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Mean performance and correlation analysisfor yield and yield contributing traits in brinjal (*Solanum melongena* L.) genotypes

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Abstract
A comparative study on 40 brinjal genotypes for growth, flowering and yield attributing parameters was conducted at Vegetable Experimental Farm, Division of Vegetable Science, SKUAST-Kashmir, Shalimar during kharif season, 2021. Based on mean performancethe earliest flowers were produced in SKAU-B-193 however; earliest fruit were set in SKAU-B-241 and fruits were earliest harvested in SKAU-B-241. SKAU-B-209 recorded maximum number of branches per plant. Maximum plant height was recorded in the SKAU-B-276 and plant spread was maximum in IC-111010. Maximum fruit length was recorded in the genotype SKAU-B-274 while SKAU-B-276 has widest fruits. SKAU-B-226 produced highest number of fruit per plant whereas, SKAU-B-231 recorded highest average fruit weight. The yield per plant, per plot and per hectare was highest in genotype SKAU-B-276. Maximum TSS was recorded in SKAU-B-205 whereas; maximum anthocyanin content was recorded in SKAU-B-225 and maximum ascorbic acid content was estimated in IC-111010. Maximum phenols were recorded in SKAU-B-266. Total sugars were highest present in SKAU-B-234 and highest dry matter was recorded in IC-354867.The correlation coefficients among the different characters were worked out at both genotypic and phenotypic levels. In general, magnitudes of genotypic correlation coefficient were higher than their corresponding phenotypic correlation coefficient, implying a significant inherent relationship in different pair of traits also the economically important trait i.e., fruit yield per hectarewas positively and significantly correlated with fruit yield per plant followed by plant spread, number of fruits per plant, plant height, average fruit weight and fruit length.

Keywords: Brinjal, mean performance, correlation analysis, genotype, phenotype

Introduction
Typically known as Brinjal in South Asia (particularly India, Pakistan and Bangladesh), Aubergine in Europe, Melongena in the West Indies, Guinea squash in America and Patlican in Turkey, eggplant (*Solanum melongena* L.) is a member of the nightshade family. It is a member of the Solanaceae family and is native to India, where there is a greater variety of Brinjal. Warm-season vegetable eggplant is listed among the ten healthiest foods with the fewest calories. It also has a high phenolic content, which aids in its potential to absorb free radicals (Hautea, 2014). Iron, calcium, potassium, magnesium, phenolic phytochemicals, vitamins and other minerals are all abundant in eggplant.

The fruit of eggplant is a good source of vitamins and minerals (especially vitamin C). The following values (per 100 g fresh weight) were obtained from an analysis of fruit portions that might be consumed, excluding the stalk and calyx: 92.7 g of hydration; 1.4 g of protein; 0.3 g of fat; 0.3 g of minerals; 1.3 g of fibre; and 4.0 g of carbohydrates. Ca, 18 mg, Mg, 16 mg, riboflavin, 0.47 mg (phytin P, 3 mg), Fe, 0.9 mg (ionisable Fe, 0.8 mg), Na, 3 mg, Cu, 0.17 mg, S, 44 mg, Cl, 52 mg and Mn, 2.4 mg are the mineral components per 100 g edible parts. There is also a very modest amount of iodine (7 microg/kg). There are 124 IU of vitamin A, 0.4 mg of thiamin (B1), 0.11 mg of riboflavin (B2), 0.9 mg of nicotinic acid (niacin), 12 mg of vitamin C and 25 mg of choline per 100 grammes of edible parts (Singh and Kalda, 2001). Minerals including copper (0.17 mg), magnesium (16 mg), phosphorus (47 mg), iron (0.9 mg), sodium (3

mg) and potassium (200.0 mg) are also present in addition to organic acids. Along with being an excellent source of calories, the fruit's Mn, Mo, Fe and Cu content is crucial for the health of the bones. According to numerous studies, eggplant extracts are incredibly effective at treating a range of conditions, including burns, warts, inflammatory infections, gastritis, stomatitis and arthritis (Im *et al.*, 2016) [6]. The main phenolic component chlorogenic acid (5-O-caffeoyl-quinic acid; CGA), which is present in the fruits of eggplant, has anti-obesity, anti-inflammatory, anti-diabetic and cardio-protective properties (Plazas *et al.*, 2013) [10]. By inducing apoptosis in a variety of human cancer cells, including leukaemia and lung cancer cells, chlorogenic acid also exhibits anticarcinogenic properties (Tajik *et al*., 2017) [19]. Anthocyanin molecules are abundant in eggplants and in addition to serving as food dyes, they have important anti-diabetic, anti-cancer and anti-neuronal effects. *In vitro*, the aglycone component (solasodine) in eggplant fruits reduces human lung cancer cells (Shen *et al*., 2017) [16]. Additionally, they contain anti-inflammatory properties and are advantageous for lowering blood cholesterol (Friedman, 2006) [5]. By eliminating toxins and toxic substances from our stomach, the fibre in eggplant aids in digestion and lowers the risk of stomach and colon cancer (Fraikue, 2016) [4]. Additionally, the phytonutrients in eggplant help to improve cognition and protect cell membranes. It protects its cells from being destroyed by free radicals, preserving brain health. Additionally, compounds found in eggplant have the ability to prevent brain tumours.

The annual global production of Brinjal is around 55.2 million metric tonnes, making it an important crop both economically and horticulturally. In India, the total area planted with Brinjal is 730,000 hectares, producing 12801,000 MT annually with an average productivity of 16.8 MT/hectare (NHB, 2018-2019) [2]. While in Jammu and Kashmir, it covers 2.51 thousand hectares and produces 45.62 thousand metric tonnes annually (NHB, 2017 - 2018) [2]. Based on the mean performance of various genotypes, the best genotype performer can be recommended for commercial cultivation region after critically evaluating their stability, also based on some suitable parameters these genotypes can be used in various types of breeding programmes of brinjal for developing new varieties.

The basic goal of any crop improvement programme is to increase crop yield potential, for which it is important to understand the physiological behavior of the existing material in the plant genetic pool and to determine the major traits affecting the yield. Although yield is the main objective of a breeder, direct selection of genotypes based on yield alone would not be effective, because yield is a complex character and is collectively influenced by association of many component traits. Hence, the knowledge of the association between yield and its component traits obtained through the estimation of correlations will make the selection competence more operative for the breeders (Rekha and Celine, 2015) [14].

Materials and Methods

The proposed investigation on "Mean performance and correlation analysis for yield and yield contributing traits in brinjal (*Solanum melongena* L.) genotypes''was initiated at Vegetable Experimental Farm, Division of Vegetable Science, SKUAST-Kashmir, Shalimar during kharif season 2021. The experimental field located at the main campus, Shalimar, Srinagar is 15 km away from Srinagar city on the foot hills of Mahadev. The altitude of the location is 1685 meter above mean sea level and situated 34º N of latitude and 74.89º E of longitude. The climate is temperate characterized by mild summers Forty genotypes of Brinjal shall be evaluated in Randomised Complete Block Design with three replications.

Total no of genotypes: 40

Design of experiment: RCBD

Spacing : 60×45 cm

Table 1: List of Brinjal (*Solanum melongena* L.) genotypes used in the present study

S. No.	Genotypes	Source	S. No.	Genotypes	Source
1.	IC-074207	SKUAST-K	21.	SKAU-B-229	SKUAST-K
2.	IC-074244-1	SKUAST-K	22.	SKAU-B-231	SKUAST-K
3.	IC-089818	SKUAST-K	23.	SKAU-B-234	SKUAST-K
4.	IC-089888	SKUAST-K	24.	SKAU-B-236	SKUAST-K
5.	IC-090062	SKUAST-K	25.	SKAU-B-239	SKUAST-K
6.	IC-090063	SKUAST-K	26.	SKAU-B-241	SKUAST-K
7.	IC-099712	SKUAST-K	27.	SKAU-B-245	SKUAST-K
8.	IC-111010	SKUAST-K	28.	SKAU-B-247	SKUAST-K
9.	IC-261801	SKUAST-K	29.	SKAU-B-249	SKUAST-K
10.	IC-354867	SKUAST-K	30.	SKAU-B-251	SKUAST-K
11.	SKAU-B-193	SKUAST-K	31.	SKAU-B-255	SKUAST-K
12.	SKAU-B-197	SKUAST-K	32.	SKAU-B-257	SKUAST-K
13.	SKAU-B-205	SKUAST-K	33.	SKAU-B-259	SKUAST-K
14.	SKAU-B-209	SKUAST-K	34.	SKAU-B-263	SKUAST-K
15.	SKAU-B-211	SKUAST-K	35.	SKAU-B-266	SKUAST-K
16.	SKAU-B-215	SKUAST-K	36.	SKAU-B-268	SKUAST-K
17.	SKAU-B-219	SKUAST-K	37.	SKAU-B-270	SKUAST-K
18.	SKAU-B-222	SKUAST-K	38.	SKAU-B-274	SKUAST-K
19.	SKAU-B-224	SKUAST-K	39.	SKAU-B-276	SKUAST-K
20.	SKAU-B-226	SKUAST-K	40.	SKAU-B-279	SKUAST-K

Results and Discussion

Mean performance

The mean performance of different genotypes and its component characters are presented in Table 2a and 2b.

Days to first flowering

Days to first flowering varied from 40.53 to 50.52 days with average of 46.81 days. The minimum days to first flowering was recorded by SKAU-B-193 (40.53 days) followed by SKAU-B-241 (41.58 days) and IC-089888 (42.08 days). The maximum days to first flowering was recorded for SKAU-B-205 (50.52 days) followed by IC-090063(50.45 days) and SKAU-B-215 (50.25 days).

Days to first fruit set

Days to first fruit set varied from 47.36 to 59.2 days with

average of 55.24 days. The minimum days to first fruit set were observed in SKAU-B-241 (47.36 days) followed by SKAU-B-222 (48.52 days) and IC-089818 (49.82 days). The maximum days to first fruit set were recorded in SKAU-B-245(59.2 days) followed by SKAU-B-215 (58.91 days) and SKAU-B-259 (58.73 days).

Days to first fruit picking
Days to first fruit picking varied from 55.33 to 68.46 days with average of 64.30 days Data on average number of days taken to first fruit picking showed that minimum number of days to first fruit picking were recorded in SKAU-B-241 (55.33 days) followed by SKAU-B-193 (58.46 days) and SKAU-B-231 (58.5 days) and the maximum days to first fruit picking were recorded in SKAU-B-226 (68.46 days) followed by SKAU-B-263 (68.33 days) and SKAU-B-245 (68.3 days).

Number of branches per plant
Number of branches per plant varied from 8.81 to 14.86 with average of 12.43 branches. The highest number of branches per plant were noted in SKAU-B-209 (14.86) followed by SKAU-B-197 (14.76) and IC-261801(14.2). Whereas, the lowest number of branches per plant were noted in SKAU-B-234 (8.81) followed by IC-090062(9.26) and IC-074244 (9.31).

Plant height (cm)
Plant height (cm) varied from 44.3 to 103.54 cm with average of 77.78 cm The maximum plant height (cm) was observed in SKAU-B-276 (103.54 cm) followed by SKAU-B-274(100.47cm) and IC-099712 (94.33 cm). The minimum plant height (cm) was observed in IC-354867 (44.3 cm) followed by SKAU-B-193 (51.45 cm) and SKAU-B-263 (54.44 cm).

Plant spread (cm)
Plant spread (cm) varied from 38.45 to 74.52 cm with average of 57.20 cm The maximum plant spread (cm) was observed in IC-11010 (74.52 cm) followed by IC-074207 (70.53 cm) and SKAU-B-294 (69.41 cm). The minimum plant spread (cm) was observed in SKAU-B-197 (38.45 cm) followed by SKAU-B-209 (42.46 cm) and IC-354867 (44.62 cm).

Fruit length(cm)
Fruit length(cm) varied from 7.27 to 18.96 cm with average of 14.13 cm Highest fruit length of (18.96 cm) was observed in SKAU-B-274 followed by SKAU-B-249 (18.83 cm) and SKAU-B-259 (18.82 cm). While minimum fruit length was observed in SKAU-B-241 (7.27 cm) followed by SKAU-B-193 (8.08 cm) and SKAU-B-215 (8.07 cm).

Fruit diameter (cm)
Fruit diameter (cm) varied from 3.15 to 4.66 cm with average of 4.05 cm Highest fruit diameter of (4.66 cm) was observed in SKAU-B-276 followed by IC-111010 (4.62 cm) and IC-089818 (4.52 cm). While minimum fruit diameter was observed in SKAU-B-251 (3.15 cm) followed by SKAU-B-197 (3.16 cm) and SKAU-B-229 (3.23 cm).

Number of fruits per plant
Number of fruits per plant varied from 7.26 to 19.82 with average of 10.27 fruits. The highest Number of fruits per plant were noted in SKAU-B-226 (19.83) followed by SKAU-B-224 (19.56) and SKAU-B-268 (15.52). Whereas, the lowest Number of fruits per plant were noted in SKAU-B-257 (7.26) followed by SKAU-B-211 (7.45) and SKAU-B-219 (7.45).

Average fruit weight (g)
The maximum value for average fruit weight (g) was recorded for SKAU-B-231 (307.36 g) followed by SKAU-B-274 (282.56 g) and SKAU-B-279 (274.36 g). While minimum value was recorded in SKAU-B-211 (49.44 g) followed by SKAU-B-247 (52.24 g) and SKAU-B-197 (60.33 g). The average fruit weight for all the genotypes was 159.63 g with a range of 49.44 to 307.36

Fruit yield per plant (kg)
The genotype SKAU-B-276 (1.14 kg) recorded the highest fruit yield per plant followed by SKAU-B-268 (1.1 kg) and SKAU-B-279 (1.1 kg). While as, SKAU-B-193 (0.38 kg) recorded the lowest fruit yield per plant followed by SKAU-B-257 (0.56 kg) and IC-090062 (0.57 kg). The average fruit yield per plant for all the genotypes was 0.90 kg with a range of 0.38 to 1.14

Fruit yield per plot (kg)
The genotype SKAU-B-276 (87.01 kg) recorded the highest fruit yield per plot followed by SKAU-B-268 (83.97 kg) and SKAU-B-279 (83.97 kg). While as, SKAU-B-193 (29.01 kg) recorded the lowest fruit yield per plot followed by SKAU-B-257 (42.89 kg) and IC-090062 (43.49 kg). The average fruit yield per plot for all the genotypes was 69.06 kg with a range of 29.01 to 87.01

Fruit yield per hectare (q)
The highest fruit yield per hectare(q) was recorded in SKAU-B-276 (422.76 q) followed by SKAU-B-268 (407.4 q) and SKAU-B-279 (407.4 q). Whereas, the lowest fruit yield per hectare(q) was recorded in SKAU-B-193 (140.7 q) followed by SKAU-B-257 (208.43 q) and SKAU-B-209 (211.1 q). The average fruit yield per hectare for all the genotypes was 334.54 q with a range of 140.7 to 422.76

TSS content (˚Brix)
Highest TSS was recorded in SKAU-B-205 (5.96˚Brix) followed by SKAU-B-222 (4.9˚Brix) and SKAU-B-247 (4.6˚Brix). Lowest TSS was recorded in SKAU-B-259 (2.6˚Brix) followed by SKAU-B-257 (2.9˚Brix) and SKAU-B-274 (3˚Brix). The average TSS for all the genotypes was 3.93˚Brix with a range of 2.6 to 5.96

Total anthocyanin (mg/100g)
Highest anthocyanin (mg/100g)content was recorded in SKAU-B-255 (7.8 mg/100g) followed by SKAU-B-263 (7.6 mg/100g) and SKAU-B-226 (7.4 mg/100g). Whereas the lowest anthocyanin (mg/100g) content was recorded in IC-354867 (0.21 mg/100g) followed by SKAU-B-257 (0.26 mg/100g) and IC-089818 (2.13 mg/100g). The average anthocyanin (mg/100g) content for all the genotypes was 4.65 mg/100g with a range of 0.21 to 7.8

Vitamin C (mg/100g)
Highest Vitamin C was recorded in IC-111010 (10.33 mg/100g) followed by IC-090062 (10.23 mg/100 g) and IC-089818 (10 mg/100 g). While as, the lowest Vitamin C was recorded in IC-074244 (2.30 mg/100 g) followed by SKAU-B-268 (2.62 mg/100g) and SKAU-B-274 (3.21 mg/100 g). The average Vitamin C for all the genotypes was 7.46 mg/100g with a range of 2.30to 10.33

Phenols (mg/100g)
Highest phenol (mg/100g**)** content was recorded in SKAU-B-

266 (114.1 mg/100 g) followed by IC-090063 (113.1 mg/100 g) and SKAU-B-209 (113.1 mg/100 g). While as, IC-11010 (77.1 mg/100 g) recorded the lowest phenol (mg/100 g**)** content followed by SKAU-B-249 (78.1 mg/100 g) and SKAU-B-215 (79.1 mg/100 g). The average phenol (mg/100 g**)** content for all the genotypes were 95.24 (mg/100 g) with a range of 77.1 to 114.1

Total sugars (%)

The highest total sugars (%) was observed in SKAU-B-234 (3.62%) followed by IC-089888 (3.52%) and SKAU-B-239 (3.52%). Whereas, the lowest total sugars (%) was observed in IC-354867 (2.08%) followed by IC-11010 (2.08%) and SKAU-B-209 (2.10%). The average total sugars (%) for all the genotypes was 2.65 with a range of 2.08 to 3.62

Dry matter (%)

Highest dry matter (%) was recorded in IC-089888 (10.2%) followed by IC-354867 (10.2%) and SKAU-B-279 (10.1%) and the lowest dry matter (%) was recorded in SKAU-B-205(1.4%) followed by SKAU-B-209 (1.6%) and SKAU-B-224 (1.8%). The average dry matter (%) for all the genotypes was 5.60.

Table 2a: Mean performance of brinjal genotypes for various growth, maturity, yield attributing and quality characters

S. No.	Genotypes	Days to first flowering	Days to first fruit set	Days to first fruit picking	No. of branches / plant	Plant height (cm)	Plant spread (cm)	Fruit length (cm)	Fruit diameter (cm)	No. of fruits per plant	Average fruit weight (g)
01	IC-074207	46.14	53.48	62.9	13.73	92.27	70.57	11.04	5.41	12.36	131.38
02	IC-074244-1	46.30	54.6	65.33	9.31	71.26	65.6	16.07	4.3	8.06	214.26
03	IC-089818	44.26	49.82	60.3	12.84	68.71	52.66	10.90	4.52	10.62	91.45
04	IC-089888	42.08	56.53	64	10.36	75.44	60.38	18.75	4.24	10.47	86.50
05	IC-090062	44.40	53.55	67.26	9.26	82	57.26	16.88	4.25	7.72	135.43
06	IC-090063	50.45	56.3	65.33	12.03	83.3	60.41	11.88	4.52	9.4	97.46
07	IC-099712	49.46	54.47	64.4	9.72	94.33	63.43	12.03	4.32	7.54	106.46
08	IC-111010	43.66	50.66	60.73	10.84	87.61	74.52	12.98	4.62	11.33	188.54
09	IC-261801	50.00	56.48	66.13	14.2	82.34	66.36	10.86	4.13	8.37	82.14
10	IC-354867	44.56	54.3	63.23	13	44.3	44.62	9.15	3.96	8.34	187.88
11	SKAU-B-193	40.53	50.53	58.46	12.62	51.45	47.57	8.03	3.92	7.58	81.03
12	SKAU-B-197	50.14	58.03	66.66	14.76	80.3	38.45	12.44	3.16	15.37	60.33
13	SKAU-B-205	50.52	58.16	67.43	11.44	73.60	59.4	17.11	4	9.5	234.41
14	SKAU-B-209	49.43	58.48	66.46	14.86	85.47	42.46	8.63	4.06	7.75	119.1
15	SKAU-B-211	48.48	56.66	66.33	13.44	63.34	54.63	14.02	4.11	7.45	49.44
16	SKAU-B-215	50.25	58.91	67.63	13.44	71.2	63.47	8.07	4.03	8.33	189.85
17	SKAU-B-219	48.40	58.53	67.6	13.41	65.48	46.45	11.26	4.5	7.45	80.31
18	SKAU-B-222	42.36	48.52	59.23	13.41	91.37	63.28	18.11	4.43	9.33	201
19	SKAU-B-224	46.58	55.58	65.26	13.8	83.47	56.47	16.82	4.41	19.56	140.57
20	SKAU-B-226	44.36	58.53	68.46	14.02	90.37	62.55	17.3	4.35	19.83	103.55
21	SKAU-B-229	49.52	57.5	65.5	13.55	77.23	64.32	11.07	3.23	12.55	150.48

Table 2a: contd….

S. No.	Genotypes	Days to first flowering	Days to first fruit set	Days to first fruit picking	No. of branches/plant	Plant height (cm)	Plant spread (cm)	Fruit length (cm)	Fruit diameter (cm)	No. of fruits per plant	Average fruit weight (g)
22	SKAU-B-231	43.62	50.71	58.5	10.78	85.43	56.26	16.6	4.48	9.23	307.36
23	SKAU-B-234	49.66	56.97	64.9	8.81	66.58	55.5	17.66	4.38	9.5	186.65
24	SKAU-B-236	46.48	54.26	59	9.48	85.3	59.4	11.83	3.28	10.3	187.53
25	SKAU-B-239	49.58	55.4	66.33	12.85	73.15	49.67	16.8	4.25	11.44	138.43
26	SKAU-B-241	41.58	47.36	55.33	14.13	62.23	55.33	7.27	3.44	10.44	152.31
27	SKAU-B-245	50.13	59.2	68.3	12	56.58	53.46	12	3.27	10.13	247.66
28	SKAU-B-247	48.58	56.62	66.7	12.96	58.47	51.70	10.22	3.72	9.44	52.24
29	SKAU-B-249	43.52	55.58	66.4	13.7	83.45	69.41	18.83	3.53	9.33	119.43
30	SKAU-B-251	43.33	51.47	60.36	11.55	76.23	51.4	18.32	3.15	9.44	111.33
31	SKAU-B-255	49.47	58.65	66.46	12.33	81.37	59.57	12.91	3.84	11.36	155.33
32	SKAU-B-257	49.23	56.3	65.33	13.36	72.58	47.26	11.87	3.93	7.26	74.32
33	SKAU-B-259	48.26	58.73	66.5	12.96	92.55	54.42	18.82	3.81	7.52	237.5
34	SKAU-B-263	49.33	58.61	68.33	11.46	54.44	67.45	10.65	4.33	10.33	143.36
35	SKAU-B-266	46.36	53.47	63.36	12.61	83.36	54.49	16.22	3.73	10.33	248.35
36	SKAU-B-268	43.58	51.54	60.43	13.17	84.47	57.35	18.73	3.41	15.52	245.66
37	SKAU-B-270	46.46	58.62	67.2	13.42	82.51	53.23	18.7	4.23	10.41	169.54
38	SKAU-B-274	45.4	53.52	61.3	13.96	100.47	54.32	18.96	4.13	10.3	282.56
39	SKAU-B-276	49.45	58.55	67.56	10.33	103.54	65.55	17.88	4.66	10.41	211.57
40	SKAU-B-279	46.43	54.58	63.36	13.38	93.54	57.37	17.57	4.13	9.44	274.36
Mean		46.81	55.24	64.36	12.43	77.78	57.20	14.13	4.05	10.27	156.93

Table 2b: Mean performance of brinjal genotypes for various growth, maturity, yield attributing and quality characters

S. No.	Genotypes	Fruit yield/ plant (kg)	Fruit yield/ plot (kg)	Fruit yield/ hectare (q)	TSS content (˚Brix)	Total anthocyanin content (mg/100g)	Ascorbic acid (mg/100g)	Phenols (mg/100g)	Total sugars (%)	Dry matter (%)
01	IC-074207	1.07	81.7	396.2	4.5	5.7	8.53	95.03	2.92	5.8
02	IC-074244-1	1.05	80.17	388.53	4	5.5	2.30	105	2.30	4.8
03	IC-089818	1.06	81.19	393.73	3.8	2.13	10.51	85	3.22	3.8
04	IC-089888	0.95	72.51	351.86	4.3	2.5	8.70	109.1	3.52	10.3
05	IC-090062	0.57	43.49	212.06	3.7	5.1	10.23	82.1	2.22	8
06	IC-090063	0.96	73.80	335.5	4.3	3.1	9.75	113.1	2.30	4.2
07	IC-099712	1.01	77.6	376.46	3.9	5.7	3.53	84.1	2.41	6.8
08	IC-111010	1.09	83.22	403.66	3.9	3.4	10.33	77.1	2.08	9.03
09	IC-261801	0.81	61.81	299.93	4.5	4.4	9.32	80.1	2.6	3.8
10	IC-354867	0.84	64.11	311.1	3.8	0.214	9.62	108.1	2.08	10.2
11	SKAU-B-193	0.38	29.01	140.7	3.9	4.8	7.64	94.1	2.11	6
12	SKAU-B-197	0.86	65.65	318.46	4	5.7	9	112.1	2.4	6.02
13	SKAU-B-205	0.78	59.55	289.4	5.96	6.7	9.5	80.1	2.41	1.4
14	SKAU-B-209	0.57	43.52	211.1	4	3.5	9.5	113.1	2.10	1.6
15	SKAU-B-211	0.66	50.39	244.26	3.4	5.2	7.71	109.1	2.81	4.6
16	SKAU-B-215	0.89	67.95	330.4	4	7	4.12	79.1	3.52	4.4
17	SKAU-B-219	0.69	52.68	255.66	4.1	7.26	7.31	100.1	2.30	3.6
18	SKAU-B-222	0.86	65.65	318.33	4.9	4.5	7.41	81.1	2.4	6.2
19	SKAU-B-224	1.09	83.22	403.66	3	3.8	3.62	92.1	2.41	1.8
20	SKAU-B-226	1.08	82.71	401.16	4.3	7.4	9.12	84.1	2.4	3.8
21	SKAU-B-229	1.00	76.61	371.53	3.5	3.1	9.01	111.1	3.42	4.2

Table 2b: contd….

S. No.	Genotypes	Fruit yield/ plant (kg)	Fruit yield/ plot (kg)	Fruit yield/ hectare (q)	TSS content (˚Brix)	Total anthocyanin content (mg/100g)	Ascorbic acid (mg/100g)	Phenols (mg/100g)	Total sugars (%)	Dry matter (%)
22	SKAU-B-231	1.08	82.46	399.93	3.8	4.8	6.42	110.1	2.5	4
23	SKAU-B-234	1.09	83.73	406.16	3.2	3	6.12	95.1	3.62	5.2
24	SKAU-B-236	1.05	80.17	388.8	4.26	4.8	7.8	112.1	3.10	3.87
25	SKAU-B-239	0.99	75.59	366.6	4.1	4.2	9.6	80.1	3.52	4.6
26	SKAU-B-241	0.83	63.34	307.33	3.5	6.1	4.62	92.1	2.51	4.94
27	SKAU-B-245	0.87	66.48	322.36	4.23	4.3	9.3	89.1	2.4	9.6
28	SKAU-B-247	0.71	54.74	265.5	4.6	6.9	7.5	97.1	2.55	4.6
29	SKAU-B-249	1.09	83.22	403.66	4.6	3.1	5.21	78.1	2.35	3.4
30	SKAU-B-251	0.7	53.44	259.2	3.6	6.3	9.4	98.1	2.34	6.1
31	SKAU-B-255	0.99	75.95	368.93	3.9	7.8	8.2	95.1	2.6	8.5
32	SKAU-B-257	0.56	42.89	208.43	2.9	0.26	9.6	82.13	2.13	4.2
33	SKAU-B-259	0.74	56.76	276.16	2.6	5.4	9.12	112.13	2.57	7.8
34	SKAU-B-263	0.85	64.86	314.86	3.8	7.6	6.73	82.1	3	5.8
35	SKAU-B-266	1.08	82.46	399.93	4.4	4.7	7.41	114.1	3	5.2
36	SKAU-B-268	1.1	83.97	407.4	4	4.3	2.62	111.1	2.75	7.8
37	SKAU-B-270	0.82	63.12	306.46	4	6	9.42	83.1	3.16	4.1
38	SKAU-B-274	1.07	81.7	396.2	3	4.1	3.21	87.1	2.57	9.4
39	SKAU-B-276	1.14	87.01	422.76	3.9	2.7	5.72	90.1	2.52	4.6
40	SKAU-B-279	1.1	83.97	407.4	3.4	3.3	4.31	106.1	2.78	10.1
Mean		0.90	69.06	334.54	3.93	4.65	7.49	95.24	2.65	5.60

Correlation analysis

The correlation coefficients were determined using variances and co variances to obtain relationship among various characters and their relationship with fruit yield per hectare at genotypic level.

The genotypic correlation coefficients (r_g) among the various characters of Brinjal genotypes are presented in Table 3a and 3b. The days to first flowering was positively and significantly correlated with days to first fruit set (r_g = 0.763) and days to first fruit picking (r_g = 0.720) ; days to first fruit set was found to be positively and significantly correlated with days to first fruit picking (r_g = 0.923) ; days to first fruit picking was positively correlated with number of branches per plant(0.044), plant spread (0.017), fruit length(0.087), fruit diameter(0.093) ; number of branches per plantwas positively correlated with Number of fruits per plant(r_g=0.283); plant height was positively and significantly correlated with plant spread (r_g = 0.369), fruit length (0.528), average fruit weight (0.312),fruit yield per plant (0.473) and fruit yield per hectare(r_g = 0.470); plant spread was positively and significantly correlated with fruit diameter (0.362),fruit yield per plant (0.520) and fruit yield per hectare(r_g = 0.516) ; fruit length was positively and significantly correlated with average fruit weight (r_g= 0.414),fruit yield per plant (0.377) and fruit yield per hectare(r_g = 0.380); fruit diameter was positively correlated with fruit yield per plant (0.212) and fruit yield per hectare(r_g = 0.202) ; Number of fruits per plant was positively and significantly correlated with fruit yield per plant (0.494) and fruit yield per hectare(r_g = 0.495) ; average fruit weight was positively and significantly correlated with fruit yield per plant (0.459) and fruit yield per hectare(r_g = 0.466).

Number of branches per plantwas negatively and significantly correlated with plant spread (r_g =-0.330. Rest of the characters exhibited non-significant correlations with each other.

The economically important trait i.e., fruit yield per hectare was positively and significantly correlated with plant height (r_g = 0.473), plant spread (r_g = 0.520), fruit length (r_g = 0.377), Number of fruits per plant (r_g = 0.494), average fruit weight (r_g = 0.459) and fruit yield per plant (r_g = 0.998).

Among quality traits significant positive correlation was also found to exist between total anthocyanin content and Vitamin C (r_g = 3.17); negative significant correlation was found to exist between TSS and phenols (-1.145) and total sugars (-0.599); between total anthocyanin content and total sugars (-3.058); between vitamin C and dry matter (-1.464); between phenols and total sugars (-0.738); between total sugars and dry matter (-.0362). Association between other quality traits were found to be either positive or negative but non-significant.

Calculating the proportion of variability that is inherited vs acquired is useful. Consequently, it becomes imperative to use a bio-metrical strategy to separate the entire computed "variability" into "heritable and non-heritable" components by using several genetical factors, including "genetic heritability, coefficient of variation and genetic progress." Characters that do not correlate with one another highlight their relationship and aid in the selection of elite genotypes. Selection can be aided by the association of multiple economic traits like yield and associated component characteristics. Without identifying the underlying reason of the link, correlation quantifies the interdependence of several plant characteristics and identifies the constituent traits on which selection might be based for genetic improvement in yield

Table 3a: Estimates of genotypic (above diagonal) correlation coefficients among different growth, maturity and yield attributing characters in brinjal (*Solanum melongena* L.)

S. No	Parameters	Days to first flowering	Days to first fruit set	Days to first fruit picking	No. of branches / plant	Plant height (cm)	Plant spread (cm)	Fruit length (cm)	Fruit diameter (cm)	No. of fruits/ plant	Average fruit weight (g)	Fruit yield plant / (kg)	Fruit yield/ hectare (q)
1	Days to first flowering	1.00	0.763**	0.720**	0.023	0.008	-0.070	-0.199	-0.005	-0.108	-0.0918	-0.015	-0.022
2	Days to first fruit set		1.00	0.923**	0.075	-0.020	-0.069	0.015	-0.041	0.040	-0.146	-0.079	-0.078
3	Days to first fruit picking			1.00	0.044	-0.030	0.017	0.087	0.093	0.370*	-0.225	0.106*	-0.101
4	No. of branches/plant				1.00	0.000	-0.330*	-0.247	-0.176	0.283	-0.234	-0.203	-0.171
5	Plant height(cm)					1.00	0.368*	0.528**	0.251	0.244	0.312*	0.473*	0.470*
6	Plant spread(cm)						1.00	0.169	0.362*	0.104	0.192	0.520**	0.516**
7	Fruit length (cm)							1.00	0.072	0.228	0.414*	0.377*	0.380*
8	Fruit diameter (cm)								1.00	-0.030	-0.014	0.212	0.202
9	No. of fruits per plant									1.00	-0.002	0.494*	0.495*
10	Average fruit weight (g)										1.00	0.459*	0.466*
11	Fruit yield/ plant (kg)											1.00	0.998**
12	Fruit yield/ hectare (q)												1.00

*, ** = Significant at 5% and 1% respectively

Table 3b: Estimates of genotypic (above diagonal) correlation coefficients among quality characters in brinjal (*Solanum melongena* L.)

S. No.	Parameters	TSS content (˚Brix)	Total anthocyanin content (mg/100g)	Ascorbic acid (mg/100g)	Phenols (mg/100g)	Total sugars (%)	Dry matter (%)
1	TSS content (˚Brix)	1.00	-0.033	0.214	-1.145**	-0.599**	0.295
2	Total anthocyanin content (mg/100g)		1.00	3.17**	-0.060	-3.058**	0.286
3	Ascorbic acid (mg/100g)			1.00	-0.194	0.024	-1.464**
4	Phenols (mg/100g)				1.00	-0.738**	-0.010
5	Total sugars (%)					1.00	-0.362*
6	Dry matter (%)						1.00

*, ** = Significant at 5% and 1% respectively

The genotypic correlation coefficients (r_g) among the various characters of Brinjal genotypes are presented in Table-3a and 3b. The days to first flowering was positively and significantly correlated with days to first fruit set and days to first fruit picking. Days to first fruit set was positively and significantly correlated with days to first fruit picking. Days to first fruit picking with number of fruits per plant. Plant height with plant spread, fruit length, average fruit weight and fruit yield per plant. Plant spread with fruit diameter and fruit yield per plant. Fruit length with average fruit weight and fruit yield per plant. Number of fruits per plant with fruit yield per plant. Average fruit weight with fruit yield per plant. Days to first flowering exhibited highly significant positive correlation with days to first fruit set. Similar results were reported by Pratibha *et al.* (2004) [11] and Patel and Sarnaik (2004) [9]. Plant height showed significant positive correlation with plant spread, similar to the results of Sharma and Krishan Swaroop (2000) [15] and Singh *et al*. (2003) [17].

The economically important trait i.e., fruit yield per hectarewas positively and significantly correlated with fruit yield per plant followed by plant spread, number of fruits per plant, plant height, average fruit weight and fruit length. The result were in conformity with the findings of Angadi *et al.* (2017) [1], Ravali *et al.* (2017) [13], Sujjin *et al.* (2017) [18], Tripathy *et al.* (2017) [20], Jirankali *et al.* (2019) [7], Onyia *et al.* (2019) [8] and Bende *et al.* (2019) [3].

Conclusion

The earliest flowers were produced in SKAU-B-193 however; earliest fruit were set in SKAU-B-241 and fruits were earliest harvested in SKAU-B-241. SKAU-B-209 recorded maximum number of branches per plant. Maximum plant height was recorded in the SKAU-B-276 and plant spread was maximum in IC-111010. Maximum fruit length was recorded in the genotype SKAU-B-274 while SKAU-B-276 has widest fruits. SKAU-B-226 produced highest number of fruit per plant whereas, SKAU-B-231 recorded highest average fruit weight. The yield per plant, per plot and per hectare was highest in genotype SKAU-B-276.

Maximum TSS was recorded in SKAU-B-205 whereas; maximum anthocyanin content was recorded in SKAU-B-225 and maximum ascorbic acid content was estimated in IC-111010.Maximum phenols were recorded in SKAU-B-266. Total sugars were highest present in SKAU-B-234 and highest dry matter was recorded in IC-354867The correlation coefficients among the different characters were worked out at both genotypic and phenotypic levels. The results indicated that the economically important trait i.e., fruit yield per hectarewas positively and significantly correlated with fruit yield per plant followed by plant spread, number of fruits per plant, plant height, average fruit weight and fruit length.

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