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Per Se performances of brinjal (*Solanum melongena* L.) F_1 crosses for fruit yield and bacterial wilt tolerance

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Abstract
Field experiment was conducted with 36 F_1 crosses, nine parents and one hybrid check at OUAT, Bhubaneswar, Odisha during *rabi*, 2019-20 for round fruits, tolerance to bacterial wilt and higher yield in brinjal. Results showed significant variations among 13 quantitative traits indicating existence of variations for effective selection. On *per se* performance, four F_1 crosses *viz*., BBSR-08-2 X BBSR-192-1 (2705.80 & 4.17), Jammusahi Local X BBSR-192-1 (2558.50 & 4.17), BBSR-195-3 X BBSR-192-1 (2555.10 & 0.00) and BBSR-10-26 X BBSR192-1 (2515.80 & 8.33) were identified as superior types for round fruits, higher fruit yield plant^{-1} (g) and bacterial wilt (%), respectively. These F_1 crosses produced about 52.40%, 44.10%, 43.91% and 41.70% of total fruit yield plant^{-1} while (-)13.13%, (-)13.13%, (-)100.00% and 73.54% for bacterial wilt, respectively as compared to total 36 F_1 crosses evaluated. Thus, it may be concluded that these above superior four F_1 crosses may be recommended for multi-locational trials for commercialization.

Keywords: Bacterial wilt, F_1 crosses, multilocational and *per se* performance

Introduction
Brinjal, eggplant or aubergine (*Solanum melongena* L.) of Solanaceae family is a kind of vegetable which has been cultivated worldwide in the central, southern and south-east Asia and in some African countries (Sharma *et al.*, 2004) [16]. Brinjal is undoubtedly of Indian origin and has been cultivated since long time (Thompson and Kelly, 1957) [18]. It is often referred as poor man's crop (Sharma *et al*., 2004) [16] and vegetable of masses (Patel and Sarnaik, 2003) [12]. The unripe fruits of brinjal contain carbohydrates, protein, ascorbic acid, Ca, Mg, Fe, P, vitamin B6, niacin, pantothenic acid, vitamin A and vitamin K (Timmareddygari *et al*, 2021) [20]. India is major producer of brinjal in the world. In India, brinjal occupies an area of 0.73 million hectares with an annual production of 12.51 million tonnes and productivity stands at 18.9 MTha^{-1} (NHB, 2018) [9]. The productivity of brinjal in India is far below than the other brinjal growing areas of the world. Cultivation of local landraces or genotypes seems to be the major factor of low productivity. It has been reported that, in India, the share of different brinjal varieties are about 17.8% hybrid, 32.2% local landraces and 50% by HYVs. Further, cultivation of brinjal varied widely in different parts of country due to wide variations in fruit shape, colour, productivity and tolerance to stresses. Consumer's preference also play very vital role in India for instance, South India people preferred slender types while Eastern India people prefer round and oblong shape fruits. Therefore, to increase the productivity of brinjal of local landraces keeping the priority of consumer's preference, the present experiment was designed to develop hybrids having round fruits, tolerance to bacterial wilt and higher yield.

Materials and Methods
The present study was conducted at All India Co-ordinated Research Project on Vegetable Crops, Odisha University of Agriculture and Technology, Bhubaneswar, Odisha, India during *rabi*, 2019-20. The experiment was laid out by adopting randomized block design with two replications consisting of 46 genotypes including 36 F_1 crosses, nine parents and one hybrid check (VNR-5). The recommended package of practices was adopted uniformly to raise a good brinjal crop. Observations on various parameters including vegetative growth, flowering, fruit yield and yield attributing parameters were recorded from five randomly selected plants from each replication. Observed data were subjected to statistical analysis by adopting standard statistical procedures (Panse and Sukhatme, 1987) [11].

Results and Discussion

The results of analysis of variance for 13 traits revealed that the parents and F_1 crosses showed significant differences for all the traits, except the incidence of bacterial wilt at 90 days after transplanting (DAT) indicating the existence of enormous amount of genetic variability for these traits. Results also showed that for most of the traits the CV value was within 10% except incidence of bacterial wilt at 90 DAT.

Vegetative growth parameters

Results revealed that among parents, BBSR-195-3 recorded significantly tallest plants at both peak fruiting and final harvest stage (83.70 cm and 96.53 cm) than rest of the parents (Table 1). Similarly, BBSR-10-25 (90.30 cm) showed significantly highest plant spreads while that of primary branches plant^{-1} by BBSR-08-2 (4.85 cm). The F_1 cross BBSR-08-2 X BBSR-195-3 (96.40 cm) and BBSR 10-25 X BBSR-195-3 (110.10 cm) recorded significantly tallest plants at both the stages than rest of the tested crosses, respectively. However, crosses *viz.*, BBSR-08-2 X Selection from BBSR-192-1 (92.10 cm and 104.57 cm), BBSR-08-2 X Jammusahi Local (91.10 cm and 108.84 cm), BBSR-08-2 X BBSR-10-25 (89.85 cm and 105.00 cm), BBSR-08-2 X BBSR-10-26 (87.10 cm and 101.00 cm) and Jammusahi Local X BBSR-195-3 (85.88 cm and 97.03 cm) were showed *statistical parity* with the highest value of respective trait. Significantly highest plant spreads were observed in BBSR-08-2 X Selection from BBSR-192-1 (98.92 cm) whereas primary branches plant^{-1} in BBSR-08-2 X Jammusahi Local (5.90). However, both the crosses registered *statistical parity* with BBSR-08-2 X BBSR-195-3 (92.90 cm and 5.50) for the trait plant spread and primary branches plant^{-1}, respectively.

Results on overall performance of 36 F_1 crosses of brinjal showed that crosses *viz.*, BBSR-08-2 X BBSR09-5, BBSR-08-2 X BBSR-10-25, BBSR-08-2 X Jammusahi Local, BBSR-08-2 X Selection from BBSR-192-1, Jammusahi Local X BBSR-09-5 and BBSR-195-3 X BBSR09-5 were identified as superior for various vegetative growth parameters under study. Similar reports of significant variations among the F_1 crosses and parents in brinjal were reported earlier (Nirmala *et al*., 2013; Vethamoni and Praneetha, 2016; Kumar *et al*., 2017 and Khobragade *et al*., 2019) [10, 23].

Table 1: Mean performance of 46 genotypes (36 f1 crosses, 09 parents and 01 standard check hybrid) in brinjal

Sl. No.	Crosses	Plant height at peak fruiting stage (cm)	Plant height at final harvest stage (cm)	Plant spread (cm)	Number of primary branches plant^{-1}	Days to First Flowering	Days to 50% Flowering	Flowers cluster^{-1}	Fruit length (cm)	Fruit breadth (cm)	Average fruit weight (g)	Fruits plant^{-1}	Bacterial wilt % at 90 DAT (Square root transformation value)	Total fruit yield plant^{-1} (g)
1	BBSR-08-2	72.50	90.05	86.70	4.85	52.00	55.30	5.10	11.90	22.64	128.69	12.90	0.00 (0.71)	1275.50
2	BBSR-10-25	73.10	82.44	90.30	3.60	40.40	66.00	5.50	12.95	22.19	137.75	18.50	0.00 (0.71)	1109.67
3	Jammusahi Local	76.00	92.97	40.90	3.90	59.30	73.20	2.20	21.00	28.94	284.60	6.20	0.00 (0.71)	1096.00
4	BBSR-10-26	59.60	69.62	53.90	2.90	44.90	48.00	4.60	13.21	19.88	111.50	22.55	0.00 (0.71)	1530.90
5	BBSR-195-3	83.70	96.53	77.80	3.70	46.10	46.90	5.20	15.50	21.78	160.05	19.25	4.17 (1.87)	1887.30
6	BBSR-192-1	67.80	83.00	57.10	3.20	42.20	59.70	4.00	12.47	26.59	132.24	17.34	4.17 (1.87)	1775.50
7	Selection from BBSR-192-1	52.90	66.52	55.90	2.60	42.40	60.40	3.70	12.63	23.00	128.10	28.20	4.17 (1.87)	2370.00
8	Selection from BBSR-145-1	64.80	75.86	51.40	2.80	48.40	61.70	6.00	13.54	21.83	159.40	14.00	0.00 (0.71)	1376.15
9	BBSR-09-5	68.60	81.54	53.10	2.40	50.20	58.70	4.50	14.35	23.98	132.60	11.10	4.17 (1.87)	988.00
10	BBSR-08-2 X BBSR-10-25	89.85	105.00	89.22	5.30	53.50	62.40	5.60	15.78	27.69	197.15	19.00	0.00 (0.71)	2085.50
11	BBSR-08-2 X Jammusahi Local	91.10	108.84	88.90	5.90	53.20	51.40	5.20	18.22	27.13	252.40	14.50	4.17 (1.87)	2188.90
12	BBSR-08-2 X BBSR-10-26	87.10	101.00	73.30	4.20	53.00	66.60	5.00	13.93	23.95	188.50	14.10	0.00 (0.71)	1945.80
13	BBSR-08-2 X BBSR-195-3	96.40	109.29	92.90	5.50	42.60	58.80	5.60	15.89	27.25	187.34	10.80	0.00 (0.71)	1458.90
14	BBSR-08-2 X BBSR-192-1	84.40	102.23	87.00	4.60	45.50	56.60	5.15	13.65	29.07	227.70	19.50	4.17 (1.84)	2705.80
15	BBSR-08-2 X Selection from BBSR-192-1	92.10	104.57	98.92	5.30	48.10	65.70	5.20	14.48	26.91	230.94	18.90	16.67 (4.01)	2488.50
16	BBSR-08-2 X Selection from BBSR-145-1	79.80	91.74	88.10	5.40	55.40	63.70	6.10	15.17	27.13	220.40	14.50	4.17 (1.84)	2250.50
17	BBSR-08-2 X BBSR-09-5	71.40	85.15	83.70	4.90	46.50	49.60	5.00	15.39	27.53	220.30	14.10	8.33 (2.97)	2141.00
18	BBSR-10-25 X Jammusahi Local	69.32	79.39	72.70	4.70	43.70	56.70	5.00	19.50	27.70	166.10	14.00	12.50 (3.61)	1285.10
19	BBSR-10-25 X BBSR-10-26	51.88	64.95	85.62	4.70	46.30	55.40	6.40	15.73	20.48	112.80	14.90	0.00 (0.71)	1121.65
20	BBSR-10-25 X BBSR-195-3	91.80	110.10	79.80	4.60	50.70	54.10	6.10	16.30	26.50	187.80	20.10	4.17 (1.84)	1908.10
21	BBSR-10-25 X BBSR-192-1	81.20	96.45	77.00	5.00	41.30	48.80	4.60	13.91	24.78	184.50	17.20	4.17 (1.84)	2303.70
22	BBSR-10-25 X Selection from BBSR-192-1	59.90	72.26	80.14	4.50	48.40	57.80	4.60	13.61	24.41	147.50	18.90	0.00 (0.71)	2050.80
23	BBSR-10-25 X Selection from BBSR-145-1	69.45	80.00	74.40	3.40	45.15	65.50	6.15	15.58	22.50	136.95	12.94	8.33 (2.97)	1123.00
24	BBSR-10-25 X BBSR-09-5	68.30	80.18	88.00	4.70	40.40	60.70	6.00	15.00	19.23	190.60	19.00	8.33 (2.97)	1451.90
25	Jammusahi Local X BBSR-10-26	82.60	93.69	85.20	4.70	39.90	60.40	4.70	18.19	22.90	185.40	13.75	0.00 (0.71)	1611.70
26	Jammusahi Local X BBSR-195-3	85.88	97.03	73.30	5.10	47.70	52.50	4.00	18.37	32.67	285.80	15.60	0.00 (0.71)	2158.50
27	Jammusahi Local X	60.10	76.00	57.50	3.90	45.60	62.40	4.10	17.59	29.30	293.20	18.80	4.17 (1.84)	2558.50

	BBSR-192-1													
28	Jammusahi Local X Selection from BBSR-192-1	80.80	94.29	72.00	4.40	52.10	55.80	4.50	21.10	33.06	275.34	12.40	0.00 (0.71)	2180.20
29	Jammusahi Local X Selection from BBSR-145-1	75.10	84.30	75.20	4.30	44.40	65.40	5.20	21.79	30.96	122.88	15.30	0.00 (0.71)	1084.20
30	Jammusahi Local X BBSR-09-5	72.50	88.00	47.50	3.25	55.70	66.50	3.45	21.50	27.15	220.30	10.50	8.33 (2.97)	989.15
31	BBSR-10-26 X BBSR-195-3	74.60	85.51	78.30	4.70	45.50	64.20	4.70	16.45	20.44	175.10	15.10	4.17 (1.84)	1686.18
32	BBSR-10-26 X BBSR-192-1	74.10	86.37	73.60	4.70	42.10	56.50	5.70	17.49	31.10	218.50	18.40	8.33 (2.97)	2515.80
33	BBSR-10-26 X Selection from BBSR-192-1	72.90	83.88	71.70	4.50	50.30	57.60	5.20	13.70	24.50	170.15	17.40	12.50 (3.61)	1824.60
34	BBSR-10-26 X Selection from BBSR-145-1	74.50	84.70	66.10	4.40	42.30	50.80	5.30	14.16	20.22	141.95	17.80	0.00 (0.71)	1847.90
35	BBSR-10-26 X BBSR-09-5	58.10	70.53	65.60	4.40	41.50	50.00	4.00	14.69	19.44	151.00	16.80	4.17 (1.84)	1677.90
36	BBSR-195-3 X BBSR-192-1	67.70	83.49	72.90	4.20	58.00	62.20	4.20	16.45	27.64	234.35	21.50	0.00 (0.71)	2555.10
37	BBSR-195-3 X Selection from BBSR-192-1	75.90	85.26	89.40	4.80	46.10	51.00	4.40	17.35	27.45	179.80	16.90	0.00 (0.71)	2238.50
38	BBSR-195-3 X Selection from BBSR-145-1	67.10	78.16	91.90	4.20	56.40	66.20	4.60	16.12	27.05	256.95	11.80	4.17 (1.84)	1499.20
39	BBSR-195-3 X BBSR-09-5	90.40	107.03	81.30	4.80	51.60	59.50	4.70	16.23	27.85	245.75	15.50	0.00 (0.71)	2188.10
40	BBSR-192-1 X Selection from BBSR-192-1	60.40	73.50	56.50	2.90	43.10	55.00	3.75	12.05	24.80	126.50	15.50	8.33 (2.97)	1310.00
41	BBSR-192-1 X Selection from BBSR-145-1	78.80	91.77	69.30	5.00	51.60	56.70	6.10	14.48	21.88	134.54	18.80	8.33 (2.97)	1844.50
42	BBSR-192-1 X BBSR-09-5	55.60	66.90	50.60	2.80	47.00	49.20	3.80	10.85	20.30	101.38	18.20	8.33 (2.97)	853.35
43	Selection from BBSR-192-1 X Selection from BBSR-145-1	66.30	76.61	84.40	3.60	42.40	53.50	6.10	12.10	22.70	170.30	16.40	12.50 (3.61)	1527.60
44	Selection from BBSR-192-1 X BBSR-09-5	65.70	79.57	70.80	2.40	46.90	46.90	4.70	15.38	22.30	167.90	18.00	29.17 (5.45)	2275.80
45	Selection from BBSR-145-1 X BBSR-09-5	83.50	96.66	66.50	4.20	40.60	57.40	5.90	12.56	21.33	274.20	15.20	8.33 (2.97)	1196.30
46	VNR-5 (Check)	69.40	80.62	67.60	4.30	60.40	71.50	3.40	13.40	26.90	217.45	12.70	8.33 (2.97)	2131.10
	Grand Mean	73.80	86.82	73.78	4.22	47.63	58.15	4.89	15.47	25.11	186.41	16.19	4.80 (1.82)	1775.49
	Grand Mean of Parents	68.78	82.06	63.01	3.33	47.32	58.88	4.53	14.17	23.42	152.77	16.67	1.85 (1.23)	1489.89
	SE (m) ±	4.17	4.96	2.91	0.27	2.10	1.71	0.33	0.69	1.19	10.90	0.64	0.93	66.71
	C.D.	11.91	14.18	8.31	0.78	6.01	4.87	0.95	1.97	3.41	31.14	1.84	NS	190.64
	C.V.	7.99	8.08	5.57	9.18	6.25	4.15	9.61	6.30	6.71	8.27	5.61	19.72	5.31

Figures in parentheses indicate square root transformed values for corresponding values

Flowering parameters

Earliness is considered an important character in any crop improvement programme, which is manifested in F_1 hybrids and preferred for commercial cultivation when high yield is coupled with earliness. The results revealed significant variations for all the flowering traits (days to 1st flowering, days 50% flowering and flowers cluster^{-1}). It was observed that crosses *viz.*, BBSR-10-26 X BBSR-09-5 (41.50 days and 50.00 days), BBSR-10-26 X Selection from BBSR-145-1 (42.30 days and 50.80 days) were superior to the standard hybrid check, VNR-5 (60.40 days and 71.50 days) for days to 1st flowering & 50% flowering, respectively. Regarding, both days to 1st flowering and flowers cluster^{-1}, crosses *viz.*, BBSR-10-25 X Selection from BBSR-145-1 (45.15 & 6.15), Selection from BBSR-192-1 X Selection from BBSR-145-1 (42.40 & 6.10), BBSR-10-25 X BBSR-09-5 (40.40 & 6.00), Selection from BBSR-145-1 X BBSR-09-5 (40.60 & 5.90) and BBSR-10-26 X BBSR-192-1 (42.10 & 5.70) showed significantly highest values than rest of the crosses but were *statistically at par* with each other, respectively.

The overall results clearly established that the F_1 crosses were superior to the standard hybrid check. However, the crosses *viz.*, BBSR-10-25 X BBSR-192-1, BBSR-10-25 X Selection from BBSR-145-1, BBSR-10-25 X BBSR-09-5, BBSR-10-26 X BBSR-09-5, Selection from BBSR-192-1 X Selection from BBSR-145-1, Selection from BBSR-192-1 X BBSR-09-5 and Selection from BBSR-145-1 X BBSR-09-5 were found to be superior crosses than the check (VNR-5) for days to 1st flowering, 50% flowering & flowers cluster^{-1}. Similar reports of significant variations in flowering behaviour among F_1 crosses with their parents in brinjal were reported by Nirmala *et al*. (2013) [10] Vethamoni and Praneetha (2016) [23] Kumar *et al*. (2017) [6] and Khobragade *et al*. (2019).

Fruit yield attributing parameters

The basic objective of the present study was to develop round fruited brinjal F_1 hybrids with high yield and tolerance to bacterial wilt. In general, round shape fruits have relatively shorter fruit length with higher fruit breadth. Keeping that in view, selection of F_1 crosses were made. In the present study, significantly lowest fruit length was recorded in BBSR-192-1 X BBSR-09-5 (10.85 cm) and was *statistically at par* with BBSR-192-1 X Selection from BBSR 192-1 (12.05cm), Selection from BBSR 192-1 X Selection from BBSR-145-1 (12.10 cm) and Selection from BBSR 145-1 X BBSR-09-5 (12.56 cm). On the other hand, Jammusahi Local X Selection from BBSR-192-1 (33.06 cm) recorded significantly highest fruit breadth and was *statistically at par* with Jammusahi Local X Selection from BBSR-195-3 (32.67 cm), BBSR-10-26 X BBSR 192-1 (31.10 cm) and Jammusahi Local X

Selection from BBSR-145-1 (30.96 cm). Similar observations on fruit shape have also been reported by Timmapur *et al.* (2007) [19] and Kumar *et al.* (2013) [7] in brinjal.

Significantly heaviest fruit of 293.20 g was recorded in Jammusahi Local X BBSR-192-1 and was *statistically at par* with Jammusahi Local X BBSR-195-3 (285.80 g), Jammusahi Local X Selection from BBSR-192-1 (275.34 g) and Selection from BBSR-145-1 X BBSR-09-5 (274.20 g). Invariably, the parent, Jammusahi Local in all the crosses transmit the relatively higher fruit weight to the respective crosses, which might be due to significantly heaviest fruits (233.97 & 284.60 g) with lowest number of fruits plant^{-1} (5.88 & 6.20) by the parent, Jammusahi Local. Similar observations of significantly higher fruit weight by F_1 crosses than corresponding parents in brinjal have also been reported earlier by Nirmala *et al.* (2013) [10], Vethamoni and Praneetha (2016) [23] and Khobragade *et al.* (2019) [6].

The results showed significantly highest number of fruits plant^{-1} by cross between BBSR-195-3 X BBSR-192-1 (21.50) and were *statistically at par* with BBSR-10-25 X BBSR-195-3 (20.10) than rest of the tested crosses. On the other hand, significantly lowest number of fruits plant^{-1} was observed in cross between Jammusahi Local X BBSR-09-5 (10.50). Similar observations of significantly higher number of fruits plant^{-1} by F_1 crosses than corresponding parents in brinjal have also been reported earlier by Nirmala *et al.* (2013) [10] Vethamoni and Praneetha (2016) [23] Kumar *et al.* (2017) [6] and Khobragade *et al.* (2019) [5].

Results on overall performance of genotypes showed that F_1 cross *viz.*, BBSR-08-2 X BBSR-192-1, BBSR-10-25 X BBSR-192-1, Jammusahi Local X BBSR-195-3 and BBSR-10-25 X BBSR-192-1 were identified as relatively superior cross combinations for various fruit yield attributing traits under study. Similar reports of superiority of fruit yield attributing traits in brinjal by F_1 crosses have also been reported by Nirmala *et al.* (2013) [10] Vethamoni and Praneetha (2016) [23] Kumar *et al.* (2017) [6] and Khobragade *et al.* (2019) [5].

Reaction to bacterial wilt at 90 DAT

In terms of mean performance, the parents BBSR-08-2, BBSR-10-25, Jammusahi Local, BBSR-10-26 and Selection from BBSR-145-1 were identified as highly resistant (0.00%) to bacterial wilt disease whereas, other four parents (BBSR-195-3, BBSR-192-1, Selection from BBSR-192-1 and BBSR-09-5) showed resistance reaction with PDI score of 4.17% bacterial wilt. Similarly, crosses BBSR-08-2 X BBSR-10-25, BBSR-08-2 X BBSR-10-26, BBSR-08-2 X BBSR-195-3, BBSR-10-25 X BBSR-10-26, BBSR-10-25 X Selection from BBSR-192-1, Jammusahi Local X BBSR-10-26, Jammusahi Local X BBSR-195-3, Jammusahi Local X Selection from BBSR-192-1, Jammusahi Local X Selection from BBSR-145-1, BBSR-10-26 X Selection from BBSR-145-1, BBSR-195-3 X BBSR-192-1, BBSR-195-3 X Selection from BBSR-192-1 and BBSR-195-3 X BBSR-09-5 showed highly resistance to incidence of bacterial wilt (0.00%) as compared to other crosses under sick plot conditions. The variations of resistance to bacterial wilt at 90DAT by F_1 crosses, parents and check might be due to the secondary metabolism of polyphenols and the higher concentration of steroidal glycoalkaloids present in resistant plants, thereby preventing bacterial movement into the vicinity of the plant system *i.e.* by their action as a repellent (Vasse *et al.*, 2005; Santhosha *et al.*, 2015 and Lalralmhlimi *et al.*, 2019) [22, 15, 8]. Similar observations of superiority of F_1 crosses over parents towards incidence of bacterial wilt in brinjal have also been reported by several scientists (Ajjappalavara *et al.*, 2013; Thimmapur *et al.*, 2007; Bhavidoddi, 2013 and Santosha *et al.*, 2017) [1, 19, 2, 14].

The results of present study also showed that the F_1 crosses *viz.*, BBSR-08-2 X BBSR-10-25, BBSR 08-2 X BBSR 10-26, BBSR 10-25 X BBSR 10-26, Jammusahi Local X BBSR 10-26, Jammusahi Local X Selection from BBSR 145-1, BBSR 10-26 X Selection from BBSR145-1 showed highly resistance (0.00% PDI) to bacterial wilt at 90 DAT along with their respective parents. This might be due to the presence of resistance gene governed by both the parents, the F_1 cross also showed the resistance to bacterial wilt. Similar observations on transmission of resistance to bacterial wilt by parents to progeny have also been reported by Sharma *et al.* (2005) [17] in brinjal.

On the other hand, the F_1 crosses *viz.*, BBSR 10-25 X Selection from BBSR 192-1, Jammusahi Local X BBSR 195-3 and Jammusahi Local X Selection from BBSR 192-1 showed highly resistance (0.00%) to bacterial wilt. The parent *viz.*, BBSR 10-25 and Jammusahi Local from the cross involving one of the resistant parent contributed to impact highly resistance (0.00%) bacterial wilt. Similar observation was also reported by Khapte *et al.* (2018) in brinjal. Many workers suggested that the resistance to bacterial wilt was controlled by single dominant gene (Zhu *et al.*, 2004 and Gopalkrishnan *et al.*, 2005) [25, 4]. This type of inter-allelic relationship helps to produce resistant hybrids by retaining the gene for resistance in one of the parental inbreds.

Fruit yield parameters

Significantly highest total fruit yield plant^{-1} was observed in F_1 cross, BBSR-08-2 X BBSR-192-1 (2705.80 g) closely followed by Jammusahi Local X BBSR-192-1 (2558.50 g), BBSR-195-3 X BBSR-192-1 (2555.10 g) and BBSR-10-26 X BBSR-192-1 (2515.80 g) where *statistical parity* were observed. Similar observations of higher total fruit yield in brinjal due to higher significant positive correlation and direct path was also reported by Yadav *et al.* (2017) [24], Tiwari *et al.* (2019) [21] and Datta *et al.* (2021) [3].

Conclusion

It may be concluded from the present study that, on the basis of *per* se performance, four F_1 crosses *viz.*, BBSR-08-2 X BBSR-192-1 (2705.80 & 4.17), Jammusahi Local X BBSR-192-1 (2558.50 & 4.17), BBSR-195-3 X BBSR-192-1 (2555.10 & 0.00) and BBSR-10-26 X BBSR192-1 (2515.80 & 8.33) were identified as superior types for round fruits, higher fruit yield plant^{-1} (g) and bacterial wilt (%), respectively. These F_1 crosses produced about 52.40%, 44.10%, 43.91% and 41.70% of total fruit yield plant^{-1} while (-)13.13%, (-)13.13%, (-)100.00% and 73.54% for bacterial wilt, respectively as compared to total 36 F_1 crosses evaluated. These F_1 crosses may be recommended for multi-locational trials for commercialization of the crop.

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