



Comparative Performance of Brinjal (*Solanum melongena* L.) genotypes for various quantitative traits under temperate condition of Kashmir

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ABSTRACT

*In the present investigation, comparative performance in fifty five brinjal genotypes (Parents and crosses) of brinjal (*Solanum melongena* L.) for various quantitative traits was evaluated at the Experimental Farm of Division of Vegetable Science, Sher-e-Kashmir University of Agricultural Sciences and Technology of Kashmir, Shalimar, Srinagar and significant differences was found among parents as well as crosses.*

Key words: Brinjal, comparative performance, temperate condition.

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INTRODUCTION

Brinjal is a low calorie vegetable but a rich source of minerals which makes it ideal for diabetics, hypersensitive and obese patients [5, 6]. It is a rich source of phenolic compounds that function as antioxidant and help prevent cancer, cholesterol build-up and bacterial and viral infection besides being an important source of anthocyanin which have potent beneficial effect on a variety of health conditions like anti-inflammatory properties, which affect collagen and the nervous system, ability to protect both large and small blood vessels from oxidative damage including mitigating micro vessel damage from high blood-sugar levels that cause complications in diabetics. Evaluation of genotypes (parents versus crosses) by estimation of mean performance *per se* for various yield and yield related parameters gives an idea about their suitability to a region and provides preliminary information before initiation of any planned breeding programme [10, 12].

MATERIAL AND METHODS

The experimental material for the present investigation consisted of ten diverse parental lines that were crossed in a diallel fashion during *Kharif* 2011 and 45 cross combinations were generated as per method II and Model-I of Griffing. The parents and F₁ crosses were evaluated during *Kharif* 2012 in randomized complete block design with three replications at each of the three different locations viz., Vegetable Experimental Farm, Division of Vegetable Science, SKUAST-Kashmir, Shalimar (E₁), Mountain Research Center for Field Crops, Khudwani Anantnag (E₂) and Regional Research Station and Faculty of Agriculture, Wadura (E₃). The observations were recorded on days to first flowering, days to first fruit set, days to first fruit picking, plant height (cm), plant spread (cm), number of branches plant⁻¹, fruit length (cm), fruit diameter (cm), number of fruits plant⁻¹, average fruit weight (g), number of pickings plant⁻¹, fruit yield plant⁻¹ (kg) and fruit yield (q ha⁻¹) and mean performance was worked out.

RESULTS AND DISCUSSION

The mean performance of ten parents and forty five crosses of brinjal for various yield and yield attributing traits is given in table 1 which clearly indicated that genotypes differed significantly for all the traits under study.

Comparison of parents for days to first flowering revealed that the parent GOB-1 recorded maximum number (49.78) followed by A. Kusmaker (49.22) and minimum by PPC (35.67) whereas among crosses maximum number of days to flowering was recorded by A.Nidhi x L.Long (49.78) followed by GOB-1 x L.Long (49.67) and SBPL-27 x SBW-11(49.67) and minimum by GOB-1 x PPL (26.78). Among parents L.Long recorded maximum number of days to first fruit set (55.33) followed by GOB-1(54.89) and A. Kusumkar (53.56) and minimum by P. Kranti (41.11) whereas among crosses PPC x PPL (55.89) recorded maximum number of days to fruit set followed by A.Nidhi x L.Long (55.33) and A.Nidhi x A.Kusumkar (55.11) and minimum by SBW-11 x PPL (39.22). Maximum days to first fruit picking was observed with L.Long (72.78) followed by GOB-1(72.11) and A.Kusmaker (70.67) and minimum by P.Kranti (58.44) while among crosses maximum days to first fruit picking was recorded by PPC X PPL (73.33) followed by A.Nidhi x L.Long (73.11) and minimum by SBW-11 X GOB-1 (56.56). Significant differences for days to flowering or earliness in brinjal genotypes was reported by Kumar *et al.* [8], Chadha *et al.* [4] and Bavage *et al.* [2]. Maximum plant height was recorded by L.Long (43.84cm) followed by SBPL-27 (35.80) and A.Kusumkar (35.10) and minimum by GOB-1(22.80). Among crosses A.Nidhi x L.Long (58.98cm) recorded maximum plant height followed by P.Kranti x L.Long (43.17cm) and minimum by SBPL-27 x PPL (12.26cm). Similarly, results for plant height was reported in brinjal by Bavage [1], Kumar *et al* [8], Bulgundi [3]. SBPL-27 recorded maximum plant spread of 72.59 cm followed by A.Nidhi (63.04cm) and A. Kusmaker (58.81cm) and minimum by PPC (40.83) whereas among crosses maximum plant spread was recorded by A. Kusumkar x L.Long (85.43cm) followed by SBPL-27 x PPL (84.78cm) and minimum by P.Kranti x GBL-1(39.52cm). Maximum number of branches per plant were observed with A.Kusumkar(18.08) followed by SBW-11(17.98) and PPL(17.12) and minimum by PPC(12.88) whereas among crosses maximum number of branches per plant was observed by GBL-1x PPL (23.12) followed by P.Kranti x GBL-1 (21.80) and SBW-11 x L.Long (21.74) and minimum by PPC x L.Long (12.06). These results are in concordance with the results of Chadha *et al.* [4] and SBW-11(7.67) and GBL-1 (7.67) recorded highest number of pickings per plant and lowest by PPC (6.67) and L.Long (6.67) whereas among crosses highest number of pickings per plant was recorded by GBL-1 x PPL (8.67) minimum by PPC X P.Kranti (6.00) and A.Nidhi x P.Kranti (6.00). PPL recorded highest fruit length of 24.86 cm followed by A.Nidhi (16.91) and lowest by SBW-1(8.08) while among crosses maximum fruit length was recorded by GBL-1 X PPL (26.16cm) followed by A.Nidhi x A.Kusumkar (18.51) and A.Kusumkar x PPL (18.51) and minimum by SBPL-27 x A. Kusumkar (6.51cm). A wide genetic difference in fruit length were observed in brinjal by Muniappan *et al* [9] and Patel *et al* [11]. Similarly fruit diameter was recorded highest in GOB-1(7.35) followed by P. Kranti (6.35cm) and L. Long (5.86cm) and lowest by PPC (3.73cm) whereas among crosses it was recorded highest by P.Kranti x SBPL-27 (7.53cm) followed by A.Nidhi x GOB-1(7.52cm) and P. Kranti x GBL-1 (7.44cm) and lowest by A. Kusumkar x GBL-1(3.55cm). Muniappan *et al* [9] reported wide range of variability in case of fruit diameter.

Average fruit weight was recorded by L.Long (126.50g) followed by P. Kranti (102.46g) and SBW-11(86.58g) and lowest by A. Nidhi (39.01g) and in crosses it was recorded highest in SBPL-27 X GOB-1(117.64g) followed by SBW-11 X L.Long (116.47g) and GOB-1 X PPL (115.79g) and lowest by SBPL-27 x A.Kusumkar (8.63g). The wide range of variability was observed for fruit weight in brinjal by Muniappan *et al* (2010) and Islam and Uddin [7]. Highest fruit number per plant was recorded by GBL-1(21.57) followed by A.Nidhi (20.04) and A. Kusumkar (17.67) and lowest by P.Kranti (11) whereas among crosses it was recorded by GBL X PPL (42.94) followed by PPC X A. Kusumkar (25.23) and SBPL-27 X GBL-1(25.22) and lowest was recorded by A.Nidhi x A.Kusumkar (8.13) highest fruit yield per plant was recorded by L.Long (1.41kg) followed by A.Kusumkar (1.23Kg) and GOB-1(1.14kg) and lowest was recorded by PPC (0.63kg) however among crosses it was recorded highest by GBL-1 X PPL (3.54 Kg) followed by A.Kusumkar x L.Long (1.92 Kg) and PPC X GOB-1(1.90 Kg) and lowest by SBPL-27 X A.Kusumkar (0.18 Kg). L.Long recorded highest yield of 488.62 q/ha followed by A. Kusumkar (426.64 q/ha)and GOB-1 (394 q/ha) and lowest yield was recorded by PPC (217.40 q/ha) and among crosses yield was recorded highest by GBL-1 x PPL (1230.46 q/ha) which differed significantly from all of the remaining crosses and parents .out of the remaining crosses A.Kusumkar x L. Long recorded a yield of 666.47 q/ha followed by PPC X GOB-1(660.01q/ha) and GBL-1X L.Long (646.32 q/ha and lowest was recorded by the cross SBPL-27 X A.Kusumkar (64.06q/ha). The variation in the productivity of brinjal genotypes have been substantiated by many workers [7, 11].

Table 1: Mean performance of genotypes for various quantitative and qualitative traits in Brinjal (*Solanum melongena* L.) (data pooled over environments)

Genotype	Days to first flowering	Days to first fruit set	Days to first fruit picking	Plant height (cm)	Plant spread (cm)	No. of branches plant ⁻¹	No. of pickings plant ⁻¹	Fruit length (cm)	Fruit diameter (cm)	Av. fruit weight (g)	Fruit number plant ⁻¹	Fruit yield kg plant ⁻¹	Fruit yield qha ⁻¹
PPC	35.67	51.78	65.11	31.89	40.83	12.88	6.67	11.23	3.73	41.36	15.19	0.63	217.40
A.Nidhi	38.67	42.33	59.67	30.57	63.04	14.23	6.67	16.91	4.34	39.01	20.04	0.78	270.10
P.Kranti	37.44	41.11	58.44	29.73	47.84	13.13	7.33	14.30	6.35	102.46	11.00	1.12	389.33
SBPL-27	41.56	47.11	64.56	35.80	72.59	17.06	6.67	11.13	3.75	72.29	14.53	1.05	364.49
A.Kusmakar	49.22	53.56	70.67	35.10	58.81	18.08	7.33	15.73	4.11	69.82	17.67	1.23	426.64
SBW-11	37.56	41.78	59.00	31.79	47.00	17.98	7.67	8.08	5.42	86.58	11.24	0.97	335.73
GBL-1	38.56	52.00	69.33	26.96	54.64	17.04	7.67	11.63	5.37	50.46	21.57	1.09	377.15
GOB-1	49.78	54.89	72.11	22.80	56.39	16.99	7.33	8.22	7.35	83.33	13.71	1.14	394.38
PPL	38.33	45.33	62.67	32.83	49.51	17.12	7.33	24.86	4.94	77.97	13.71	1.07	370.27
L. Long	43.44	55.33	72.78	43.84	51.80	16.08	6.67	15.83	5.86	126.50	11.10	1.41	488.62
PPC x A.Nidhi	38.56	43.44	60.89	42.55	53.31	14.82	7.33	11.00	6.30	73.97	17.66	1.31	453.15
PPC x P. Kranti	41.67	47.44	64.78	25.73	51.59	16.97	6.00	15.41	5.14	96.08	17.94	1.72	597.79
PPC x SBPL-27	46.33	51.22	68.56	32.10	52.61	17.98	6.67	11.88	4.61	73.93	19.74	1.46	506.78
PPC x A.Kusmakar	38.00	41.78	59.11	22.82	43.51	20.86	8.00	13.20	4.06	67.39	25.23	1.70	589.81
PPC x SBW-11	36.44	42.00	59.33	37.09	69.54	14.93	7.33	11.15	5.30	91.58	19.26	1.76	611.14
PPC x GBL-1	40.22	45.44	62.78	34.17	52.01	20.09	7.33	12.24	4.56	105.13	17.51	1.84	637.48
PPC x GOB-1	46.33	51.33	68.67	29.57	49.76	13.77	6.67	10.47	6.47	100.58	18.92	1.90	660.01
PPC x PPL	49.56	55.89	73.33	29.86	51.84	17.06	6.67	11.64	6.13	87.02	18.21	1.58	548.51
PPC x L. Long	38.44	43.00	60.22	38.08	46.04	12.06	7.33	12.24	4.09	91.49	19.34	1.76	610.72
A.Nidhi x P. Kranti	42.33	47.00	64.22	35.28	46.32	16.11	6.00	14.06	4.01	99.53	18.58	1.85	640.61
A.Nidhi x SBPL-27	39.56	44.78	62.22	27.23	46.88	15.62	6.67	16.20	3.98	74.17	19.09	1.41	490.58
A.Nidhi x A.Kusmakar	49.56	55.11	72.44	41.09	50.53	19.88	6.33	18.51	4.07	93.54	8.13	0.76	264.30
A.Nidhi x SBW-11	39.00	44.11	61.11	32.63	56.33	21.22	7.00	12.31	4.96	77.29	17.50	1.35	468.23
A.Nidhi x GBL-1	39.00	43.44	60.89	40.69	54.93	16.12	7.00	17.53	3.93	55.53	14.93	0.82	285.88
A.Nidhi x GOB-1	37.89	42.78	60.22	36.13	56.96	19.63	7.67	16.33	7.52	111.68	15.52	1.73	600.84
A.Nidhi x PPL	48.78	53.00	70.00	33.91	61.63	18.90	7.00	14.47	6.78	75.81	17.52	1.33	460.57
A.Nidhi x L. Long	49.78	55.33	73.11	58.98	67.38	16.96	6.67	15.60	4.05	105.97	17.36	1.83	635.97
P.Kranti x SBPL-27	45.33	50.89	67.67	29.33	53.33	20.72	7.33	9.01	7.53	53.07	14.09	0.75	259.00
P.Kranti x A.Kusmakar	39.11	42.78	60.44	38.04	43.72	19.88	7.33	15.08	4.86	91.19	17.04	1.55	538.97
P.Kranti x SBW-11	45.78	51.33	68.67	33.90	49.86	18.02	7.33	12.82	6.74	49.53	14.71	0.73	252.61
P.Kranti x GBL-1	43.00	49.89	67.44	32.79	39.52	21.80	7.67	11.60	7.44	66.86	14.49	0.97	336.68
P.Kranti x GOB-1	45.33	52.00	69.22	28.54	51.66	21.07	7.33	11.41	7.14	63.89	15.18	0.97	336.13
P.Kranti x PPL	38.00	42.00	59.33	34.07	54.64	21.13	7.67	15.28	4.83	86.03	13.88	1.19	414.04
P.Kranti x L. Long	49.00	54.56	72.00	43.17	54.78	19.92	7.00	15.96	6.30	55.56	14.25	0.79	274.37
SBPL-27 x A.Kusmakar	41.89	47.44	64.56	33.92	55.80	20.17	7.33	6.51	5.08	8.63	20.90	0.18	64.06
SBPL-27 x SBW-11	49.67	54.78	72.00	33.10	54.70	15.89	7.44	10.62	5.68	112.26	11.64	1.31	453.64
SBPL-27 x	38.56	43.11	60.44	29.39	64.42	16.12	7.67	11.78	3.70	61.83	25.22	1.55	537.69

GBL-1													
SBPL-27 x GOB-1	37.11	41.33	58.56	26.87	42.73	20.01	7.67	11.52	5.43	117.64	11.09	1.30	452.73
SBPL-27 x PPL	38.22	43.67	61.22	12.26	84.78	20.24	7.33	15.08	4.56	110.71	15.59	1.72	595.38
SBPL-27 x L. Long	47.56	51.11	68.56	37.68	43.48	14.10	7.67	12.60	4.01	107.59	14.94	1.60	556.96
A.Kusmakar x SBW-11	38.00	42.44	60.00	27.97	43.89	18.90	7.67	16.82	4.02	77.04	14.92	1.15	398.25
A.Kusmakar x GBL-1	40.67	45.33	62.44	35.31	51.66	17.93	7.33	15.99	3.55	95.74	10.87	1.04	360.08
A.Kusmakar x GOB-1	42.78	48.56	66.22	33.92	52.36	20.01	8.00	10.56	5.00	70.03	9.06	0.63	220.01
A.Kusmakar x PPL	49.56	54.33	71.56	42.64	52.73	20.19	6.67	18.51	4.90	68.35	16.14	1.10	382.17
A.Kusmakar x L. Long	38.33	40.11	57.44	41.66	85.43	18.46	7.33	16.20	4.71	114.32	16.81	1.92	666.47
SBW-11 x GBL-1	37.67	53.00	70.33	30.03	55.04	21.18	7.33	12.23	3.57	93.01	14.02	1.30	452.91
SBW-11 x GOB-1	35.00	39.44	56.56	25.92	43.86	14.52	6.67	8.12	6.33	110.66	14.09	1.56	540.52
SBW-11 x PPL	35.11	39.22	56.67	19.63	41.34	19.04	7.33	11.81	4.33	87.20	14.56	1.27	441.24
SBW-11 x L. Long	39.89	44.33	61.67	38.97	56.83	21.74	6.67	11.12	5.83	116.47	13.28	1.54	535.13
GBL-1 x GOB-1	37.67	41.67	59.00	40.84	58.75	21.12	6.67	11.92	5.06	115.66	12.50	1.45	504.24
GBL-1 x PPL	43.67	45.33	62.89	26.02	49.99	23.12	8.67	26.16	3.96	82.57	42.94	3.54	1230.4 6
GBL-1 x L. Long	37.00	41.33	58.67	43.12	56.04	19.03	8.00	15.29	6.29	96.04	19.39	1.86	646.32
GOB-1 x PPL	26.78	43.11	60.44	33.06	58.05	17.17	6.67	13.38	5.26	115.79	14.76	1.71	593.74
GOB-1 x L. Long	49.67	54.78	71.89	29.98	54.69	19.01	7.33	10.18	5.42	53.81	14.48	0.78	269.63
PPL x L. Long	49.11	52.89	70.11	43.15	41.17	19.29	7.33	15.46	5.57	60.14	15.08	0.91	314.22
CV (%)	2.88	1.85	1.34	1.93	1.45	4.14	0.36	3.69	7.06	1.47	1.74	0.92	0.88
CD at 5 %	1.94	1.42	1.40	1.04	1.26	1.21	0.04	0.81	0.59	1.97	0.46	0.01	6.59

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