



Evaluation of brinjal (*Solanum melangona* L.) landraces of Odisha for fruit yield and its components

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ABSTRACT

Field experiment was conducted at AICRP on Vegetable Crops of OUAT, Bhubaneswar during Rabi, 2017-18 to study the performance of local landraces of brinjal of Odisha. Fifty two local landraces of brinjal including four check varieties were grown by adopting Randomized Block Design replicated twice. The results revealed significant variations among the traits. The plant height varied from 65.68 cm (BBSR-200) to 161.44 cm (Utkal Jyoti), while primary branches plant⁻¹ from 2.40 (Nayagarh spiny brinjal) to 5.70 (BBSR-114). Invariably, days to 1st and 50% flowering varied from 42.50 days (BBSR-145-1) to 64.30 days (Jammusahi local) and 51.10 days (BBSR-11-4) to 71.90 days (Jammusahi local), respectively. Fruit length varied from 7.41cm (BBSR-09-8-1) to 21.10 cm (Arka Nidhi) while that of fruit breadth 9.67cm (selection from Hajari local) to 31.40cm (Keonjhar local-1). Maximum fruits plant⁻¹ was recorded in Selection from BBSR-192-1 (40.59). Similarly, average fruit weight varied significantly among the total genotypes from 50.85 g (BBSR-114) to 233.97 g (Jammusahi local). Incidence of wilt revealed significant variations among local landraces which varied from 0.00% (BBSR-08-2, BBSR-09-4, BBSR-09-16, BBSR-10-25, BBSR-10-26, Selection from BBSR-192-1, Selection from BBSR-145-1, Jammusahi local) to 22.76% (Dhenkanal local). Total fruit yield plant⁻¹ varied significantly ranging from 865.80 g (BBSR-195-2) to 3045.70 g (Selection from BBSR-192-1). Thus, the availability of wide variability among the local landraces provided enough opportunities for their improvements in brinjal. Selection from BBSR-192-1 was identified as best landrace having highest fruits plant⁻¹ with total yield plant⁻¹ having resistance to bacterial wilt. Similarly, Jammusahi local may be taken as a parent for development of large green round fruited genotype with resistance to bacterial wilt in further crop improvement programme.

Keyword: Brinjal, evaluation, landraces, performance

Brinjal, eggplant or aubergine (*Solanum melongena* L.) of solanaceae family is a kind of vegetable which has been cultivated worldwide and is often referred as poor man's crop (Sharma *et al.*, 2004). The cultivated brinjal is undoubtedly of Indian origin and has been cultivated for long time (Thompson and Kelly, 1957). Brinjal is a fairly good source of calcium, phosphorous, iron and vitamins particularly 'B' group. It is rich source of anthocyanins, vitamin C and phenolic compounds, which are treated as powerful antioxidants (Vinson *et al.*, 1998). It is useful for the patients suffering from asthma, bronchitis, high blood cholesterol and cholera. White coloured brinjal is beneficial for diabetic patient (Choudhury, 1976).

Although brinjal is cultivated in different parts of India, but the productivity is very low (17.5 t ha⁻¹) as against total world productivity (26.1t ha⁻¹) (FAO STAT, 2016). Still in India it has been estimated that 17.8 per cent of hybrids, 50.0 per cent of OP/HYVs and 32.2 per cent of local types of brinjals are cultivated. The dominance of local types and landraces might be due to regional performance by consumers because of quality

attributes. Further heterozygous nature of the local brinjal landraces gives a better scope to evolve a superior type from the local existing types specially under Odisha conditions for commercialization as Odisha has wider diversity in brinjal. Selection of superior genotypes based on mean performance is more reliable data than any other parameter for crop improvement programme. Hence, attempt was made for collection and evaluation of local brinjal landraces grown in different districts of Odisha to study the growth and yield characters.

MATERIALS AND METHODS

The field experiment was conducted at All India Co-ordinated Research Project on Vegetable Crops, Odisha University of Agriculture and Technology, Bhubaneswar, Odisha, India during during Rabi, 2017-18 to study the performance of local landraces of Odisha. The experiment was laid out in Randomized Block Design and replicated twice, with 52 genotypes including four released varieties as check. All the recommended package of practices were adopted uniformly to all the genotypes in order to raise a good crop. Observations

on vegetative, flowering, fruit yield and yield attributes were taken from randomly selected plants and were subjected to statistical analysis.

RESULTS AND DISCUSSION

Vegetative growth parameters

The mean performance of vegetative growth parameters for 52 brinjal landraces are presented in table 1. Significantly, maximum plant height at final harvest stage was recorded by Utkal Jyoti (161.44 cm), whereas BBSR-200 (65.68 cm) recorded the lowest one among all landraces. The data on number of primary branches plant⁻¹ indicated wide variations among tested genotypes ranging from 5.70 (BBSR-114) to 2.40 (Nayagarh Spiny Brinjal) with a mean value of 4.35. Genotypes BBSR-10-27 (5.5), BBSR-09-13 and BBSR-10-15 (5.2) were showed *statistical parity* with BBSR-114. Plant height is an important growth attributing character by which vigour of the plant is measured whereas, number of primary branches plant⁻¹, is contributed towards increasing yield enhancing traits in brinjal. This collaborates with the findings of Nirmala *et al.* (2013), Vidya *et al.* (2015), Akshay *et al.* (2018) and Jayalakshmi and Praneetha (2018).

Flowering parameters

The table 1 also revealed that the earliest days to 1st flowering was recorded by genotype, Selection from BBSR-145-1 (42.50 days) followed by BBSR-11-4 and Badagocha Local-2 (42.80 days). Similarly, minimum number of days to 50% flowering was recorded by BBSR-11-4 (51.10 days). The genotype Jammusahi Local (64.30 days and 71.90 days) was the late one for days to 1st flowering and 50% flowering. Estimation of earliness is an advantageous character for selecting breeding lines for commercial importance. Similar reports are also observed by Sanas *et al.* (2014), Akshay *et al.* (2018), Jayalakshmi and Praneetha (2018) and Umesh *et al.* (2018) in brinjal.

Fruit yield attributing parameters

Fruit yield attributing parameters *viz.*, fruit length, fruit breadth, fruit weight, fruits plant⁻¹ and 100 seed weight showed significant variation among all the genotypes of brinjal (Table 1). Among the genotypes, significantly longest fruit was recorded in Arka Nidhi (21.10 cm) subsequently followed by selection from Hajari Local (19.32 cm) whereas, genotype BBSR-09-8-1 showed significantly lowest fruit length of 7.41 cm. Keonjhar Local-1 (31.40 cm) was found to have the highest value for fruit breadth among the genotypes and the lowest value was recorded with Selection from Hajari Local (9.67cm). Heaviest fruit of 233.97 gm was recorded in Jammusahi Local whereas BBSR-114

recorded lightest weight fruit of 50.85 gm. Highest number of fruits plant⁻¹ was observed in Selection from BBSR-192-1 (40.59) followed by BBSR-09-13 (34.60) and that of lowest in Jammusahi Local (5.88). The increased fruit set might be due to higher rate of anther dehiscence and higher pollen viability. Fruit length, fruit breadth, fruit weight and fruits plant⁻¹ are important parameters indirectly contribute towards the total yield. These results are in consonance with that of Sanas *et al.* (2014), Yadav *et al.* (2016), Dash (2017), Tripathy *et al.* (2017), Akshay *et al.* (2018), Jayalakshmi and Praneetha (2018), Umesh *et al.* (2018) and Dasmohapatra and Sharma (2019). Data recorded on 100 seed weight showed maximum value for Dhenkanal Local (0.56 gm) while that of lowest in BBSR-09-8 (0.28 gm).

Regarding the percentage of wilt incidence, landraces like BBSR-08-2, BBSR-09-4, BBSR-09-16, BBSR-10-25, BBSR-10-26, Selection from BBSR-192-1, Selection from BBSR-145-1 and Jammusahi Local (0.00%), recorded as resistance landraces, without showing any symptoms of bacterial wilt at 90 days after transplanting. However, Dhenkanal Local (22.76%) showed the highest value and regarded as most susceptible landrace to bacterial wilt.

Fruit yield parameters

Among the local landraces evaluated, the highest marketable fruit yield plant⁻¹ was recorded in selection from BBSR-192-1 (2720.42 g) followed by BBSR-192-1 (1976.54 g) and BBSR-195-3 (1585.47 g). The lowest marketable fruit yield plant⁻¹ was recorded by Keonjhar Local-2 with the value of 380.71 g (Table 1). Significant highest unmarketable fruit yield plant⁻¹ was found in the genotype selection from BBSR-145-1 (1246.20g) whereas, lowest unmarketable fruit yield plant⁻¹ was recorded for the genotype BBSR-145-1 (181.74g). Selection from BBSR-192-1 (3045.70 g) registered highest total fruit yield plant⁻¹. This was followed by BBSR-192-1 (2674.90 g) and BBSR-10-15 (2505.85 g). Similarly, BBSR-195-2 (865.80 g) registered significantly lowest total fruit yield plant⁻¹. Similar results were observed by Akshay *et al.* (2018) and Jayalakshmi and Praneetha (2018).

In the present investigation based on *per se* performance, the genotype Selection from BBSR-192-1 was identified as best local landraces due to significantly highest number of fruits plant⁻¹, marketable fruit yield plant⁻¹ and total fruit yield plant⁻¹ along with resistance to bacterial wilt. Similarly, Jammusahi local may be taken as a parent for development of large green round fruited genotype with resistance to bacterial wilt in future crop improvement programme.

Table 1: Mean Performance of 52 brinjal genotypes (48 landraces + 4 released varieties) for 20 characters

Genotypes	1	2	3	4	5	6	7	8	9	10	11	12	13
BBSR-202	110.25	4.80	52.70	60.40	16.11	14.54	84.85	27.63	0.40	10.51	1442.86	836.44	2279.30
BBSR-195-1	87.54	4.50	54.60	62.40	10.09	13.45	74.33	28.22	0.32	10.52	1286.38	739.03	2025.40
BBSR-192	87.10	4.30	53.40	63.40	10.46	17.77	98.54	19.48	0.35	10.52	1489.23	327.88	1817.10
BBSR-203	92.29	3.50	50.80	63.80	12.11	14.50	64.38	23.83	0.32	10.51	1071.33	441.57	1512.90
BBSR-195-3	96.23	4.60	54.70	62.40	10.39	16.86	92.01	24.50	0.36	12.75	1585.47	546.72	2132.20
BBSR-09-8-1	78.97	5.00	51.90	64.10	7.41	21.33	100.40	13.25	0.43	18.43	743.81	450.69	1194.50
BBSR-114	89.74	5.70	57.40	66.10	10.10	12.40	50.85	33.70	0.34	10.52	1273.16	411.85	1685.00
BBSR-145-1	86.55	4.90	53.70	59.00	13.76	18.23	89.48	19.85	0.41	14.97	1509.76	181.74	1691.50
BBSR-192-1	73.47	4.40	51.90	59.90	13.31	16.50	100.60	27.55	0.31	12.74	1976.54	698.35	2674.90
BBSR-200	65.68	4.60	56.30	62.00	10.99	18.82	77.46	22.10	0.38	10.51	1353.32	282.13	1635.45
BBSR-195-2	109.10	4.80	55.30	57.70	10.86	13.00	72.40	12.95	0.37	10.52	623.79	242.01	865.80
BBSR-08-2	117.64	4.80	53.30	59.40	12.09	22.59	113.18	17.70	0.39	0.00	1081.29	804.60	1885.90
Hajari Local	79.76	5.20	56.40	61.40	12.39	14.62	79.94	28.05	0.32	14.97	1403.74	760.55	2164.30
BB-67	89.04	4.50	56.10	61.50	9.58	16.94	70.90	25.15	0.40	10.51	1031.10	646.80	1677.90
BB-55	71.78	4.70	46.20	60.90	11.45	17.25	67.96	23.25	0.33	10.52	1081.64	417.27	1498.90
BBSR-09-4	87.29	5.00	47.90	60.60	13.52	14.72	97.13	18.15	0.41	0.00	665.71	988.08	1653.80
BBSR-09-5	86.15	3.70	50.90	63.90	13.51	22.90	115.00	14.70	0.38	10.51	661.24	882.66	1543.90
BBSR-09-6	109.19	4.70	45.80	59.80	11.36	14.98	64.51	32.30	0.38	19.93	821.08	1168.82	1989.90
BBSR-09-8	93.69	4.30	56.10	63.60	14.89	16.76	81.26	24.00	0.28	10.52	819.76	1050.94	1870.70
BBSR-09-13	77.70	5.50	44.00	62.20	11.72	12.48	63.46	34.60	0.43	10.52	1062.27	1066.33	2128.60
BBSR-09-15	120.60	4.90	48.20	60.70	14.08	24.81	104.97	16.20	0.34	10.52	622.45	963.84	1586.30
BB-85	78.51	4.30	50.90	64.60	12.08	10.68	61.84	20.45	0.29	14.97	427.22	773.68	1200.90
BBSR-09-11	79.18	3.80	48.30	56.10	11.62	18.03	75.09	17.30	0.41	10.51	899.00	253.60	1152.60
BBSR-10-1	79.48	4.80	49.30	60.40	13.20	16.88	90.07	16.40	0.33	10.51	655.13	725.28	1380.40
BBSR-10-7	81.49	4.20	57.70	63.20	16.96	14.26	81.07	22.15	0.46	10.52	887.32	818.98	1706.30
BBSR-10-8	70.33	4.10	59.90	65.00	11.81	17.62	104.18	17.17	0.33	10.52	664.51	1019.30	1683.80
BBSR-10-11	80.29	3.80	51.20	61.40	14.71	17.85	116.40	15.07	0.33	10.51	808.87	828.13	1637.00
BBSR-10-15	67.67	5.20	47.30	57.20	16.03	13.53	77.20	34.00	0.34	10.52	1270.79	1235.06	2505.85
BBSR-09-16	83.36	5.20	48.20	61.20	12.86	13.45	72.68	27.90	0.40	0.00	799.71	1155.69	1955.40
BBSR-10-24	90.63	3.60	49.80	60.50	15.70	14.24	89.78	16.55	0.41	10.52	576.99	818.70	1395.70
BBSR-10-25	83.66	3.90	55.80	60.60	11.79	17.93	94.12	16.66	0.31	0.00	649.13	825.67	1474.80
BBSR-10-26	71.76	4.60	57.60	61.50	9.29	15.62	71.62	28.26	0.31	0.00	802.64	1148.76	1951.40
BBSR-10-27	80.10	5.60	56.00	60.20	16.45	15.04	99.55	17.25	0.36	10.52	597.86	949.89	1547.75
BBSR-11-4	76.62	4.40	42.80	51.10	11.99	11.38	65.15	16.40	0.41	10.52	430.67	536.53	967.20
BBSR-10-31	85.77	2.80	53.30	59.90	10.00	14.42	68.06	22.75	0.34	0.00	539.48	930.02	1469.50
Sel. From BBSR-09-11	104.26	3.60	50.20	61.40	10.56	11.67	65.18	21.05	0.33	10.52	549.68	725.63	1275.30
Sel. From Hajari Local	117.24	4.80	55.60	61.70	19.32	9.67	75.42	22.90	0.36	0.00	482.54	1167.97	1650.50
Sel. From BBSR-192-1	74.84	4.60	45.40	64.20	8.83	14.24	77.55	40.59	0.30	0.00	2720.42	325.28	3045.70
Sel. From BBSR-145-1	117.37	4.50	42.50	53.80	14.27	20.58	121.94	16.35	0.41	0.00	625.00	1246.20	1871.20
Sel. From BBSR-192	81.63	4.30	55.50	62.40	9.48	15.76	124.29	12.98	0.41	14.97	625.65	838.96	1464.60
Dhenkanal Local	75.72	4.50	55.70	61.50	12.28	21.80	129.43	12.41	0.56	22.76	590.82	873.58	1464.40
Badagocha Local-1	120.20	4.60	43.40	58.50	18.22	25.74	156.05	11.40	0.49	10.52	461.02	1165.78	1626.80
Badagocha Local-2	100.53	3.50	42.80	60.00	14.26	24.02	128.25	12.55	0.51	10.52	644.75	837.75	1482.50
Nayagarh Spiny Brinjal	99.06	2.40	55.00	65.10	11.54	21.03	106.10	9.43	0.43	10.52	490.62	405.53	896.15
Keonjhar Local-1	80.54	3.30	54.80	64.90	15.39	31.40	169.54	8.60	0.51	12.74	759.07	508.83	1267.90
Badakutuna Local	118.75	3.30	48.90	69.60	15.05	25.85	123.93	10.88	0.41	10.52	557.72	665.08	1222.80
Keonjhar Local-2	84.61	4.30	56.00	65.90	15.16	27.65	185.65	5.93	0.50	14.97	380.71	523.59	904.30
Jammusahi Local	93.53	4.10	64.30	71.90	13.59	27.46	233.97	5.88	0.46	0.00	677.92	447.38	1125.30
UtkalTarini ©	100.87	4.30	55.00	59.90	10.65	14.30	78.26	14.80	0.42	14.96	894.97	590.68	1485.65
UtkalJyoti ©	161.44	3.60	53.00	64.80	11.51	13.98	88.49	15.80	0.48	10.52	894.88	590.62	1485.50
UtkalKeshari ©	92.45	3.90	52.50	58.40	10.70	15.95	101.46	12.35	0.40	0.00	854.40	563.90	1418.30
ArkaNidhi ©	141.59	3.80	47.80	52.60	21.10	10.91	100.33	21.00	0.46	14.97	1268.46	837.18	2105.65
Mean	91.98	4.35	52.00	61.44	12.82	17.28	96.08	19.82	0.39	9.59	905.65	735.41	1641.07
SE m (±)	4.76	0.31	2.10	1.64	0.26	0.81	5.69	1.35	0.01	0.59	62.22	52.81	108.54
SE(d)	6.73	0.44	2.97	2.32	0.37	1.14	8.05	1.91	0.01	0.84	87.99	74.68	153.49
LSD(0.05)	13.55	0.89	5.99	4.68	0.75	2.30	16.19	3.85	0.02	1.69	177.18	150.37	309.05
C.V.	7.31	10.17	5.72	3.78	3.06	6.61	8.37	9.65	3.11	8.77	9.72	10.16	9.35

Note: 1. Plant height at final harvest, 2. Primary branches plant⁻¹, 3. Days to 1st flowering, 4. Days to 50% flowering, 5. Fruit length (cm), 6. Fruit breadth (cm), 7. Average fruit weight (g), 8. Fruits plant⁻¹, 9. 100 seed weight (g), 10. Wilt % at 90 DAT, 11. Total marketable fruit yield plant⁻¹(g), 12. Total unmarketable fruit yield plant⁻¹(g), 13. Total fruit yield plant⁻¹(g).

REFERENCES

- Akshay, D.A., Praneetha, S., Vethamoni, P.I. and Rajeswari, S. 2018. Mean performance of brinjal (*Solanum melongena* L.) genotypes under Tamil Nadu condition, *J. Ag. Ecol.* **6**: 47-53.
- Choudhury, B. 1976 a. *Vegetables* (4th edition), pp 50-58 National Book Trust, New Delhi.
- Dash, S. P. 2017. Divergence, combining ability and heterosis for fruit yield and its components in brinjal (*Solanum melongena* L.), *Ph.D. (Hort)*, Indira Gandhi Krishi Vishwavidyalaya, Raipur (C.G.), p 99.
- Dasmohapatra, A. and Sharma, D. 2019. Mean performance and variability analysis in long fruited brinjal (*Solanum melongena* L.) for Chhattisgarh, *Bull. Env. Pharmaco. Life Sci.*, **8(2)**: 28-31.
- FAOSTAT, 2016. <http://faostat3.fao.org>. Food and Agriculture organization of the United Nations.
- Jayalakshmi, K. and Praneetha, S. 2018. Evaluation of Mean performance local types for yield and its quality characters. *Int. J. Chem. Studies*, **6(3)**: 292-97.
- Nirmala, N, Praneetha, S. and Manivannan, N. 2013. *Per se* performance of cluster bearing, glossy purple Brinjal, *Int. J. Chem. Studies (Solanum melongena L.)*, **4(2)** :1188-92.
- Panse, V. G. and Sukhatme, P. V. 1978. Statistical methods for Agricultural workers, ICAR, New Delhi.
- Sanas, M.P., Sanas, A.P. and Shinde, S.M. 2014. Performance of different types of brinjal for their physical fruit parameters and flowering parameters, *Int. J. Sci. Res.*, **3(12)**: 1995-97.
- Sharma, B., Pathania, N..K. and Gautham, V. 2004. Combining ability studies in brinjal (*Solanum melongena* L.), *Himachal J. Agric. Res.*, **30**: 54-59.
- Thompson, C.H. and Kelly, C.W. 1957. *Vegetable Crops*. Pp 501, McGraw-Hall Book Co., Inc., New York.
- Tripathy, B., Sharma, D., Jangde ,B.P. and Bairwa, P.L. 2017. Evaluation of brinjal (*Solanum melongena* L.) genotypes for growth and yield characters under Chhattisgarh condition, *Pharma. Innov. J.*, **6(10)** : 416-20.
- Umesh, B. C., Patil, M. G., Patil, S. S., Kavita, K. and Prasad, S.S. 2018. Performance of different types of brinjal for their physical fruit parameters and flowering parameters, *J. Pharmaco. Phytochem.*, **7(4)**: 2798-2800.
- Vidhya, C. and Kumar, N. 2015. Studies on Correlation and Path Coefficient Analysis in Brinjal (*Solanum melongena* L.), *Trends in Biosc.*, **8(6)**:1560-62.
- Vinson, J.A., Hao, Y., Su, X. and Zubik, L. 1998. Phenol antioxidant quantity and quality in foods: Vegetables. *J. Agric. Food Chem.*, **46**: 3630-34.
- Yadav, N., Dhankar, S. K., Chandanshive, A.V. and Kumar, V. 2016. Studies on variability, heritability and genetic advance in brinjal (*Solanum melongena* L.), *Bioscan.*, **11(4)**: 3001-05