Promising round-shaped variety Anand Raj exhibiting glossy skin characteristics in brinjal (S*olanum melongena* L.)

Abstract

In brinjal, 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 Raj" was meticulously developed, and tailored to excel in the unique agro-climatic conditions prevalent in middle Gujarat. Anand Raj, emerged from the controlled crossbreeding program involving AB 07-2 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 Raj showcased a mean fruit yield of 425.77 q/ha, exhibiting 25.47, 20.90, 24.33, 25.69 and 32.00% higher fruit yield in whole Gujarat while evaluating under PET, SSVT and LSVT. Based on mean fruit yield data, Anand raj (513.18q/ha)exhibited26.88, 31.65, 47.55, 35.76 and 32.00higher fruit yield at Anand during the *kharif* season compared to the controls GAOB 2, GNRB 1, GRB 5, Swarna Mani Black and GOB 1, respectively.Fruits of this variety have StrongFruit: Glossiness at harvest maturityand shows lower susceptibility to diseases and pests. This variety presents a promising option for middle Gujarat, offering improved yields and market preference.

Keywords: Anand raj, Brinjal, Glossiness, Yield

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 (Taher *et al.*, 2017). Its cultivation and utilization trace back over 4000 years, particularly prominent in the South Asian subcontinent (Dunlop F., 2006). 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 (Sato *et al.*, 2011). On the other hand, there is conjecture regarding its secondary origin in China, contributing to its taxonomic complexity within the Solanaceae family—which is economically significant and has a fundamental chromosomal number of 2n=2x=24 (Taher et al., 2017). As a vegetable crop, brinjal is very important, especially in Southeast Asia and Africa, where it is a staple diet (Kalloo, 1988).

With its exceptional resilience to a wide range of environmental circumstances, brinjal thrives in equatorial, tropical, and humid climates found in Asia, Africa, and the southern United States. Due to difficult temperature regimes, brinjal growth was historically

restricted to areas lacking temperate hills. But recent changes in the climate have made these temperate zones suitable for growing brinjal. The best crop lifetime is ensured by the April–September cultivation window, which makes it easier to produce fruits of superior quality that are less susceptible to pest infestation, especially from borers. Despite being predominantly self-pollinated, brinjal demonstrates a significant potential for cross-pollination, attributed to pronounced heterostyly mechanisms favoring such interactions. Fruit set percentage 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. Brindavan is important for agriculture, but it's also used medicinally in traditional systems like as Ayurveda and Unani, where different portions of the plant are used for their therapeutic qualities. Its fruits and roots are said to have anti-inflammatory and pain-relieving qualities, while its leaves and seeds are linked to hunger stimulation, asthma relief, and cardio-tonic benefits. Interestingly, white brinjal cultivars are said to treat diabetics, demonstrating the variety of pharmacological potential that brinjal cultivars possess.

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 (2020) 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 (NHB, 2023). 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 (DOH, 2023).

Brinjal exhibits extensive genetic diversity across various geographical regions, encompassing a wide array of traits such as fruit size, shape, color, growth habit, canopy bearing, yield potential, and resistance to diseases and insect pests (Kumar *et al.*, 2008). 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 (Pujer*et al.*, 2018). Current research has revealed that different brinjal cultivars have diverse biochemical compositions. Long-fruited cultivars have

larger concentrations of free reducing sugars, anthocyanins, phenols, and glycoalkaloids, whereas oblong-fruited types have higher amounts of total soluble sugars(e.g., solasodine), dry matter, and amide proteins (Tirkey*et al.*, 2018).

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 Raj" was meticulously developed, tailored to excel in the unique agro-climatic conditions prevalent in middle Gujarat. This variety boasts a distinctive trait of high glossiness on its fruit epidermis, a characteristic sought after by discerning consumers for its aesthetic appeal and indicative of fruit quality. Simultaneously, "Anand Raj" is engineered to exhibit prolific yield potential, aligning with the production objectives of farmers and addressing market demands effectively.

Material and Methods

Experimental materials and design

The genotype AB 17-28, alternatively known as Anand Raj, emerged from the controlled crossbreeding program involving AB 07-2 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. The field experiment was executed following a randomized complete block design, comprising three replications, while GAOB 2, GNRB 1, GRB 5, Swarna Mani Black and GOB 1were 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 seeding per hole, with subsequent thinning to a singular plant per hole once plants attained the 5-10 leaf stages.

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), fruit firmness (N), fruit volume (cc) and fruit yield q/ha. Additionally, biochemical attributes including moisture (%), total soluble solids (^{o}Brix), total soluble sugars (%), reducing sugars (%), acidity (%), acidity/sugar, flavanoid (mg/100gm), phenol (%), anthocyanin (mg/100gm), ascorbic acid (mg/100gm), glycoalkaloid (mg/100gm) were meticulously recorded following standardized protocols at the Biochemistry Department, A.A.U., Anand. Subsequent

statistical analyses were conducted utilizing the INDOSTAT software (IndoStat Inc., Hyderabad, India) within the Statistical Department at A.A.U., Anand.

Genotypic Diversity Analysis

CTAB protocol of Doyle and Doyle (1990) was used to extract the genomic DNA. PCR reaction was performed usingSSR marker and result observe using 3% agarose gel electrophoresis at department of Plant Biotechnology, A.A.U., Anand.

Result and Discussion

Yield Performance

Brinjal variety Anand Raj was derived from the segregating population resulting from the cross AB 07-2 x GOB 1. The morphological attributes of Anand Raj along with checksfor the *kharif* seasons are delineated in tables 1. Anand Raj exhibited higher Plant height (92.3 cm), Fruit girth (22.7 cm), Fruit weight (143.4 g), Leaf: Length (22.3 cm), Leaf: Width (13.8 cm), Fruit volume (196 cc) and Fruit yield (425.77 q/ha). Anand Raj showcased a mean fruit yield of 425.77 q/ha, exhibiting 25.47, 20.90, 24.33, 25.69 and 32.00% higher fruit yield in whole Gujarat compared to the controls GAOB 2, GNRB 1, GRB 5, Swarna Mani Black and GOB 1, respectively (Table 2) while evaluating under PET, SSVT and LSVT. Based on mean fruit yield data, Anand raj (513.18q/ha)exhibited26.88, 31.65, 47.55, 35.76 and 32.00% higher fruit yield at Anand during the *kharif* season compared to the controls GAOB 2, GNRB 1, GRB 5, Swarna Mani Black and GOB 1, respectively (Table 3). Moreover, across four trials at Anand, Anand Raj consistently ranked within the top non-significant group. Anand Raj emerges as a high-yielding, large fruit size with glossy appearance rendering it favourable for farmers. Results were in accordance with findings of Rathod *et al.*, 2023.

Morphological characters

Fruits of this variety are Ovoid in Fruit: General shape with StrongFruit: Glossiness at harvest maturity and Semi spreadingPlant: Growth habit(Table 4,Fig. 1 and 2). The morphological diversity of the developed variety Anand Raj is described in the table 4 as per the DUS guideline. The NBPGR has assigned the National Identity number as IC 638928.

Nutritional Quality

The variety contains higher Moisture (89.91%), Total soluble sugars (3.92%) and Reducing sugars (2.51%)as compared to the checks GAOB 2, GNRB 1, GRB 5, Swarna Mani Black and GOB 1 (Table 5). High total soluble sugars and reducing sugars in brinjal are crucial for several reasons. Firstly, they contribute to the overall sweetness and palatability of the fruit, enhancing its taste and consumer acceptance. Moreover, these sugars play a

significant role in determining the fruit quality and nutritional value, making it more desirable for consumption. Scientifically, studies have shown that elevated levels of total soluble sugars and reducing sugars in brinjal are associated with increased fruit sweetness, nutritional content, and overall quality (Tirkey*et al.*, 2018). Therefore, focusing on enhancing these sugar levels in brinjal cultivars can lead to improved consumer acceptance and market value.

Biotic stress tolerance

Anand raj exhibits reduced incidence rates of little leaf disease (%) in contrast to the control varieties GAOB 2, GNRB 1, GRB 5, Swarna Mani Black and GOB 1at Anand (Table 6). Moreover, this genotype manifests diminished Shoot and fruit borer damage (%)and minimal infestation levels of jassidand whitefly when juxtaposed with the GAOB 2, GNRB 1, GRB 5, Swarna Mani Black and GOB 1 at Anand Location (Table 8).

Molecular Characterisation

The DNA fingerprinting analysis utilizing the SSR marker smSSR01, smSSR03, smSSR04delineated distinct genetic profiles among the brinjal varieties, particularly highlighting the genetic uniqueness of variety Anand Raj in comparison to its reference varieties, namely GAOB 2, GNRB 1, GRB 5, Swarna Mani Black and GOB 1. Marker smSSR03 and smSSR04 produce unique band of 152 bp and 331 bp. (Table 9 and Fig. 3). 100 plus ladder was used as reference to measure band size.

Conclusion

The new variety excels in middle Gujarat, yielding 513.18q/ha, surpassing 26.88, 31.65, 47.55, 35.76 and 32.00% higher fruit yield at Anand during the *kharif* season compared to the controls GAOB 2, GNRB 1, GRB 5, Swarna Mani Black and GOB 1, respectively. Fruits of this variety are Ovoid in Fruit: General shape with StrongFruit: Glossiness at harvest maturity and Semi spreadingPlant: Growth habit. It contains higher Moisture (89.91%), Total soluble sugars (3.92%) and Reducing sugars (2.51%) and shows lower susceptibility to diseases and pests. This variety presents a promising option for middle Gujarat, offering improved yields and market preference.

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Table 1: Ancillary observations of economic attribute of brinjal variety Anand Raj along with checks

Sr. No.	Characters	Anand Raj	GAOB 2 (C)	GNRB 1 (C)	GRB 5 (C)	S.MANI BLACK (NC)	GOB 1 (C)
1	Plant height (cm)	**92.3 (85.0-101.0)**	88.8 (79.4-102.0)	78.8 (75.6-90.0)	86.9 (76.2-98.5)	69.8 (62.8-78.9)	68.3 (60.7-76.6)
2	Branches per plant	3.0 (2.7-4.0)	3.3 (2.7-4.2)	2.7 (2.0-3.6)	2.7 (2.3-3.6)	3.0 (2.7-3.7)	2.7 (2.3-3.3)
3	Fruits per plant	22.5 (19.8-25.3)	24.5 (21.6-26.7)	28.6 (26.0-30.8)	23.5 (21.2-25.2)	24.2 (22.4-26.6)	20.0 (18.0-21.8)
4	Fruit length (cm)	11.5 (10.6-12.8)	12.2 (11.5-13.8)	11.7 (10.5-13.0)	10.9 (9.6-12.3)	10.5 (9.3-12.7)	12.0 (11.0-13.2)
5	Fruit girth (cm)	**22.7 (18.0-24.6)**	18.3 (13.2-19.8)	17.1 (12.5-19.0)	17.3 (11.5-19.5)	21.8 (17.4-23.9)	19.0 (14.0-22.2)
6	Fruit weight (g)	**143.4 (118.6-165.0)**	95.9 (81.3-115.6)	79.6 (66.4-91.7)	85.6 (72.4-97.3)	89.3 (77.8-104.2)	118.6 (106.6-132.0)
7	Days to first picking after transplanting	56 (52-60)	60 (55-63)	63 (58-66)	65 (60-70)	60 (57-66)	62 (58-66)
8	Leaf: Length (cm)	**22.3 (19.1-24.4)**	20.0 (17.8-23.2)	18.7 (16.6-21.0)	19.2 (18.1-23.5)	18.3 (16.5-21.0)	20.3 (18.5-23.2)
9	Leaf: Width (cm)	**13.8 (12.5-15.3)**	10.5 (9.2-12.8)	11.2 (10-14)	12.4 (10.9-14.3)	11.4 (9.8-13.7)	11.8 (10.2-13.5)

10	Fruit: Length of peduncle (cm)	4.8 (3.9-5.6)	4.6 (3.8-5.5)	5.3 (4.5-6.4)	4.8 (4.2-6.0)	5.2 (4.5-6.3)	5.0 (3.8-6.0)
11	Seeds per fruit	1710 (1529-1914)	1725 (1529-1882)	2062 (1987-2168)	1656 (1436-1776)	2707 (2512-3062)	1886 (1781-2082)
12	1000 seed weight (g)	5.690 (5.478-5.916)	4.787 (4.572-5.007)	6.254 (6.049-6.479)	5.409 (5.199-5.634)	4.990 (4.770-5.215)	4.311 (4.101-4.536)
13	Fruit firmness (N)	13.96 (12.57-15.26)	12.91 (12.19-14.16)	10.83 (9.80-11.59)	16.26 (15.39-17.08)	12.83 (11.74-14.50)	10.17 (8.30-12.43)
14	Fruit volume (cc)	**196 (162-226)**	92 (78-111)	61 (51-70)	62 (53-71)	88 (76-102)	152 (136-169)

Table 2: Yield performance of brinjal variety Anand Raj in comparison with check varietiesin the Gujarat state

Year/ Season	Name of trial	Locations	Fruit yield (q/ha)						S. Em ±	CD at 5 %	CV %
			Anand Raj	Checks							
				GAOB 2 (a)	GNRB 1 (b)	GRB 5 (c)	S.MANI BLACK (d)	GOB 1 (e)			
2017-18 */Kharif-Rabi*	PET	Anand	532.41[ae]	390.05	-	-	-	389.66	21.68	61.38	13.55
		Mean (1)	**532.41**	**390.05**	**-**	**-**	**-**	**389.66**			
		% Inc. over the checks		**36.50**	**-**	**-**	**-**	**36.64**			
2018-19 */Kharif-Rabi*	SSVT	Anand	514.66[ae]	424.00	-	-	-	363.04	17.49	50.08	10.79
		Mean (1)	**514.66**	**424.00**	**-**	**-**	**-**	**363.04**			
		% Inc. over the checks		**21.38**	**-**	**-**	**-**	**41.76**			
2019-20 */Kharif-Rabi*	LSVT	Anand	496.40[abcde]	405.61	390.95	331.79	383.23	408.95	29.78	86.57	12.45
		Junagadh	506.66[abcd]	395.76	385.21	402.01	371.30	-	24.76	72.28	9.76
		Navsari	262.10	263.51	319.81	309.94	274.88	-	19.31	56.36	11.23
		Waghai	351.65[d]	294.19	300.36	313.66	261.60	-	27.60	80.40	13.23
		Ladol	275.28[a]	198.09	229.92	229.57	261.54	-	20.67	60.07	13.76
		Mean (1)	**496.40**	**-**	**-**	**-**	**-**	**408.95**			
		Mean (5)	**378.42**	**311.43**	**325.25**	**317.39**	**310.51**				
		% Inc. over the checks		**21.51**	**16.35**	**19.23**	**21.87**	**21.38**			
2020-21 */Kharif-Rabi*	LSVT	Anand	509.26[abcde]	398.15	372.94	349.79	357.51	393.52	24.26	70.80	10.49
		Junagadh	445.78[abcd]	357.18	346.63	363.43	332.72	-	23.21	68.27	9.90
		Navsari	388.09[a]	296.42	356.97	350.55	392.36	-	23.78	69.76	11.74
		Waghai	401.16[abcd]	309.70	305.04	274.05	258.05	-	16.68	48.91	9.33
		Ladol[#]	50.35	50.97	55.59	54.84	65.06	-	7.39	NS	20.65

		Mean (1)	**509.26**	**-**	**-**	**-**	**-**	**393.52**			
		Mean (4)	**436.07**	**340.36**	**345.40**	**334.46**	**335.16**				
		% Inc. over the checks		**28.12**	**26.25**	**30.38**	**30.11**	**29.41**			
Over all mean (4)			**513.18**					**388.79**			
Over all mean (9)			**404.04**		**334.20**	**324.98**	**321.47**				
Over all mean (11)			**425.77**	**339.34**							
Overall % increase over checks				**25.47**	**20.90**	**24.33**	**25.69**	**32.00**			
Frequency in top non-signi. Groups			**9/11**	**1/11**	**3/9**	**3/9**	**1/9**	**0/4**			

Note: -a, b, c, d, e indicates the significantly superior than respective check
 # Data was not considered due below state average

Table 3:Yield performance of brinjal variety Anand Raj in comparison with checks in themiddle Gujarat

Year / Season	**Name of trial**	**Location**	**Fruit yield (q/ha)**						**S. Em ±**	**CD at 5 %**	**CV %**
			Anand Raj	**Checks**							
				GAOB 2 (a)	**GNRB 1 (b)**	**GRB 5 (c)**	**S.MANI BLACK (d)**	**GOB 1 (e)**			
2017-18/ *Kharif-Rabi*	PET	Anand	532.41^{ae}	390.05	-	-	-	389.66	21.68	61.38	13.55
		% Inc. over the checks		**36.50**	**-**	**-**	**-**	**36.64**			
2018-19/ *Kharif-Rabi*	SSVT	Anand	514.66^{ae}	424.00	-	-	-	363.04	17.49	50.08	10.79
		% Inc. over the checks		**21.38**	**-**	**-**	**-**	**41.76**			
2019-20/ *Kharif-Rabi*	LSVT	Anand	496.40^{abcde}	405.61	390.95	331.79	383.23	408.95	29.78	86.57	12.45
		% Inc. over the checks		**22.38**	**26.97**	**49.61**	**29.53**	**21.38**			
2020-21/ *Kharif-Rabi*	LSVT	Anand	509.26^{abcde}	398.15	372.94	349.79	357.51	393.52	24.26	70.80	10.49
		% Inc. over the checks		**27.91**	**36.55**	**45.59**	**42.45**	**29.41**			
Over all mean (2)			**502.83**	**-**	**381.95**	**340.79**	**370.37**				
Over all mean (4)			**513.18**	**404.45**				**388.79**			
Over all % increase over checks				**26.88**	**31.65**	**47.55**	**35.76**	**32.00**			
Frequency in top non-signi. Groups			**4/4**	**0/4**	**0/2**	**0/2**	**0/2**	**0/4**			

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

Table 4: Morphological characters of proposed brinjal variety Anand Raj along with checks (As per DUSGuidelines)

Sr. No.	**Characters**	**Anand Raj**	**GAOB 2 (C)**	**GNRB 1 (C)**	**GRB 5 (C)**	**S.MANI BLACK (NC)**	**GOB 1 (C)**
1	Seedling: Anthocyanin colouration of hypocotyl	Absent	Absent	Absent	Absent	Absent	Absent
2	Stem: Anthocyanin colouration	Absent	Absent	Present	Absent	Present	Absent
3	Stem: Intensity of Anthocyanin colouration	-	-	Medium	-	Strong	-

4	Stem: Pubescence	Medium	Medium	Medium	Medium	Medium	Medium
5	Leaf: Length	Medium	Medium	Medium	Medium	Medium	Medium
6	Leaf: Width	Medium	Medium	Medium	Medium	Medium	Medium
7	Leaf: Margin	**Dentate**	Sinuate	Entire	Sinuate	Entire	Sinuate
8	Leaf: Blistering	Absent	Absent	Absent	Absent	Absent	Absent
9	Leaf: Spininess	Absent	Absent	Absent	Absent	Absent	Absent
10	Leaf: Blade colour	Green	Green	Green	Green	Green	Green
11	Leaf: Intensity of colour of blade	Medium	Medium	Medium	Medium	Medium	Medium
12	Leaf: Colour of vein	**Green**	Purple	Purple	Light purple	Purple	Purple
13	Leaf: Intensity of colour of veins	Medium	Medium	Dark	Medium	Dark	Medium
14	Flower: Size	Medium	Medium	Medium	Medium	Medium	Medium
15	Flower: Colour	Purple	Light purple	Light purple	Light purple	Purple	Purple
16	Flowering time (after transplanting)	Early	Medium	Medium	Medium	Early	Medium
17	Fruit: Length	Medium	Medium	Medium	Medium	Medium	Medium
18	Fruit: Diameter	Medium	Medium	Medium	Medium	Medium	Medium
19	Fruit: Length/ diameter ratio	Medium	Medium	Medium	Medium	Medium	Medium
20	Fruit: General shape	**Ovoid**	Obovate	Ovoid	Ovoid	Globular	Obovate
21	Fruit: Diameter of pistil scar	Small	Large	Small	Medium	Small	Medium
22	Fruit: Shape of apex	Rounded	Rounded	Rounded	Rounded	Indented	Rounded
23	Fruit: Colour of skin at commercial harvesting	Purple	Purple	Purple	Green	Purple	Purple
24	Fruit: Intensity of purple colour of skin	Dark	Light	Medium	-	Dark	Dark
25	Fruit: Stripes	Absent	Absent	Absent	Absent	Absent	Absent
26	Fruit: Patches	Absent	Absent	Absent	Present	Absent	Absent
27	Fruit: Glossiness at harvest maturity	**Strong**	Medium	Medium	Medium	Medium	Medium
28	Fruit: Size of calyx	Medium	Medium	Medium	Medium	Medium	Medium
29	Fruit: Colour of calyx	Green	Green	Purple	Green	Purple	Green
30	Fruit: Intensity of colour of calyx	Strong	Medium	Medium	Strong	Medium	Medium
31	Fruit: Spininess of calyx	Absent	Medium	Medium	Absent	Weak	Absent
32	Fruit: Ribs	Absent	Absent	Absent	Absent	Absent	Absent
33	Fruit: Creasing of calyx	Weak	Strong	Weak	Medium	Weak	Weak
34	Fruit: Colour of flesh	Whitish	Whitish	Whitish	Whitish	Whitish	Whitish
35	Fruit: Length of peduncle	Medium	Medium	Medium	Medium	Medium	Medium
36	Fruiting: Pattern	Solitary	Solitary	Solitary	Solitary	Solitary	Solitary
37	Plant: Growth habit	**Semispreading**	Erect	Semi spreading	Erect	Spreading	Spreading
38	Plant: Height	Medium	Medium	Medium	Medium	Short	Medium
39	Plant: Spread (distance between two extremes leaf tips at widest point	Medium	Medium	Medium	Medium	Broad	Medium
40	Fruit: Colour of skin at	Brown	Brown	Brown	Brown	Brown	Brown

	physiological maturity						

Table 5: Biochemical parameters of proposed brinjal variety Anand Rajalong with checks

Sr. No.	Characters	Anand Raj	GAOB 2 (C)	GNRB 1 (C)	GRB 5 (C)	S.MANI BLACK (NC)	GOB 1 (C)
1	Moisture (%)	**89.91**	86.45	88.86	88.46	89.61	88.77
2	Total soluble solids (^{o}Brix)	5.50	6.50	6.30	5.40	6.40	5.30
3	Total soluble sugars (%)	**3.92**	3.78	3.04	3.17	3.76	3.25
4	Reducing sugars (%)	**2.51**	2.46	2.49	1.73	2.41	1.80
5	Acidity (%)	0.07	0.08	0.07	0.08	0.06	0.11
6	Acidity/sugar	0.02	0.02	0.02	0.03	0.02	0.03
7	Flavanoid (mg/100gm)	116	131	122	114	124	127
8	Phenol (%)	0.13	0.16	0.13	0.12	0.13	0.14
9	Anthocyanin (mg/100gm)	73.59	31.07	31.12	2.92	41.23	85.95
10	Ascorbic acid (mg/100gm)	10.02	9.19	9.88	10.30	11.55	10.16
11	Glycoalkaloid (mg/100gm)	8.50	9.36	8.82	7.38	6.04	5.11

Table 6:Rating of incidence of diseases at Anand

(a) Little leaf disease (%) at Anand								
Diseases	**Year and season**	**Name of trial**	**Varieties**					
			Anand Raj	**GAOB 2 (C)**	**GNRB 1 (C)**	**GRB 5 (C)**	**S.MANI BLACK (NC)**	**GOB 1 (C)**
Little leaf disease (%)	2017-18 *Kharif-Rabi*	PET	2.03	3.30	-	-	-	5.04
	2018-19 *Kharif-Rabi*	SSVT	0.00	5.70	-	-	-	2.10
	2019-20 *Kharif-Rabi*	LSVT	4.17	6.94	6.94	4.17	8.33	11.11
	2020-21 *Kharif-Rabi*	LSVT	0.00	2.00	1.33	23.00	15.20	3.33
	Range		**0.00-4.17**	**2.00-6.94**	**1.33-6.94**	**4.17-23.00**	**8.33-15.20**	**2.10-11.11**
	Reaction		**R**	**R**	**R**	**MS**	**MS**	**R**

Table 7: Rating scale of disease reaction and its description

Rating Scale	Disease reaction	Severity Range (%)
0	Highly resistant (HR)	0% infection (all plants free of symptoms)
1	Resistant (R)	up to 15% plants infected
2	Moderately susceptible (MS)	15 to 25% plants infected
3	Susceptible (S)	25 to 50% plants infected
4	Highly susceptible (HS)	more than 50 % plants infected

Table 8:Rating of incidence of insect-pests at Anand centre

Insect-pests	Year and Season	Name of trial	Varieties					
			Anand Raj	**GAOB 2 (C)**	**GNRB 1 (C)**	**GRB 5 (C)**	**S.MANI BLACK (NC)**	**GOB 1 (C)**
Number of jassid per leaf	2019-20*Kharif-Rabi*	LSVT	3.33	4.16	4.24	4.64	4.20	5.49
	2020-21*Kharif-Rabi*	LSVT	0.73	2.70	1.57	5.50	5.70	3.50
Range			**0.73-3.33**	**2.70-4.16**	**1.57-4.24**	**4.64-5.50**	**4.20-5.70**	**3.50-5.49**
Number of Whitefly per leaf	2019-20 *Kharif-Rabi*	LSVT	3.20	3.78	5.33	5.09	4.33	4.71
	2020-21 *Kharif-Rabi*	LSVT	2.29	3.66	3.42	4.75	6.68	2.89
Range			**2.29-3.20**	**3.66-3.78**	**3.42-5.33**	**4.75-5.09**	**4.33-6.68**	**2.89-4.71**
Shoot and fruit borer damage (%)	2019-20 *Kharif-Rabi*	LSVT	4.21	8.23	4.44	4.33	4.94	4.11
	2020-21 *Kharif-Rabi*	LSVT	1.80	6.47	2.37	8.73	6.52	3.56
Range			**1.80-4.21**	**6.47-8.23**	**2.37-4.44**	**4.33-8.73**	**4.94-6.52**	**3.56-4.11**

Table 9: Genetic diversity in band size of the brinjal variety Anand Raj along with checks

Primer Name (P1): smSSR01						
	1	2	3	4	5	6
Band number	GOB-1 (LC)	GNRB-1 (LC)	S Mini Black (NC)	**Anand Raj**	GRB-5 (C)	GAOB-2 (LC)
1	328	328	328	328	328	-
2	-	-	-	-	-	340
Primer Name (P2): smSSR03						
	1	2	3	4	5	6
Band number	GOB-1 (LC)	GNRB-1 (LC)	S Mini Black (NC)	**Anand Raj**	GRB-5 (C)	GAOB-2 (LC)
1	-	-	-	152	-	-
2	160	160	160	-	160	160
Primer Name (P3): smSSR04						
	1	2	3	4	5	6
Band number	GOB-1 (LC)	GNRB-1 (LC)	S Mini Black (NC)	**Anand Raj**	GRB-5 (C)	GAOB-2 (LC)
1	-	-	-	331	-	-
2	344	344	344	-	344	344

Figure 1: Appearance of the fruits of brinjal variety Anand Raj

Figure 2: Plant with Fruits of brinjal variety Anand Raj

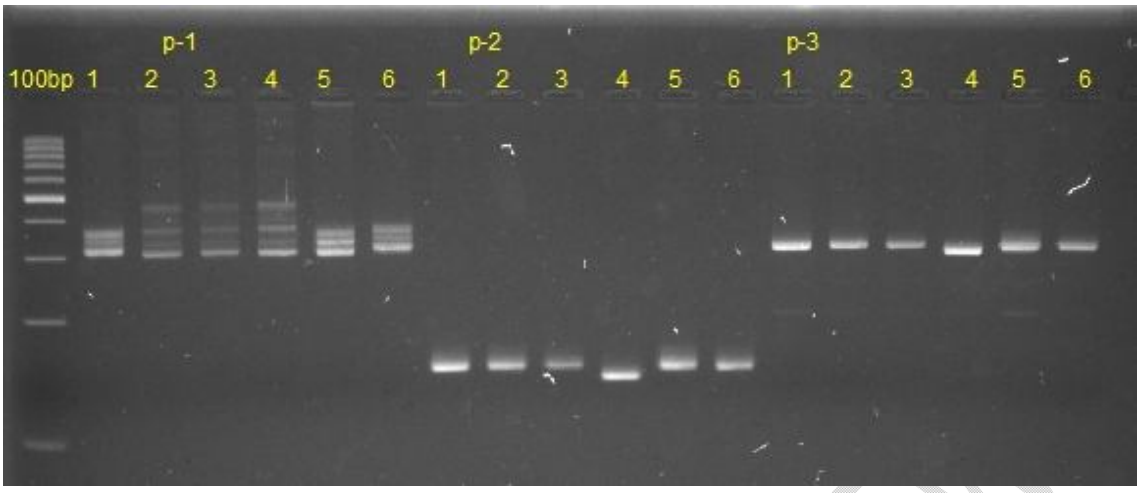

Figure 3: DNA fingerprinting report of brinjal variety Anand Raj generated by SSR marker system