread (distance between two extremes leaf tips at widest point)	Medium	Medium	Medium	Medium	Medium
35	Fruit: Colour of skin at physiological maturity	Brown	Brown	Brown	Brown	Brown
36	Time of physiological ripeness	Early	Medium	Early	Early	Medium

Table 5. Biochemical parameters of brinjal genotype Anand Doli along with checks recorded at Anand during 2018-19

Sr.	Characteristics	Anand Doli	GJB 2 (C)	GJLB 4 (C)	Doli 5 (LC)	P. Sada (NC)
1	Dry matter (%)	14.32	10.59	11.36	12.22	11.71
2	Total soluble solids (%)	5.07	5.17	5.17	4.87	4.93
3	Acidity (%)	0.11	0.06	0.08	0.06	0.06
4	Total soluble sugar (%)	3.16	3.86	3.35	3.16	4.39
5	Glycoalkaloid (%)	0.005	0.005	0.004	0.004	0.004
6	Total phenol (%)	0.087	0.055	0.055	0.071	0.046
7	Protein (%)	0.82	0.62	0.58	0.74	0.70
8	Anthocyanin (%)	0.122	0.068	0.150	0.107	0.149



Fig. 1. Fruits and its Cross section view of Anand Doli



Fig. 2. Plant with Fruits of Anand Doli variety

Table 6. Major biotic stress incidence in genotype Anand Doli along with checks under field condition at Anand

Major disease	Year	Anand Doli	GJB 2 (C)	GJLB 4 (C)	Doli 5 (LC)	P. Sada (NC)
Little leaf disease reaction (%)	2016-17	2.17	2.00	4.17	1.43	3.45
	2017-18	3.00	3.65	2.55	4.88	3.00
	2018-19	1.00	4.50	5.10	6.00	5.40
	Range	1.00-3.00	2.00-4.50	2.55-5.10	1.43-6.00	3.00-5.40
Number of jassids/leaf	2016-17	3.95	3.00	7.85	3.54	7.74
	2017-18	3.78	2.68	5.12	2.27	4.21
	2018-19	2.54	3.43	2.51	5.01	5.71
	Range	2.54-3.95	2.68-3.43	2.51-7.85	2.27-5.01	4.21-7.74
Number of whiteflies/leaf	2016-17	6.58	5.90	9.05	5.36	8.03
	2017-18	3.36	4.12	4.16	4.34	4.88
	2018-19	3.29	4.62	4.95	4.43	6.80
	Range	3.29-6.58	4.12-5.90	4.16-9.05	4.34-5.36	4.88-8.03
Fruit damage by fruit and shoot borer (%)	2016-17	3.53	3.29	12.16	5.23	8.40
	2017-18	3.74	3.41	9.45	3.46	4.78
	2018-19	4.07	3.39	9.50	3.68	4.83
	Range	3.53-4.07	3.29-3.41	9.45-12.16	3.46-5.23	4.78-8.40

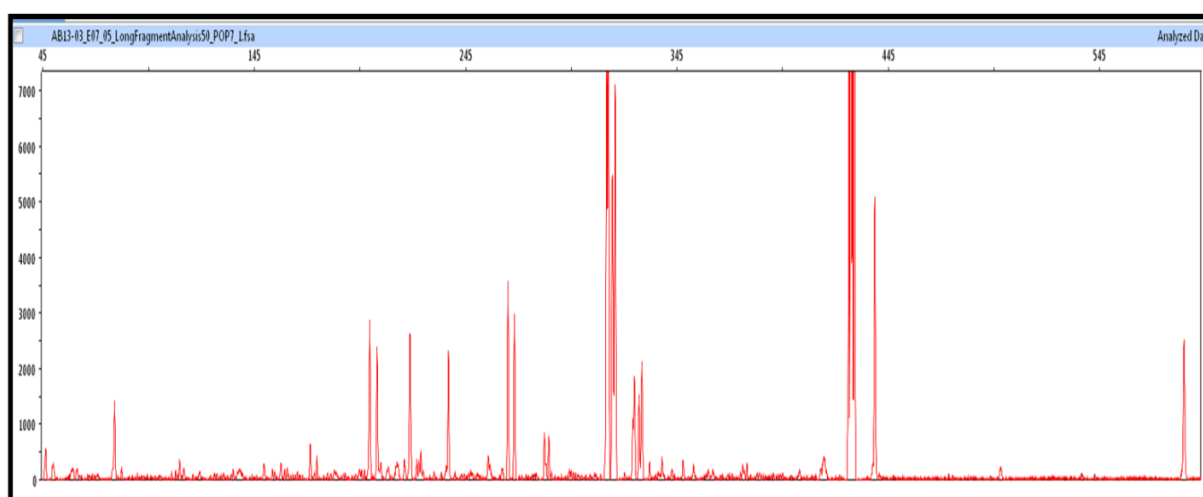


Fig. 3. DNA fingerprinting report of brinjal variety Anand Doli generated by AFLP marker system

4. CONCLUSION

Anand Doli, with a high fruit yield of 634.90 q/ha, demonstrated significant advantages over controls such as GOB 1, GBL 1, GJB 2, GJLB 4, Doli 5, and Punjab Sadabahar, displaying 27.19% to 40.74% higher yields in various evaluations. Within the Anand region, it showed even greater enhancements, ranging from 17.72% to 44.70% higher yields compared to the same controls. The fruit morphology is characterized by a club-shaped structure with large pistil scar diameter and dark pink skin colouration upon commercial harvesting. Notably, it exhibits strong creasing of the calyx and a clustered fruiting pattern. Moreover, Anand Doli has higher levels of Dry matter (14.32%), Acidity (0.11%), Glycoalkaloid (0.005%), Total phenol (0.087%), and Protein (0.82%) compared to control varieties. Additionally, it has lower incidence rates of Little leaf disease. These attributes, coupled with multifaceted consumer preferences and farmer priorities, position Anand Doli as a promising choice for cultivation.

DISCLAIMER (ARTIFICIAL INTELLIGENCE)

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc) and text-to-image generators have been used during writing or editing of manuscripts.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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