



Evaluation of Mean Performance in Agronomic and Quality Traits of Bottle Gourd [*Lagenaria siceraria* (Molina) Standl.] Genotypes

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

An experiment was conducted at the Experimental Field of Urban Technological Park (Habbak), Srinagar, Jammu and Kashmir, during *Kharif*-2023 to assess forty-one phenotypically diverse bottle gourd genotypes, including two checks, Pusa Naveen and Pusa Santushti, for different agronomic and quality traits. The experiment was laid out in single-factor Randomized Complete Block Design with three replications. The analysis of variance showed significant differences among genotypes for all the traits. The highest fruit yield per hectare was found in SKUA-BG-35 (714.58 q), SKUA-BG-29 (654.36 q), and SKUA-BG-23 (621.77 q). The lowest fruit yield per hectare was obtained in Pusa Naveen (221.21 q), SKUA-BG-36 (237.20 q), and SKUA-BG-14 (316.61 q). The mean fruit yield per hectare over all genotypes was 485.74 q.

Keywords: Bottle gourd; genotypes; fruit yield; mean performance.

1. INTRODUCTION

Bottle gourd [*Lagenaria siceraria* (Molina) Standl.], climbing vine from the family Cucurbitaceae, is one of the important vegetable crops grown in vast tropical and subtropical areas of the world. It is known for not only economic value but also for its medicinal and nutritional values. The tender fruits of bottle gourd are consumed as a vegetable and its seeds as a source of oil and protein (Barot et al., 2015). It has been acclaimed for its cooling, diuretic, and digestive properties in traditional medicine, and more recent studies show that it is an antioxidant and a cardioprotective agent. In many places, it has its cultural significance. Some have even used the mature fruit to put containers or use them as a musical instrument (Dhatt & Khosa, 2015). Research has made significant improvements on bottle gourd towards its production aspects, including productivity and quality features. Productivity indicators comprise aspects such as yield of fruit per plant, vine length, and number of primary branches. These traits often determine the suitability of a genotype for cultivation under specific agro-climatic conditions. Similarly, quality traits, such as total sugars, dry matter content, and total soluble solids (TSS), are critical for consumer acceptability and market value. A balanced focus on both agronomic and quality traits is necessary to meet the demands of producers and consumers alike.

The bottle gourd genetic diversity has created extensive opportunities for breeding and selection programs, but full exploitation requires that genotypes be evaluated in a systematic fashion to get an overview of mean performance across a spectrum of traits (Mkhize et al., 2021). Mean performance can indeed be considered the most credible measure of a genotype's inherent potential especially considering its environmental

influence. High-performing genotypes with stable expression of desirable traits may greatly improve the breeding program to develop improved varieties. The key aim of evaluating the genotypes is to ascertain lines with better agronomic and quality traits under specific conditions (Iqbal et al., 2019). Yield-related traits are fruit number and weight, whereas quality traits include dry matter and vitamin C content, contributing to better nutritional value. However, those characteristics usually present with complicated inheritance patterns and depend both on genetics and the environment. Thus, genotypes need to be evaluated in well-designed experiments with low environmental variation to offer strong data for selection.

Bottle gourd, though important, has not been the focus of research as much as other cucurbits like cucumber and watermelon. This gap highlights the necessity for studies that aim at its genetic enhancement. Assessment of mean performance of genotypes may assist in determining desirable traits and lines of interest for inclusion in breeding programs with special emphasis on improving yield and quality traits at the same time. Further, such assessments give information on the genetic variability, heritability and genetic gain for the target traits which are important for the success of the breeding programs.

The current investigation seeks to assess the mean performance of bottle gourd genotypes for the entire set of agronomical as well as quality traits. The study also aims to screen a diverse panel of genotypes, with the focus of this study being high performing lines to serve as ideal candidates for breeding programs.

2. MATERIALS AND METHODS

The study was conducted during *kharif* of 2023 in research plot at Urban Technological Park,

Habbak, Srinagar, Jammu and Kashmir. The coordinates of site are 34.16° N, 74.83° E and the altitude is 1608 meters above the sea level. This area is characterized with a temperate type of climate, within which warm summers are reported, with an extreme low of 5.26°C in October and an extreme high of 31.40°C in August. The area depicted the highest rainfall during the month of April. Evaluation of agronomic and quality traits was conducted on forty-one morphological diverse bottle gourd genotypes including two checks Pusa Naveen & Pusa Santushti. A randomized complete block design (RCBD) was used for the single-factor experiment. Proper agronomic practices which involved manuring, irrigation, pest control and weeding were carried out to promote optimal growth of the crop.

The study collected data for the numerous phenological, vegetative and yield traits from five randomly selected plants in each germplasm line across all replicates. The evaluated traits included node number at which the 1st male flower appears, node number at which the 1st female flower appears, number of primary branches, days to the appearance of the 1st male flower, days to the appearance of the 1st female flower, days to anthesis of the 1st male flower, days to anthesis of the 1st female flower, sex ratio (male to female flowers), days to the 1st fruit harvest, days to the last fruit harvest, vine length (m), number of fruits per plant, average fruit weight (kg), fruit length (cm), fruit diameter (cm), seed cavity width (cm), flesh thickness (cm), rind thickness (mm), seed cavity weight (g), flesh weight (g), fruit yield per plant (kg), fruit yield per hectare (q), number of seeds per fruit, 100 seed weight (g), total sugars (%), dry matter content (%), Vitamin C content (mg/100 g), total soluble solids (°Brix), chlorophyll content (mg/100 g), and crude fiber content (%).

3. RESULTS AND DISCUSSION

The results from the analysis of the mean values indicated that no single genotype outperformed all the traits that were being studied (Tables 1,2 and 3). However, certain genotypes demonstrated superiority in specific traits. For instance, SKUA-BG-35, SKUA-BG-29, SKUA-BG-23, SKUA-BG-25 and SKUA-BG-27 outperformed others in the node number at which the 1st male flower appears. In terms of the node number at which 1st female flower appears, genotypes like SKUA-BG-35, SKUA-BG-29, SKUA-BG-4, SKUA-BG-5, SKUA-BG-9, SKUA-BG-23, SKUA-BG-24, SKUA-BG-25 and SKUA-

BG-26 were superior. For the number of primary branches, SKUA-BG-35, SKUA-BG-23, SKUA-BG-29, SKUA-BG-25, SKUA-BG-11 and SKUA-BG-27 performed the best. Regarding days to the appearance of the 1st male flower, Pusa Santushti, SKUA-BG-35, SKUA-BG-14, SKUA-BG-29 and SKUA-BG-23 were superior. For the days to the appearance of the 1st female flower, SKUA-BG-35, Pusa Santushti, SKUA-BG-11, SKUA-BG-29 and SKUA-BG-25 excelled. Similar trends were observed for the days to anthesis of the 1st male flower, with Pusa Santushti, SKUA-BG-35, SKUA-BG-29, SKUA-BG-3 and SKUA-BG-11 standing out and for the days to anthesis of the 1st female flower, where SKUA-BG-35, Pusa Santushti, SKUA-BG-29, SKUA-BG-3 and SKUA-BG-25 were prominent. These findings are consistent with those of Harika et al. (2012), Jain and Singh (2016), Rambabu et al. (2017), Rashid et al. (2020), Kumar et al. (2018) and Khansa et al. (2024).

Genotypes such as SKUA-BG-38, SKUA-BG-17, SKUA-BG-12, Pusa Naveen and SKUA-BG-39 exhibited superior performance in terms of sex ratio. For days to 1st fruit harvest, SKUA-BG-35, Pusa Santushti, SKUA-BG-11, SKUA-BG-23 and SKUA-BG-2 were identified as superior. SKUA-BG-37, SKUA-BG-3, SKUA-BG-7, SKUA-BG-41 and SKUA-BG-39 performed best for days to last fruit harvest. Vine length was most favorable in genotypes SKUA-BG-35, SKUA-BG-29, SKUA-BG-23, SKUA-BG-25 and SKUA-BG-27. The highest number of fruits per plant was recorded in SKUA-BG-9, SKUA-BG-30, SKUA-BG-35, SKUA-BG-40 and SKUA-BG-29, while genotypes such as SKUA-BG-17, SKUA-BG-32, Pusa Santushti, SKUA-BG-16 and SKUA-BG-5 stood out for average fruit weight. SKUA-BG-1, SKUA-BG-15, SKUA-BG-12, SKUA-BG-24 and SKUA-BG-37 were found superior in fruit length. These findings align with those reported by Mishra et al. (2019), Yogananda et al. (2021), Bhatt et al. (2022) and Khansa et al. (2024).

Genotypes SKUA-BG-7, Pusa Santushti, SKUA-BG-39, SKUA-BG-3 and SKUA-BG-22 showed superior performance in fruit diameter. For seed cavity width SKUA-BG-1, SKUA-BG-34, SKUA-BG-23, SKUA-BG-9 and SKUA-BG-27 were found to excel. Superior genotypes for flesh thickness included SKUA-BG-41, SKUA-BG-17, Pusa Santushti, SKUA-BG-16 and SKUA-BG-11. Rind thickness was most favorable in SKUA-BG-16, SKUA-BG-20, SKUA-BG-27, SKUA-BG-32 and SKUA-BG-24. SKUA-BG-36, SKUA-BG-14, SKUA-BG-19, Pusa Naveen and SKUA-BG-12 were superior for seed cavity weight, while

Table 1. Mean performance of bottle gourd [*Lagenaria siceraria* (Molina) Standl.] genotypes for various agronomic and quality characters

S.NO	GENOTYPES	NMA	NFA	NOPB	DAPMF	DAPFF	DAMF	DAFF	SR	DFFH	DLFH	VL	NOFPP
1	SKUA-BG-1	6.53	9.40	16.93	46.47	50.53	49.93	53.73	8.57	69.73	146.73	6.49	5.40
2	SKUA-BG-2	6.40	8.47	19.27	44.73	47.80	47.47	50.53	10.44	68.00	142.80	6.83	8.40
3	SKUA-BG-3	8.47	10.40	12.40	42.73	48.40	46.20	50.20	8.55	75.73	148.73	5.60	6.40
4	SKUA-BG-4	6.47	8.20	18.27	45.87	51.47	50.53	54.73	10.58	71.73	134.53	6.54	6.40
5	SKUA-BG-5	6.60	8.20	16.27	46.87	50.60	50.13	54.07	9.37	74.73	146.47	6.45	5.20
6	SKUA-BG-6	6.47	9.40	18.27	45.73	50.93	49.80	53.73	7.43	72.93	145.73	6.57	6.20
7	SKUA-BG-7	8.13	10.40	14.60	49.07	52.73	53.52	55.20	10.28	77.07	148.47	6.15	6.20
8	SKUA-BG-8	7.60	9.40	10.47	48.87	52.60	51.53	55.60	10.33	73.93	140.67	6.47	8.33
9	SKUA-BG-9	6.40	8.20	19.67	43.87	49.60	48.67	52.27	10.63	70.53	135.93	6.88	10.40
10	Pusa Naveen	8.40	12.07	10.67	42.67	47.80	46.53	50.60	7.33	73.93	142.80	5.84	5.00
11	SKUA-BG-11	6.40	9.20	19.73	43.73	46.73	46.27	50.87	7.54	65.73	146.00	6.88	5.40
12	SKUA-BG-12	6.60	8.40	15.20	47.13	53.60	51.60	56.07	7.23	71.60	136.67	5.48	7.20
13	SKUA-BG-13	6.40	8.40	18.73	44.80	49.53	48.47	52.53	9.45	75.87	144.47	6.75	7.60
14	SKUA-BG-14	7.40	10.27	10.73	41.67	47.73	46.73	51.93	8.51	77.87	145.87	5.46	7.33
15	SKUA-BG-15	8.40	11.33	12.47	49.00	54.27	53.40	57.27	8.56	74.60	145.00	5.75	7.20
16	SKUA-BG-16	8.00	10.33	14.80	51.67	54.87	54.07	57.87	7.50	77.93	146.80	5.55	4.60
17	SKUA-BG-17	8.60	10.27	10.60	48.73	53.13	52.13	56.73	6.66	72.60	141.53	5.81	3.60
18	Pusa santushti	8.07	10.27	14.73	40.13	45.73	44.53	49.73	7.64	65.27	146.73	5.78	4.33
19	SKUA-BG-19	8.53	12.00	13.73	50.13	55.93	54.93	58.93	7.65	78.47	146.93	5.68	6.60
20	SKUA-BG-20	7.40	10.40	14.73	50.80	53.73	54.80	56.67	8.24	74.80	143.53	5.71	6.60
21	SKUA-BG-21	8.00	9.47	10.67	50.53	55.87	54.13	58.93	7.52	73.93	142.87	6.03	6.60
22	SKUA-BG-22	7.47	9.40	14.87	48.27	53.27	52.27	56.80	9.32	75.60	146.73	5.78	7.60
23	SKUA-BG-23	6.20	8.20	20.27	42.07	47.73	47.00	51.00	9.35	66.73	135.60	7.49	8.33
24	SKUA-BG-24	6.40	8.20	18.27	45.20	50.63	50.73	54.87	8.61	69.73	141.67	6.68	5.73

Contd....

Table 1: Contd....

S.NO	GENOTYPES	NMA	NFA	NOPB	DAPMF	DAPFF	DAMF	DAFF	SR	DFFH	DLFH	VL	NOFPP
25	SKUA-BG-25	6.20	8.20	20.00	42.73	47.53	46.53	50.53	7.54	70.67	145.93	7.20	5.40
26	SKUA-BG-26	6.60	8.20	15.20	47.07	52.07	51.73	56.13	10.26	76.87	147.20	6.42	6.20
27	SKUA-BG-27	6.33	8.27	19.73	43.13	47.73	47.67	51.53	10.52	72.73	139.93	6.92	8.60
28	SKUA-BG-28	8.20	10.47	13.67	51.00	56.53	55.47	59.07	8.43	74.80	142.73	5.89	7.53
29	SKUA-BG-29	5.47	7.40	20.27	41.73	46.73	45.53	49.87	7.53	70.53	136.67	7.85	9.20
30	SKUA-BG-30	6.47	9.53	18.27	45.67	51.13	50.27	55.20	10.63	68.67	142.73	6.58	10.20
31	SKUA-BG-31	8.20	12.20	13.73	50.73	55.67	54.53	59.73	10.42	78.73	140.07	5.74	6.40
32	SKUA-BG-32	8.27	11.20	12.20	49.73	55.07	54.53	59.13	7.50	74.93	142.73	5.83	4.20
33	SKUA-BG-33	7.20	9.53	15.13	47.73	52.60	51.47	56.53	9.42	75.73	143.60	6.41	7.47
34	SKUA-BG-34	8.20	10.47	13.20	50.00	55.87	54.87	58.27	7.66	75.60	146.73	5.32	5.40
35	SKUA-BG-35	5.40	7.33	21.27	41.13	44.80	45.07	48.60	10.51	63.20	142.80	7.89	10.20
36	SKUA-BG-36	7.47	9.20	13.73	48.73	53.87	52.73	56.67	7.51	74.87	147.20	5.75	4.40
37	SKUA-BG-37	8.60	10.60	12.20	50.67	55.60	54.87	58.67	7.53	78.53	149.80	5.77	6.60
38	SKUA-BG-38	7.20	9.20	15.07	50.80	55.93	54.53	58.87	6.55	73.93	140.67	6.13	6.20
39	SKUA-BG-39	8.60	10.33	15.00	50.80	55.47	54.53	59.73	7.34	74.53	147.80	5.43	7.20
40	SKUA-BG-40	6.47	9.53	17.60	46.13	52.07	51.87	56.33	10.52	75.40	145.00	6.51	9.40
41	SKUA-BG-41	7.40	9.47	10.40	49.27	54.93	53.73	57.60	9.24	72.40	148.47	6.10	5.60
	MEAN	7.26	9.55	15.44	46.78	51.67	50.86	54.96	8.69	73.20	143.74	6.25	6.75
	CD(p ≤ 0.05)	0.42	0.42	0.21	0.66	0.92	0.80	0.85	0.34	0.69	0.67	0.54	0.51
	SEm	0.14	0.14	0.07	0.23	0.32	0.28	0.30	0.11	0.24	0.23	0.19	0.18
	C.V.	1.93	1.46	0.45	0.49	0.62	0.55	0.54	1.26	0.33	0.16	3.04	2.67

NMA: Node number at which 1st male flower appears, NFA: Node number at which 1st female flower appears, NOPB: Number of primary branches, DAPMF: Days to appearance of 1st male flower, DAPFF: Days to appearance of 1st female flower, DAMF: Days to anthesis of 1st male flower, DAFF: Days to anthesis of 1st female flower, SR: Sex Ratio, DFFH: Days to 1st Fruit Harvest, DLFH: Days to Last Fruit Harvest, VL: Vine Length (m), NOFPP: Number of Fruits/Plant.

Table 2. Mean performance of bottle gourd [*Lagenaria siceraria* (Mol) Standl.] genotypes for various agronomic and quality characters

S.NO	GENOTYPES	AFW	FL	FD	SCL	FT	RT	SCW	FLW	FYPP	FYPH	NOSPF	100SW
1	SKUA-BG-1	1.87	60.67	5.09	2.22	1.43	3.43	461.07	1062.75	10.09	519.18	346.40	22.20
2	SKUA-BG-2	1.42	42.90	7.57	3.44	2.43	2.73	310.13	842.20	11.90	555.97	386.87	24.64
3	SKUA-BG-3	1.48	34.00	13.77	9.35	2.43	3.45	315.60	859.46	9.47	461.04	295.60	11.87
4	SKUA-BG-4	1.48	35.50	6.62	3.47	1.34	2.54	280.64	830.58	9.49	521.08	351.40	22.73
5	SKUA-BG-5	2.00	34.60	7.43	4.63	1.43	3.36	420.12	1199.51	10.39	513.73	340.20	22.19
6	SKUA-BG-6	1.74	46.00	5.59	3.44	1.73	2.46	420.47	1016.54	10.81	526.62	352.27	22.78
7	SKUA-BG-7	1.49	14.00	16.03	12.44	2.42	2.46	270.85	882.88	9.27	426.21	270.33	19.81
8	SKUA-BG-8	1.25	47.60	7.55	3.45	2.33	3.73	316.99	736.13	10.39	515.61	274.80	20.96
9	SKUA-BG-9	1.07	36.50	5.74	2.53	1.34	2.72	280.89	681.16	11.09	557.27	388.60	24.96
10	Pusa Naveen	0.90	29.90	6.48	4.75	1.74	2.54	251.16	641.40	4.50	221.21	273.30	18.21
11	SKUA-BG-11	1.96	28.80	8.26	3.43	2.51	3.82	461.77	1121.24	10.06	571.82	401.33	24.98
12	SKUA-BG-12	1.44	53.80	5.68	3.35	1.33	3.67	260.25	850.24	10.35	502.05	308.27	21.95
13	SKUA-BG-13	1.45	39.60	5.70	3.45	1.43	2.55	310.54	834.43	10.99	553.82	366.33	24.48
14	SKUA-BG-14	0.92	38.80	8.17	4.46	2.33	2.35	219.30	700.63	6.72	316.61	262.20	15.11
15	SKUA-BG-15	1.06	55.00	5.44	3.53	1.44	2.43	316.30	710.24	7.62	371.71	285.73	21.24
16	SKUA-BG-16	2.04	32.90	7.30	4.43	2.52	1.55	480.72	1180.06	9.40	421.08	225.40	20.65
17	SKUA-BG-17	2.25	49.00	8.51	4.43	2.63	2.75	519.32	1301.55	8.08	372.98	236.40	19.91
18	Pusa Santushti	2.06	42.10	15.68	12.75	2.62	3.85	429.97	1190.25	8.91	500.73	192.07	16.87
19	SKUA-BG-19	1.26	42.60	6.13	3.37	1.43	3.44	230.55	821.11	8.01	428.72	240.40	11.92
20	SKUA-BG-20	1.48	37.20	5.57	3.49	1.33	1.56	261.48	912.35	9.79	477.04	246.73	12.92
21	SKUA-BG-21	1.23	34.10	5.47	3.32	1.35	2.74	290.47	732.05	8.10	390.60	226.93	16.02
22	SKUA-BG-22	1.18	45.80	13.26	10.46	2.33	2.64	300.10	620.03	8.97	436.23	224.13	20.93
23	SKUA-BG-23	1.48	38.80	4.65	2.35	1.42	3.24	319.79	809.79	12.65	621.77	520.13	25.88
24	SKUA-BG-24	1.81	53.00	6.52	4.35	1.55	2.33	410.39	1040.76	10.37	542.62	364.93	23.97

Contd....

Table 2:contd.....

S.NO	GENOTYPES	AFW	FL	FD	SCL	FT	RT	SCW	FLW	FYPP	FYPH	NOSPF	100SW
25	SKUA-BG-25	1.94	50.00	5.58	3.28	1.45	3.22	460.53	1130.36	10.49	583.43	442.33	25.70
26	SKUA-BG-26	1.65	35.40	7.71	5.43	1.74	2.42	400.66	920.18	10.25	505.82	311.87	22.14
27	SKUA-BG-27	1.35	39.70	6.97	2.66	2.26	2.21	320.54	660.57	11.30	583.20	402.87	25.66
28	SKUA-BG-28	1.16	41.70	5.51	3.44	1.45	3.33	400.72	730.95	8.76	425.72	235.47	12.81
29	SKUA-BG-29	1.44	50.33	6.78	3.33	1.43	2.51	340.65	682.14	13.25	654.36	527.13	25.97
30	SKUA-BG-30	1.05	35.13	8.49	4.42	2.33	2.43	349.35	600.65	10.68	528.68	358.60	22.89
31	SKUA-BG-31	1.49	44.20	7.07	2.77	2.42	2.54	622.54	718.81	9.21	473.57	183.50	21.21
32	SKUA-BG-32	2.21	31.10	6.55	4.53	1.33	2.22	512.10	1210.26	9.29	453.99	108.27	13.64
33	SKUA-BG-33	1.30	30.30	6.76	3.52	1.36	3.23	320.15	749.08	9.69	499.42	306.53	21.89
34	SKUA-BG-34	1.94	32.90	5.63	2.23	1.45	3.22	440.71	1041.51	10.14	486.30	182.67	17.71
35	SKUA-BG-35	1.44	40.20	5.44	3.34	1.42	2.56	309.92	789.99	14.52	714.58	544.27	26.66
36	SKUA-BG-36	0.91	34.70	5.60	3.43	1.23	2.42	200.59	509.75	4.24	237.20	136.60	19.91
37	SKUA-BG-37	1.42	51.95	12.04	7.74	2.43	3.22	425.47	781.89	9.39	463.87	191.00	19.91
38	SKUA-BG-38	1.65	41.00	6.50	4.34	1.54	2.56	400.19	920.11	10.21	493.41	302.00	21.71
39	SKUA-BG-39	1.40	32.00	14.73	9.76	2.34	3.24	361.85	817.28	9.92	480.75	155.53	17.71
40	SKUA-BG-40	1.09	40.50	6.47	4.44	1.25	2.57	400.17	641.85	10.28	520.52	350.93	22.41
41	SKUA-BG-41	1.85	32.40	10.58	5.43	2.65	2.63	401.27	1039.40	10.40	484.63	112.20	13.60
	MEAN	1.50	39.92	7.72	4.66	1.83	2.80	361.13	866.39	9.74	485.74	298.35	20.46
	CD ($p \leq 0.05$)	0.08	1.05	0.49	0.25	0.31	0.27	1.79	2.09	1.05	13.46	1.74	0.78
	SEm	0.02	0.37	0.17	0.08	0.10	0.09	0.63	0.74	0.37	4.78	0.61	0.27
	C.V.	1.33	0.93	2.20	1.72	5.46	3.21	0.17	0.08	3.80	0.98	0.20	1.32

AFW: Average Fruit Weight (kg), FL: Fruit Length (cm), FD: Fruit Diameter (cm), SCWD: Seed cavity width (cm), FT: Flesh Thickness (cm), RT: Rind Thickness (mm), SCW: Seed Cavity Weight (g), FLW: Flesh Weight (g), FYPP: Fruit Yield/Plant (kg), FYPH: Fruit Yield/Hectare (q), NOSPF: No. of Seeds/Fruit, 100SW: 100 Seed Weight (g)

Table 3. Mean performance of bottle gourd [*Lagenaria siceraria* (Mol) Standl.] genotypes for various agronomic and quality characters

S.NO	GENOTYPES	TS	DM	VIT C	TSS	CC	CFC
1	SKUA-BG-1	1.30	7.27	7.62	4.11	31.45	1.38
2	SKUA-BG-2	1.90	8.18	7.13	3.45	40.09	1.30
3	SKUA-BG-3	1.41	6.45	8.26	4.49	49.84	1.42
4	SKUA-BG-4	2.26	7.95	6.20	4.04	60.70	1.51
5	SKUA-BG-5	2.47	7.26	7.10	3.48	33.77	1.53
6	SKUA-BG-6	1.39	8.11	7.33	2.89	46.75	1.63
7	SKUA-BG-7	2.91	5.53	8.06	3.01	41.29	1.70
8	SKUA-BG-8	1.15	4.67	6.95	2.24	38.88	1.31
9	SKUA-BG-9	1.33	8.20	8.44	3.80	47.83	1.28
10	Pusa Naveen	1.66	5.65	7.02	2.50	64.21	1.30
11	SKUA-BG-11	1.75	8.26	10.10	2.68	51.41	1.37
12	SKUA-BG-12	2.65	6.96	8.26	3.39	29.87	1.41
13	SKUA-BG-13	2.24	8.18	8.15	2.46	44.29	1.54
14	SKUA-BG-14	2.99	5.25	6.84	4.76	34.24	1.57
15	SKUA-BG-15	1.23	5.24	7.08	3.36	51.41	1.54
16	SKUA-BG-16	2.94	6.36	6.80	4.62	36.36	1.58
17	SKUA-BG-17	2.97	5.21	7.74	3.03	31.46	1.55
18	Pusa Santushti	2.15	4.20	8.15	3.87	29.07	1.80
19	SKUA-BG-19	1.75	4.85	6.62	3.31	25.37	1.76
20	SKUA-BG-20	2.42	6.53	6.75	3.63	51.28	1.75
21	SKUA-BG-21	2.50	6.41	7.53	4.93	26.56	1.68
22	SKUA-BG-22	2.78	5.63	9.19	4.50	42.60	1.65
23	SKUA-BG-23	2.30	8.36	7.32	4.87	56.85	1.78
24	SKUA-BG-24	1.98	8.17	6.39	4.36	45.23	1.83

Contd.....

Table 3:contd.....

S.NO	GENOTYPES	TS	DM	VIT C	TSS	CC	CFC
25	SKUA-BG-25	1.71	8.32	10.01	3.05	37.39	1.79
26	SKUA-BG-26	1.64	7.05	9.23	3.70	53.89	1.68
27	SKUA-BG-27	2.98	8.26	10.07	3.65	42.27	1.81
28	SKUA-BG-28	2.37	5.80	8.45	3.99	46.22	1.81
29	SKUA-BG-29	2.56	8.36	8.19	4.87	47.33	1.33
30	SKUA-BG-30	1.13	8.15	7.87	4.54	49.26	1.74
31	SKUA-BG-31	1.50	4.86	8.93	3.90	54.72	1.45
32	SKUA-BG-32	1.74	6.29	9.49	4.62	25.63	1.70
33	SKUA-BG-33	1.58	6.82	6.67	4.73	30.53	1.36
34	SKUA-BG-34	1.82	4.66	7.55	4.60	36.75	1.58
35	SKUA-BG-35	2.67	8.73	6.79	4.45	42.62	1.39
36	SKUA-BG-36	2.55	5.40	7.84	3.27	41.22	1.76
37	SKUA-BG-37	1.49	5.45	8.32	4.21	49.55	1.42
38	SKUA-BG-38	1.21	6.57	9.43	3.38	45.14	1.45
39	SKUA-BG-39	2.47	6.16	7.56	4.55	40.13	1.55
40	SKUA-BG-40	1.35	7.48	9.10	4.65	42.18	1.38
41	SKUA-BG-41	1.30	6.53	9.38	4.26	40.74	1.66
	MEAN	2.01	6.68	7.95	3.86	42.35	1.56
	CD(p ≤ 0.05)	0.04	0.04	0.06	0.07	0.88	0.05
	SEm	0.01	0.01	0.02	0.02	0.31	0.01
	C.V.	0.50	0.15	0.25	0.52	0.73	0.64

TS: Total Sugars (%), DM: Dry Matter content (%), VITC: Vitamin C content (mg/100g), TSS: Total Soluble Solids (°Brix), CC: Chlorophyll content (mg/100g), CFC: Crude Fiber content (%).

SKUA-BG-17, SKUA-BG-32, SKUA-BG-5, Pusa Santushti and SKUA-BG-16 excelled in flesh weight. For fruit yield per plant, genotypes SKUA-BG-35, SKUA-BG-29, SKUA-BG-23, SKUA-BG-2 and SKUA-BG-27 stood out. Similarly, SKUA-BG-35, SKUA-BG-29, SKUA-BG-23, SKUA-BG-25 and SKUA-BG-27 were superior for fruit yield per hectare, number of seeds per fruit and 100 seed weight. These findings are consistent with the results reported by Harika et al. (2012), Sharma and Sengupta (2012), Jamal Uddin et al. (2014), Khansa et al. (2024) and Venkatraman et al. (2024).

Genotypes SKUA-BG-14, SKUA-BG-27, SKUA-BG-17, SKUA-BG-16 and SKUA-BG-7 were identified as superior for total sugars, while SKUA-BG-35, SKUA-BG-23, SKUA-BG-29, SKUA-BG-25 and SKUA-BG-11 excelled in dry matter content. Superior performance for vitamin C content was observed in SKUA-BG-11, SKUA-BG-27, SKUA-BG-25, SKUA-BG-32 and SKUA-BG-38. For TSS (total soluble solids), SKUA-BG-21, SKUA-BG-23, SKUA-BG-29, SKUA-BG-14 and SKUA-BG-33 were prominent. Chlorophyll content was higher in Pusa Naveen, SKUA-BG-4, SKUA-BG-23, SKUA-BG-31 and SKUA-BG-26, while SKUA-BG-24, SKUA-BG-27, SKUA-BG-28, Pusa Santushti and SKUA-BG-25 showed superiority in crude fiber content. These findings align with the results reported by Rashid et al. (2020), Bhavanasi et al. (2022) and Khansa et al. (2024).

4. CONCLUSION

The mean performance of fortyone genotypes, including checks, over thirty different characters is summarized in Tables 1, 2 and 3 from this study. The mean values of all characters under consideration displayed broad range of variation. As no single genotype proved superior in all ranges of the studied traits, it would be possible to select superior lines from the hybridized populations in advanced segregating generations by using several divergent genotypes in a properly designed breeding program. It was found that highest fruit yield per hectare was obtained from SKUA-BG-35 (714.58 q), SKUA-BG-29 (654.36 q), SKUA-BG-23 (621.77 q) whereas the lowest were satisfied in Pusa Naveen (221.21 q), SKUA-BG-36 (237.20 q) and SKUA-BG-14 (316.61 q). The average of overall fruit yield per hectare was 485.74 q.

DISCLAIMER (ARTIFICIAL INTELLIGENCE)

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc) and text-to-image

generators have been used during writing or editing of this manuscript.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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