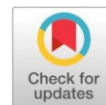


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Characterization of brinjal (*Solanum melongena* L.) genotypes for important morphological and yield attributing traits



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ABSTRACT

Collection, improvement and characterization of genetic resources is the first step of any crop improvement programme. Elite genotypes are usually selected from the genetic-stock with desirable traits for certain breeding programme. This investigation consisted of 85 genotypes of brinjal collected from different sources viz., 64 genotypes (CB-1 to CB-64) developed at Zonal Research Station, Chianki, 12 from ICAR, RCER, Ranchi Centre, Plandu (Ranchi) and rest entries from other sources. All 85 genotypes of brinjal were taken to characterize for 13 morphological characters and 10 quantitative characters. Significant difference was observed in all characters under studies. A wide range of morphological as well as yield and yield attributes variations exists among the genotypes of brinjal viz., plant type, colour of stem, leaf, petiole, mid-rib, prickliness (spinyness), flowering habit, fruit shape, size, colour and yield potential. Like any other crop plants yield is also the ultimate goal of evaluation of breeding material in this crop, thus fruit yield per plant and per hectare were analyzed along with other growth and yield attributing traits using suitable statistical methods. Significantly highest yield per hectare was recorded in the genotype CB-27 with the adjusted mean value of 471.20 q/ha and 368.56 q/ha during 2016-17 and 2017-18, respectively followed by CB-1 with the adjusted mean value of 469.95 q/ha and 359.75 q/ha during 2016-17 and 2017-18, respectively. The best check (Swarna Pratibha) gave comparatively better yield with the adjusted mean value of 1.28 kg/plant and 283.67 q/ha during 2016-17 whereas, in the same genotype with the adjusted mean yield was 1.25 kg/plant and 278.61 q/ha during 2017-18. On the basis of these studies, it can be concluded that the genotypes CB-27 and CB-1 may be recommended for the commercial exploitation of brinjal during rabi season in this region as well as adjoining areas of the same agro-climatic conditions.

Keywords: Genotypes, brinjal, characterization, variation, *Solanum melongena*, collection, improvement, morphological characters, quantitative characters, elite genotypes, prickliness, statistical methods.

INTRODUCTION

Brinjal or eggplant (*Solanum melongena* L.) is an important solanaceous vegetable crop of India. The popular name of brinjal in Indian sub-continent is derived from Arabic and Sanskrit literature whereas, the name eggplant has been derived from the shape of fruit of some varieties, which are white in colour and resemble in shape to chicken eggs [6]. It is also called *aubergine* in France, England and other European countries whereas, it is popular as eggplant in USA and Canada. This crop is extremely variable in India substantiated by the presence of wild relatives of *Solanum melongena* which are perennial herb or shrub with bitter fruits [2]. The principal method used for improvement of this crop is selection from indigenous genotypes. Yet, comprehensive characterization of this crop has not been done. An evaluation of genotypes gives considerable information to classify the available materials.

Collection, characterization, evaluation and maintenance of germplasm are pre-requisite for starting any breeding programme for the genetic improvement of the crop [1]. Present investigation has been made to evaluate brinjal genotypes for characterization for morphological traits and yield attributing and yield characters. The germplasm were collected from different sources viz., Zonal Research Station, Chianki itself, ICAR Research Centre for Eastern Region, Ranchi Centre, Plandu and local collection from farmer's field and local markets, seed vendors, dealers etc. for study.

MATERIAL AND METHODS

The present investigation consisted of 85 genotypes of brinjal collected from different sources viz., 64 genotypes (CB-1 to CB-64) developed at Zonal Research Station, Chianki, 12 from ICAR, RCER, Ranchi Centre, Plandu (Ranchi) five from GBPUAT, Pantnagar and one each from IARI, New Delhi, local collection and private firm and other sources. The field trial was carried out at Zonal Research Station, Chianki, Birsā Agricultural University, Ranchi (Jharkhand) during *Rabi* (winter season) of 2016-17 and 2017-18. Chianki falls under the dry sub-tropical zone and is situated in the western plateau region of Jharkhand (sub zone-V), which comes under rain shadow area. The seeds of 85 genotypes were sown in the beginning of the *rabi* season in raised beds. One month old seedlings were transplanted in well prepared field.

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Recommended package of practices were followed to grow normal crops. Experiment was laid out in Augmented Block Design with four blocks and five checks viz., Swarna Mani (State Check), Swarna Pratibha (State Check), Pusa Upkar (National Check), LC-3 (Local Check) and Lal Gulab (Private Check). Seedlings were transplanted in the main field at the spacing of 60 cm between rows and 50 cm within rows. Moreover, each genotype was represented as a row of ten plants in each replication. Measurements on quantitative traits or characters (Table 2) were taken on five plants per treatment which were systematically sampled. This involved tagging of first, third, fifth, seventh and ninth plants on rows. Genotypes were characterized for twelve morphological characters viz., plant type, stem colour, leaf colour, midrib colour, fruit colour, prickles on midrib, prickles on epicalyx, prickles on leaves, prickles on stem, prickles on stem, colour of epicalyx and types of epicalyx (table 1) and ten quantitative characters viz., plant height (cm), number of primary branches, days to first flowering (DAS), number of flowers per inflorescence, fruit length (cm), Fruit Diameter (cm), average fruit weight (g), number of fruits per plant, yield per plant (kg) and yield per hectare (q). Mean data were subjected to suitable statistical analysis [9].

RESULTS AND DISCUSSION

In this study, most of the genotypes showed semi-spreading (28 genotypes) and semi-erect (49 genotypes) types of growth habit, whereas, a few were documented as erect type (8 genotypes). Earlier investigations [5,15] also proved as similar growth habit in brinjal genotypes. Morphological characters were depicted in the table 1 which revealed distinguished variations among the genotypes of brinjal. Stem colour was dominated by purple green (50 genotypes) followed by green (33 genotypes) and one each of light purple and light purple green. Leaf colour was green (35 genotypes), dark green (37 genotypes), light green (six genotypes), purple green (six genotypes) in most of the genotypes whereas, dark purple in one genotype. Mid-rib colour was observed as dominated with light green (26 genotypes) followed by purple (25 genotypes), light purple (20 genotypes), purple green (10 genotypes) and light purple green (one genotype). Fruit colour is an important character in brinjal; out of 85 genotypes 22 were purple, 16 light purple, 28 light green and three genotypes with light purple green fruits whereas, one each had dark green purple, light green purple, purple white and light green purple-coloured fruits. Most of the genotypes were with non-spiny (non-prickle) on mid-rib (77 genotypes), epicalyx (56 genotypes), leaves (80 genotypes), stem (61 genotypes) and petiole (77 genotypes). Colour of epicalyx is also an important character which resembles to show the brinjal fruits fresh for longer period due to green or light green epicalyx as compared to purple-coloured epicalyx which leads to become dull fruits just after a few hours of picking or harvesting. Out of 85 genotypes, 32 were green epicalyx, one genotype of light green in colour (most preferred) and dominated by purple green in colour with 52 genotypes (not preferred). Types of epicalyx are also other characters in brinjal which decides its market value as fleshy epicalyx has been preferred by the consumers with respect to papery or leathery epicalyx. As far as types of epicalyx was concerned, 50 genotypes were fleshy followed by 28 genotypes with papery and seven genotypes having leathery type of epicalyx. Fruit shape is also an important character, not only for brinjal but also for other vegetable crops.

The fruit shape was observed that dominating shape with egg shaped fruits (31 genotypes) followed by oblong shaped (30 genotypes), long (18 genotypes) and round fruits (six genotypes). The colour variations in brinjal fruits were also reported by several workers [11,12,15].

Genotypes differed significantly for almost all the quantitative characters presented in table 2, for first year and in table 3, for the second year. The genotypes were found dwarf to erect type of growth habit with significantly the lowest plant height was recorded in the genotypes Swarna Shyamli with the adjusted mean value of 43.47 cm and 44.47 cm during 2016-17 and 2017-18, respectively whereas, significantly highest plant height was recorded in the genotype CB-1 with the adjusted mean value of 105.67 cm and 105.13 cm during 2016-17 and 2017-18, respectively. Early flowering leads to early fruiting as well as early harvesting of brinjal fruits [12]. Significantly earliest first flowering was recorded in the genotype CB-19 with the adjusted mean value of 82.25 days after sowing during 2016-17 and in the genotype CB-7 with the adjusted mean value of 57.89 days after sowing during 2017-18 whereas, significantly late first flowering were observed in the genotype Pant Samrat with the adjusted mean value of 117.52 days after sowing during 2016-17 and in the genotype CB-30 with the adjusted mean value of 96.80 days after sowing during 2017-18. Average fruit weight was significantly lowest in CB-17 (74.90 g) during 2016-17 and in the genotype CB-20 (75.98 g) during 2017-18 whereas, significantly maximum average fruit was recorded in the genotype in Swarna Shyamli with the adjusted mean value of 278.00 g and 267.07 gram during 2016-17 and 2017-18, respectively. As far as number of fruits per plant is concerned, significantly deferred in different genotypes with the lowest number of fruits in the genotype CB-57 with the adjusted mean value of 2.59 fruits/plant and 3.47 fruits/plant during 2016-17 and 2017-18, respectively whereas, significantly highest number of fruits/plant was recorded in the genotype in CB-27 with the adjusted mean value of 16.33 fruits/plant during 2016-17 and 13.27 fruits/plant in the genotype CB-50 during 2017-18. Yield of any crop plants is the ultimate objective of any breeding programme as well as agronomic trial; thus fruit yield per plant and per hectare are also most desirable characters in brinjal too. Significantly higher fruit yield per plant was obtained by CB-27 with the adjusted mean value of 2.12 kg/plant and 1.66 kg/plant during 2016-17 and 2017-18, respectively, followed by CB-1 with the adjusted mean value of 2.11 kg/plant and 1.62 kg/plant during 2016-17 and 2017-18, respectively. As far as yield per hectare was concerned, significantly highest yield per hectare was recorded in the genotype CB-27 with the adjusted mean value of 471.20 q/ha and 368.56 q/ha during 2016-17 and 2017-18, respectively followed by CB-1 with the adjusted mean value of 469.95 q/ha and 359.75 q/ha during 2016-17 and 2017-18, respectively. The lowest yield was recorded in CB-63 with the adjusted mean value of 0.31 kg/plant and 68.21 q/ha during 2016-17 and 0.28 kg/plant and 63.15 q/ha during 2017-18 whereas, the best check (Swarna Pratibha) gave comparatively better yield with the adjusted mean value of 1.28 kg/plant and 283.67 q/ha during 2016-17 whereas, in the same genotype with the adjusted mean yield was 1.25 kg/plant and 278.61 q/ha during 2017-18 which has depicted in the table 2 and table 3. The yield variation in brinjal genotypes was also observed by earlier workers [15]. Rest other characters these results are in consonance to the reports of various workers at different locations [3,4,7,8,10,13,14].

Table 1: Morphological characteristics of brinjal genotypes at ZRS, Chianki during 2016-17 and 2017-18

S. No.	Entry	Plant type	Stem colour	Leaf colour	Midrib colour	Fruit colour	Prickles on midrib	Prickles on epicalyx	Prickles on leaves	Prickles on stem	Prickles on petiole	Colour of epicalyx	Types of epicalyx	Fruit shape
1	CB-1	Erect	PG	PG	P	P	x	x	x	x	x	PG	Fleshy	Egg shaped
2	CB-2	Erect	PG	PG	P	P	x	x	x	x	x	PG	Fleshy	Egg shaped
3	CB-3	Erect	PG	G	P	P	x	x	x	x	x	PG	Fleshy	Egg shaped
4	CB-4	Semi-erect	G	G	LG	LG	x	x	x	x	x	G	Fleshy	Oblong
5	CB-5	Semi-erect	PG	DG	P	P	x	x	x	x	x	PG	Fleshy	Oblong
6	CB-6	Semi-erect	PG	DG	PG	PDG	x	x	x	x	x	PG	Fleshy	Oblong
7	CB-7	Semi-erect	PG	DG	PG	P	x	x	x	x	x	PG	Fleshy	Oblong
8	CB-8	Semi-erect	PG	DG	PG	P	x	x	x	x	x	G	Fleshy	Oblong
9	CB-9	Semi-erect	G	G	LG	P	x	x	x	x	x	PG	Leathery	Oblong
10	CB-10	Semi-erect	PG	G	PG	LP	x	x	x	x	x	PG	Fleshy	Long
11	CB-11	Semi-spreading	PG	G	PG	LP	x	x	x	x	x	PG	Fleshy	Long
12	CB-12	Semi-erect	PG	G	LP	LP	x	x	x	x	x	PG	Fleshy	Long
13	CB-13	Semi-erect	PG	G	PG	P	x	x	x	x	x	PG	Fleshy	Egg shaped
14	CB-14	Semi-erect	G	LG	LG	LG	x	x	x	x	x	G	Fleshy	Long
15	CB-15	Semi-erect	G	LG	LG	LG	x	x	x	x	x	G	Fleshy	Oblong
16	CB-16	Semi-spreading	G	LG	LG	LG	√	√	√	√	√	G	Leathery	Long
17	CB-17	Semi-spreading	G	LG	LG	LG	x	x	x	x	x	G	Leathery	Long
18	CB-18	Semi-erect	PG	DG	P	P	x	x	x	x	x	PG	Leathery	Oblong
19	CB-19	Semi-spreading	G	G	LP	G	x	x	x	x	x	G	Leathery	Egg shaped
20	CB-20	Semi-erect	G	G	LP	LP	x	x	x	x	x	PG	Leathery	Oblong
21	CB-21	Semi-spreading	G	G	LG	LP	x	x	x	x	x	PG	Leathery	Oblong
22	CB-22	Semi-spreading	G	G	LG	LG	x	x	x	x	x	LG	Papery	Egg shaped
23	CB-23	Semi-erect	G	G	LG	LG	x	x	x	x	x	G	Papery	Egg shaped
24	CB-24	Semi-erect	LP	G	LP	LG	x	x	x	x	x	PG	Papery	Egg shaped
25	CB-25	Semi-erect	PG	G	G	LGP	x	x	x	x	x	G	Papery	Egg shaped
26	Swarna Mani	Semi-erect	PG	DG	P	P	x	√	x	√	x	G	Papery	Egg shaped
27	Swarna Shyamli	Semi-spreading	PG	DG	LP	G	√	√	√	√	√	G	Fleshy	Round
28	CH-885	Semi-erect	PG	DG	LP	PW	x	x	x	x	x	PG	Papery	Round
29	CH-889	Semi-erect	PG	DG	PG	P	x	x	x	x	x	PG	Fleshy	Oblong
30	CH-894	Semi-erect	PG	DG	LP	P	x	x	x	x	x	PG	Papery	Oblong
31	CH-579	Semi-erect	PG	DG	P	LP	x	x	x	x	x	PG	Papery	Long
32	CH-573	Semi-erect	G	G	LG	LP	√	√	√	√	√	PG	Papery	Oblong
33	CH-883	Semi-erect	G	DG	P	P	x	x	x	x	x	PG	Fleshy	Oblong
34	CH-899	Semi-erect	G	G	LG	G	√	√	x	√	√	G	Papery	Round
35	CH-455	Semi-erect	G	G	LG	G	√	√	x	√	√	G	Papery	Oblong
36	CB-26	Semi-erect	PG	PG	P	P	x	x	x	x	x	PG	Fleshy	Egg shaped

37	CB-27	Erect	PG	DP	P	P	x	x	x	x	x	PG	Fleshy	Egg shaped
38	CB-28	Erect	G	G	LG	LG	x	x	x	x	x	G	Fleshy	Egg shaped
39	CB-29	Semi-erect	G	G	LG	LG	x	x	x	x	x	G	Fleshy	Egg shaped
40	CB-30	Semi-erect	G	G	LG	LG	x	√	x	x	x	G	Papery	Long
41	CB-31	Semi-erect	PG	DG	P	LG	x	√	x	√	x	G	Fleshy	Oblong
42	CB-32	Erect	PG	PG	P	PG	x	x	x	x	x	G	Fleshy	Long
43	CB-33	Semi-erect	PG	DG	P	PG	x	x	x	x	x	G	Fleshy	Long
44	CB-34	Semi-erect	G	G	LG	LG	x	x	x	x	x	G	Fleshy	Long
45	CB-35	Semi-erect	G	LG	LG	LG	x	x	x	x	x	G	Fleshy	Long
46	CB-36	Semi-erect	PG	DG	P	P	x	x	x	√	x	PG	Fleshy	Long
47	CB-37	Semi-spreading	G	G	LG	LG	x	x	x	x	x	G	Fleshy	Oblong
48	CB-38	Erect	PG	PG	P	P	x	x	x	√	x	PG	Papery	Oblong
49	Pant Samrat	Semi-erect	PG	G	P	P	x	x	x	x	x	PG	Papery	Oblong
50	PB-4	Semi-spreading	G	G	LP	LP	x	x	x	x	x	PG	Fleshy	Long
51	PB-5	Semi-spreading	G	G	LP	P	x	x	x	x	x	PG	Fleshy	Long
52	PB-6	Semi-erect	G	G	LG	LG	x	x	x	x	x	G	Fleshy	Oblong
53	PB-70	Semi-erect	G	G	LG	LG	x	√	x	√	x	G	Fleshy	Oblong
54	KS-331	Semi-erect	G	G	PG	LP	x	√	x	x	x	PG	Fleshy	Egg shaped
55	CB-39	Semi-erect	G	G	LP	LG	x	x	x	√	x	G	Fleshy	Egg shaped
56	CB-40	Semi-spreading	PG	DG	P	LG	x	x	x	x	x	G	Fleshy	Oblong
57	CB-41	Semi-erect	PG	G	LP	LG	x	√	x	√	x	G	Papery	Oblong
58	CB-42	Semi-spreading	G	G	LG	LG	x	x	x	x	x	G	Papery	Oblong
59	CB-43	Semi-spreading	PG	G	P	LP	x	x	x	x	x	G	Papery	Egg shaped
60	CB-44	Semi-spreading	G	DG	LG	LP	x	x	x	x	x	PG	Fleshy	Egg shaped
61	CB-45	Semi-spreading	G	G	LG	LP	x	√	x	x	x	PG	Fleshy	Egg shaped
62	CB-46	Semi-spreading	PG	G	LP	LG	x	√	x	√	x	G	Fleshy	Oblong
63	CB-47	Semi-spreading	PG	DG	LP	LG	x	√	x	√	x	PG	Fleshy	Egg shaped
64	CB-48	Semi-spreading	G	DG	LG	LG	x	x	x	x	x	PG	Papery	Egg shaped
65	CB-49	Semi-spreading	G	DG	LG	LG	x	√	x	√	x	PG	Papery	Egg shaped
66	CB-50	Semi-spreading	PG	DG	PG	LG	x	√	x	√	x	PG	Papery	Egg shaped
67	CB-51	Semi-spreading	PG	DG	PG	PLG	x	√	x	√	x	PG	Papery	Egg shaped
68	CB-52	Semi-spreading	PG	DG	LP	LPG	x	√	x	√	x	PG	Fleshy	Egg shaped
69	CB-53	Semi-spreading	PG	DG	LP	LG	x	√	x	√	x	PG	Fleshy	Egg shaped
70	CB-54	Semi-spreading	PG	DG	LP	LP	√	√	x	√	√	PG	Fleshy	Round
71	CB-55	Semi-spreading	PG	DG	LP	LPG	√	√	√	√	√	PG	Papery	Round
72	CB-56	Semi-erect	PG	DG	LP	LPG	x	√	x	x	x	PG	Papery	Egg shaped
73	CB-57	Semi-spreading	PG	DG	LP	LP	√	√	√	√	√	PG	Fleshy	Egg shaped
74	CB-58	Semi-erect	PG	DG	LP	LP	x	√	x	√	x	PG	Papery	Egg shaped
75	CB-59	Semi-erect	LPG	DG	G	G	x	√	x	x	x	PG	Fleshy	Egg shaped

76	CB-60	Semi-erect	PG	DG	P	PG	x	x	x	x	x	PG	Papery	Oblong
77	CB-61	Semi-erect	PG	DG	P	PG	x	√	x	x	x	PG	Papery	Oblong
78	CB-62	Erect	PG	DG	P	PG	x	x	x	x	x	PG	Fleshy	Oblong
79	CB-63	Semi-erect	PG	DG	P	PG	x	√	x	x	x	PG	Fleshy	Long
80	CB-64	Semi-erect	PG	DG	P	PG	x	x	x	x	x	PG	Fleshy	Long
81	Swarna Shree (C)	Semi-spreading	PG	G	LPG	LG	x	x	x	x	x	G	Papery	Egg shaped
82	Swarna Pratibha (C)	Semi-erect	PG	DG	P	P	x	x	x	x	x	PG	Fleshy	Oblong
83	LC-3 (C)	Semi-erect	PG	DG	LP	P	x	√	x	√	x	PG	Fleshy	Oblong
84	Lal Gulab (C) Pvt.	Semi-erect	G	G	LG	LP	x	x	x	x	x	PG	Fleshy	Long
85	Pusa Upkar (NC)	Semi-spreading	PG	PG	P	P	x	√	x	x	x	PG	Papery	Round

Note: G = Green, PG = Purple Green, LG = Light Green, LP = Light Purple, PDG = Purple Dark Green, DG = Dark Green, LPG = Light Purple Green, LGP = Light Green Purple, DP = Dark Purple, x = Absent, √ = Present

Table 2: Growth, yield and yield attributing traits of brinjal genotypes during 2016-17

S. No.	Entry	Plant height (cm)	No. of Primary branches	First flowering DAS	No. of flowers/inflorescence	Fruit length (cm)	Fruit Diameter (cm)	Average fruit weight (g)	Number of fruits per plant	Yield per plant (kg)	Yield per hectare (q)
1	CB-1	105.67	4.70	86.25	4.59	8.49	7.45	161.14	13.39	2.11	469.95
2	CB-2	85.87	5.31	102.25	4.79	8.69	7.05	162.48	8.29	1.33	294.64
3	CB-3	87.27	4.50	84.25	4.09	13.90	6.25	177.91	7.59	1.33	295.08
4	CB-4	66.87	3.31	110.25	4.99	11.10	5.25	146.74	5.29	0.77	171.75
5	CB-5	69.67	3.90	90.25	5.19	11.70	4.25	105.94	11.59	1.21	268.63
6	CB-6	67.07	4.51	93.25	4.39	12.79	4.05	123.27	10.49	1.27	283.08
7	CB-7	62.87	4.30	114.25	5.19	9.69	4.25	133.06	4.99	0.67	147.97
8	CB-8	71.47	4.31	107.25	5.39	11.29	4.25	147.99	7.99	1.17	259.31
9	CB-9	64.27	4.50	107.25	5.39	10.89	4.45	117.17	6.29	0.74	163.96
10	CB-10	69.27	5.70	100.25	4.79	12.70	4.05	132.45	10.79	1.41	312.42
11	CB-11	56.27	3.71	109.25	4.39	12.89	3.65	163.15	6.19	1.00	221.74
12	CB-12	67.27	4.70	104.25	6.59	13.29	3.05	105.42	11.39	1.18	262.85
13	CB-13	81.07	5.30	111.25	4.19	8.89	5.45	123.23	6.59	0.81	179.97
14	CB-14	74.67	5.70	113.25	4.39	10.09	4.65	153.70	6.49	0.99	219.30
15	CB-15	65.47	5.31	109.25	4.79	7.89	5.05	112.65	9.19	1.02	227.74
16	CB-16	51.07	4.31	91.25	4.59	13.49	4.45	93.49	6.09	0.58	128.42
17	CB-17	52.27	4.31	112.25	4.79	12.89	4.65	74.90	5.69	0.44	98.20
18	CB-18	71.67	3.51	114.25	4.59	13.09	4.05	120.64	7.59	0.91	202.19
19	CB-19	46.27	3.90	82.25	4.99	8.29	5.05	117.92	3.09	0.38	84.19
20	CB-20	65.27	5.70	112.25	5.19	11.09	4.45	75.91	7.99	0.61	135.97
21	CB-21	58.87	3.54	116.77	4.49	11.15	5.17	94.86	3.93	0.37	81.86
22	CB-22	54.47	4.34	95.77	4.29	6.95	6.97	97.70	5.63	0.55	122.52
23	CB-23	62.87	4.14	115.77	4.89	9.15	5.77	189.99	4.53	0.81	179.63
24	CB-24	63.67	5.54	93.77	4.69	8.75	5.37	127.08	6.53	0.82	182.07
25	CB-25	69.47	5.54	89.77	3.89	9.96	7.37	144.10	6.63	0.94	208.08
26	Swarna Mani	63.67	5.74	104.77	5.29	10.15	6.17	151.53	4.33	0.62	138.52
27	Swarna Shyamli	43.47	3.34	91.77	3.49	8.75	10.37	278.00	3.63	0.91	201.41
28	CH-885	66.47	4.34	109.77	4.49	7.55	6.77	133.25	4.13	0.53	116.97
29	CH-889	52.47	3.35	111.77	4.29	11.15	4.77	88.98	3.63	0.32	71.19
30	CH-894	63.07	3.74	111.77	4.69	10.15	5.17	116.68	5.93	0.68	152.08
31	CH-579	61.87	4.14	91.77	4.09	11.36	4.77	106.14	5.63	0.59	132.08
32	CH-573	64.27	4.74	110.77	4.49	9.15	4.77	110.53	7.43	0.82	182.96
33	CH-883	64.87	5.74	114.77	3.29	12.76	5.17	97.38	7.83	0.77	171.85
34	CH-899	57.87	3.55	92.77	4.69	5.16	4.97	112.36	7.03	0.79	175.42
35	CH-455	50.67	3.75	107.77	4.09	10.35	4.17	108.90	5.93	0.64	142.75
36	CB-26	63.27	4.15	112.77	4.59	7.36	4.57	94.08	4.13	0.39	85.63
37	CB-27	101.47	5.74	115.77	4.79	10.95	6.57	127.97	16.33	2.12	471.20
38	CB-28	86.47	3.54	116.77	3.89	17.75	4.17	100.82	7.43	0.76	168.08
39	CB-29	70.87	5.14	109.77	4.29	14.36	4.37	89.55	12.63	1.17	259.19
40	CB-30	62.47	3.74	108.77	4.29	15.76	4.57	132.36	8.23	1.08	240.74
41	CB-31	62.39	5.53	111.52	4.45	13.31	5.75	117.94	7.09	0.86	191.51
42	CB-32	87.99	5.93	116.52	4.85	11.91	5.55	92.59	10.39	0.97	215.94

43	CB-33	63.19	5.32	96.52	4.65	12.51	5.35	92.60	3.29	0.31	68.84
44	CB-34	62.99	4.33	114.52	3.85	15.51	5.55	95.90	7.69	0.75	166.18
45	CB-35	60.79	4.93	108.52	3.95	13.52	5.35	104.72	7.49	0.80	177.96
46	CB-36	71.79	4.73	87.52	3.85	16.12	5.15	119.76	6.69	0.83	183.96
47	CB-37	57.99	3.73	91.52	3.95	12.91	4.95	134.63	6.49	0.91	202.40
48	CB-38	86.79	5.33	89.52	5.05	13.71	4.75	92.68	9.79	0.92	203.72
49	Pant Samrat	71.79	4.53	117.52	5.45	14.51	3.75	86.63	8.49	0.74	164.39
50	PB-4	42.79	4.92	112.52	4.45	14.71	4.75	107.41	2.89	0.33	72.40
51	PB-5	46.99	4.53	89.52	4.65	12.71	4.95	82.68	3.49	0.29	63.73
52	PB-6	64.19	3.52	92.52	3.85	11.31	4.75	151.29	2.89	0.48	107.50
53	PB-70	61.59	3.53	109.52	4.15	10.11	6.75	145.27	6.89	1.05	232.39
54	KS-331	61.59	6.53	88.52	3.95	10.31	6.95	136.08	4.49	0.65	143.95
55	CB-39	66.79	3.32	96.52	5.25	10.51	6.95	94.46	3.99	0.38	85.29
56	CB-40	48.59	3.72	99.52	4.85	11.51	5.75	125.31	3.99	0.53	117.51
57	CB-41	60.59	4.53	104.52	3.95	12.71	6.35	131.56	12.09	1.63	362.01
58	CB-42	57.59	5.33	108.52	4.65	10.31	6.35	129.35	7.29	0.98	217.06
59	CB-43	56.59	4.53	107.52	4.25	9.31	7.55	97.87	4.69	0.47	104.18
60	CB-44	54.39	4.53	99.52	4.45	10.51	5.95	117.65	4.59	0.56	125.28
61	CB-45	59.07	3.43	91.45	3.87	11.03	5.63	100.71	6.99	0.68	151.55
62	CB-46	49.47	3.03	110.45	5.27	11.83	6.03	119.39	6.69	0.78	173.10
63	CB-47	55.27	4.22	109.45	4.97	7.83	5.63	108.75	6.49	0.68	152.21
64	CB-48	53.87	3.42	98.45	3.87	10.03	7.23	123.56	9.59	1.16	258.66
65	CB-49	54.97	5.62	89.45	4.27	9.43	7.63	126.40	10.69	1.33	295.54
66	CB-50	53.27	5.02	93.45	4.47	10.63	6.23	109.87	12.69	1.37	304.45
67	CB-51	51.87	4.42	100.45	4.67	9.63	6.43	149.60	7.09	1.04	232.00
68	CB-52	52.67	3.43	104.45	4.07	10.63	6.23	110.95	10.39	1.13	251.10
69	CB-53	57.27	4.03	109.45	4.87	10.03	6.43	85.29	10.49	0.87	193.11
70	CB-54	51.47	4.62	114.45	4.47	7.43	6.23	154.66	6.49	0.99	219.55
71	CB-55	40.87	4.62	111.45	4.27	8.63	7.23	122.24	2.89	0.34	74.66
72	CB-56	61.47	5.02	89.45	4.17	12.83	6.23	151.00	6.69	0.99	220.88
73	CB-57	50.27	4.22	99.45	4.57	9.63	8.63	175.38	2.59	0.44	98.44
74	CB-58	73.67	5.02	89.45	4.67	11.03	7.23	141.71	7.79	1.09	241.33
75	CB-59	74.47	5.62	103.45	4.27	10.83	5.83	180.15	7.09	1.26	280.88
76	CB-60	63.07	6.42	104.45	3.87	10.83	6.23	78.45	6.49	0.48	107.77
77	CB-61	75.87	6.22	111.45	3.97	10.83	7.83	134.76	2.99	0.39	85.99
78	CB-62	92.67	6.42	109.45	4.27	15.03	5.63	112.04	6.69	0.73	161.99
79	CB-63	78.67	6.62	111.45	4.27	17.43	3.63	76.93	4.29	0.31	68.21
80	CB-64	68.07	3.62	112.45	4.47	12.63	3.83	147.98	2.99	0.43	95.11
81	Swarna Shree (C)	51.25	3.35	95.85	4.00	9.05	7.35	166.20	6.00	0.99	220.34
82	Swarna Pratibha (C)	67.75	4.42	105.92	4.18	15.82	5.57	137.97	9.25	1.28	283.67
83	LC-3 (C)	73.60	4.15	110.75	4.25	15.40	5.55	146.80	8.55	1.25	278.02
84	Lal Gulab (C) Pvt.	70.25	6.40	111.25	4.58	13.35	3.82	77.50	13.25	1.02	227.39
85	Pusa Upkar (NC)	49.50	4.20	90.50	4.15	7.55	6.55	124.25	8.60	1.06	236.60
	CV (%)	7.23	0.53	6.22	0.63	1.17	0.96	13.45	1.22	0.12	26.96
	CD (P=0.05)	7.35	7.48	3.90	9.26	6.62	11.07	7.02	10.79	8.85	8.85

Table 3: Adjusted mean of growth, yield and yield attributing traits of brinjal genotypes during 2017-18

S. No.	Entry	Plant height (cm)	No of Primary branches	First flowering DAS	No. of flowers/ inflorescence	Fruit length (cm)	Fruit Diameter (cm)	Average fruit weight (g)	Number of fruits per plant	Yield per plant (kg)	Yield per hectare (q)
1	CB-1	105.13	3.99	76.80	4.45	7.99	7.04	143.63	11.09	1.62	359.74
2	CB-2	86.13	5.19	80.80	4.65	8.29	6.64	152.93	8.49	1.32	293.59
3	CB-3	88.83	3.79	74.80	4.25	12.99	6.24	169.78	7.69	1.33	295.32
4	CB-4	69.13	3.39	80.80	4.85	9.79	5.44	137.98	5.49	0.77	171.95
5	CB-5	69.33	3.19	60.80	5.45	10.59	4.64	97.58	10.49	1.04	231.90
6	CB-6	67.43	4.19	60.80	4.65	11.79	4.24	100.38	11.09	1.13	252.09
7	CB-7	62.83	3.59	57.80	5.05	10.39	4.04	122.88	5.08	0.64	142.10
8	CB-8	72.03	3.99	67.80	5.25	9.99	4.04	142.98	7.09	1.03	229.59
9	CB-9	66.03	3.79	60.80	5.25	10.09	4.24	113.98	6.08	0.71	157.50
10	CB-10	67.83	4.79	67.80	5.05	11.79	4.24	159.88	8.08	1.32	292.52
11	CB-11	55.23	3.39	75.80	4.65	12.99	3.84	154.18	6.29	0.99	219.81
12	CB-12	67.13	3.99	75.80	6.25	13.39	3.24	103.58	10.48	1.11	246.03
13	CB-13	80.03	4.59	74.80	4.45	9.39	5.24	118.98	6.48	0.79	175.11
14	CB-14	73.23	3.79	74.80	4.65	9.59	4.44	153.88	5.68	0.89	198.65
15	CB-15	67.83	4.39	59.80	4.65	8.39	5.24	108.98	9.09	1.01	224.34
16	CB-16	54.03	3.99	80.80	4.45	12.59	4.64	88.88	6.29	0.57	126.94

17	CB-17	55.03	4.19	67.80	4.65	11.59	4.44	118.88	5.08	0.62	137.47
18	CB-18	72.03	3.19	60.80	4.45	13.39	4.24	113.63	7.49	0.87	192.87
19	CB-19	48.83	3.59	75.80	4.85	8.39	4.64	108.88	3.48	0.39	86.63
20	CB-20	64.13	3.79	60.80	5.45	9.59	4.24	75.98	7.48	0.58	129.29
21	CB-21	57.75	3.75	80.80	4.61	9.87	5.28	101.92	4.24	0.42	94.24
22	CB-22	53.85	4.95	73.80	4.41	7.47	6.88	109.17	5.45	0.59	131.01
23	CB-23	62.65	4.75	81.80	4.61	8.87	5.68	187.17	3.85	0.71	156.88
24	CB-24	59.85	4.55	66.80	4.21	8.67	5.48	134.87	6.45	0.87	192.56
25	CB-25	64.65	4.75	86.80	4.01	9.27	7.48	151.07	6.05	0.91	201.87
26	Swarna Mani	58.85	5.75	86.80	4.01	10.67	6.08	159.47	4.25	0.67	147.96
27	Swarna Shyamli	44.25	3.95	66.80	3.61	9.87	10.08	267.07	3.85	1.01	224.35
28	CH-885	63.25	4.55	81.80	4.21	8.87	6.68	130.17	4.25	0.54	120.61
29	CH-889	52.55	3.95	92.80	4.41	9.87	5.48	85.27	3.85	0.32	70.83
30	CH-894	59.25	4.35	91.80	4.41	9.07	5.28	122.07	5.85	0.71	157.64
31	CH-579	57.65	4.75	80.80	4.21	10.87	5.48	111.47	5.45	0.60	133.77
32	CH-573	62.45	4.95	73.80	4.21	9.67	4.88	114.97	7.25	0.83	185.29
33	CH-883	63.65	5.95	65.80	3.61	12.27	5.68	103.87	7.65	0.80	177.06
34	CH-899	56.85	4.15	79.80	4.41	5.67	5.08	121.47	6.25	0.76	167.95
35	CH-455	51.25	3.95	63.80	4.21	11.87	4.68	117.27	5.65	0.66	146.09
36	CB-26	62.65	4.75	81.80	4.21	8.27	5.08	102.07	3.85	0.38	85.01
37	CB-27	103.85	5.95	94.80	4.61	9.87	6.48	131.87	12.45	1.66	368.56
38	CB-28	86.65	4.15	86.80	4.01	17.07	4.68	108.07	7.45	0.81	179.20
39	CB-29	71.85	5.15	93.80	3.81	13.67	4.88	94.17	12.24	1.17	260.34
40	CB-30	64.85	4.35	96.80	4.01	16.87	5.08	139.17	7.25	1.01	224.01
41	CB-31	63.65	4.31	82.40	4.29	14.23	5.08	127.00	7.81	1.03	228.90
42	CB-32	85.45	4.71	75.40	4.69	12.63	5.48	101.90	10.20	1.07	237.88
43	CB-33	62.05	5.31	76.40	4.49	13.03	4.88	91.70	4.41	0.45	101.08
44	CB-34	64.25	4.71	90.40	4.29	14.43	5.08	102.90	8.41	0.90	200.38
45	CB-35	63.75	4.51	85.40	3.89	12.23	5.28	112.50	7.81	0.92	203.77
46	CB-36	74.35	4.91	62.40	3.69	15.43	5.08	121.90	7.81	0.99	220.06
47	CB-37	60.15	3.91	85.40	3.89	12.03	4.88	144.90	6.81	1.03	228.51
48	CB-38	86.65	5.11	77.40	4.69	13.03	4.68	102.70	10.21	1.08	239.69
49	Pant Samrat	73.25	4.46	76.40	5.29	14.23	3.78	91.05	10.80	1.01	224.96
50	PB-4	45.55	5.11	82.40	4.29	14.23	4.68	116.30	4.21	0.54	120.12
51	PB-5	48.45	4.71	76.40	4.89	11.63	5.08	89.80	4.41	0.45	99.22
52	PB-6	63.35	4.71	77.40	4.29	10.43	4.68	159.90	4.61	0.79	174.71
53	PB-70	63.65	4.31	62.40	4.09	11.03	6.08	152.70	7.21	1.14	253.56
54	KS-331	64.05	6.31	74.40	3.69	9.43	6.28	136.70	5.81	0.84	186.52
55	CB-39	69.05	3.51	85.40	5.09	11.03	6.28	100.90	5.21	0.57	127.39
56	CB-40	47.45	3.91	62.40	4.79	10.43	5.68	124.00	4.81	0.64	143.37
57	CB-41	59.65	4.71	62.40	3.99	12.23	6.28	133.70	8.01	1.11	246.30
58	CB-42	56.85	5.11	62.40	4.49	11.23	5.88	131.10	7.81	1.06	236.01
59	CB-43	55.45	4.71	62.40	4.49	10.03	7.08	100.30	5.81	0.63	139.60
60	CB-44	52.85	4.71	62.40	4.29	9.43	5.48	127.00	6.41	0.86	190.48
61	CB-45	61.98	3.75	62.00	4.05	9.91	5.40	107.04	7.67	0.76	169.25
62	CB-46	52.28	3.35	76.00	4.85	11.11	5.80	122.84	7.27	0.83	185.15
63	CB-47	54.38	4.55	61.00	5.05	8.11	5.40	113.84	6.87	0.72	160.76
64	CB-48	52.68	3.75	61.00	4.25	10.31	7.00	121.04	10.47	1.20	267.32
65	CB-49	51.98	5.55	68.00	4.45	9.31	7.40	124.04	11.67	1.38	306.94
66	CB-50	53.88	5.35	68.00	4.65	10.91	5.80	112.24	13.27	1.42	315.92
67	CB-51	53.48	4.75	78.00	4.85	10.91	6.20	146.04	7.87	1.09	241.55
68	CB-52	54.38	3.75	76.00	4.25	10.31	5.80	116.04	10.47	1.15	255.76
69	CB-53	60.08	4.35	70.00	4.65	10.71	6.20	87.64	10.87	0.89	197.79
70	CB-54	53.98	4.55	60.00	4.25	8.31	6.40	152.94	7.07	1.02	226.57
71	CB-55	42.48	4.35	61.00	4.05	9.11	6.80	126.84	3.87	0.44	96.80
72	CB-56	60.48	4.95	62.00	4.15	12.11	6.40	148.84	7.27	1.02	226.75
73	CB-57	52.98	4.55	67.00	4.65	10.31	8.20	178.84	3.47	0.56	124.94
74	CB-58	72.28	5.35	77.00	4.45	10.71	7.00	139.24	8.47	1.12	248.13
75	CB-59	76.88	5.55	92.00	4.45	11.11	6.20	176.24	7.07	1.18	262.82
76	CB-60	65.08	6.15	85.00	4.25	10.31	6.40	80.64	6.87	0.50	110.59
77	CB-61	77.88	5.95	76.00	3.85	10.71	7.40	134.04	3.47	0.41	91.10
78	CB-62	97.28	6.35	77.00	4.05	13.91	5.80	108.84	6.67	0.67	148.43
79	CB-63	80.08	6.55	76.00	4.45	18.71	3.80	78.84	4.27	0.28	63.15
80	CB-64	70.08	3.95	76.00	4.45	12.11	4.00	144.04	3.87	0.50	111.33
81	Swarna Shree	52.60	3.45	83.50	4.05	9.20	6.40	167.91	5.65	0.95	210.37
82	Swarna Pratibha	65.67	4.60	87.00	4.30	14.55	5.55	129.50	9.70	1.25	278.61
83	LC-3	73.65	4.15	82.50	4.35	15.20	5.40	141.97	8.70	1.23	274.24
84	Lal Gulab	70.73	6.10	66.00	4.65	13.75	3.80	83.40	11.47	0.96	213.46
85	Pusa Upkar	57.58	4.45	73.00	4.50	9.85	6.85	123.23	4.30	1.02	227.37
	CV%	6.82	0.53	7.61	0.60	1.30	1.08	13.29	0.94	0.16	36.59
	CD (P=0.05)	6.88	7.53	6.58	8.82	7.43	12.61	6.87	8.5	11.86	11.86

CONCLUSION AND FUTURE THRUST

With the help of this investigation, it has been concluded that the crop is extremely variable in this region because of high differential selection pressure according to regional preference of fruits characters. The consumer preference varies from region to region and locality to locality. This study depicted the variability existed in the locality in brinjal. It was concluded that a wide range of morphological as well as genetic diversity in the brinjal genotypes in the public domain as well as research institutes. These variations help to select parental lines for future strategies of breeding in this important vegetable crops in this zone as well as for other parts of the country. Hence, it is necessary to characterize the genotypes of brinjal in other locations comprising with new collections for better acceptance and wider adaptability as well as for the identification of suitable lines for the region and selection of parental lines for breeding programme. The elite varieties, land races, local genotypes, wild relatives, stable breeding lines, indigenous cultivars etc. should be characterized for different quantitative and qualitative characters and utilized for breeding programmes [6]. Important characters viz., fruit colour and shape, spyness, less seeds in fruits, higher yield potential, erect and compact growth habit, solitary fruiting habit, and earliness, resistance to biotic and abiotic stresses for wider adaptability should be considered for crop improvement in brinjal in future breeding programme. On the basis of these studies, it can be concluded that the genotypes CB-27 and CB-1 may be recommended for the commercial exploitation of brinjal during *rabi* season in this region as well as adjoining areas of the same agro-climatic condition.

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Author's contributions:

Abdul Majid Ansari: Concept and design of the research, contribution to the data collection and gathering technical information of the research, as well as preparation of the manuscript and English editing.

Ekhlauque Ahmad: Design of the experiment, data collection, analysis of data and its interpretation, as well as preparation of the manuscript.

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