Mean Performance of Various Quantitative Characters in Bottle Gourd (*Lagenaria Siceraria* (Molina) Standl.) Genotypes Under Temperate Conditions of Kashmir

Abstract

Seventy-seven phenotypically diverse genotypes including two checks (Pusa Naveen and Pusa Santushti) of bottle gourd were evaluated for various quantitative traits at the Experimental field of Urban Technological Park (Habbak), Srinagar, Jammu and Kashmir during *Kharif*-2022. A single factor experiment was laid out in Augmented randomised block design with three blocks. Seventy-seven genotypes were randomly distributed among the three blocks with each block receiving thirty-one lines including two checks (Pusa Naveen and Pusa Santushti) replicated thrice. Analysis of variance revealed significant differences among genotypes for all the traits. The maximum fruit yield ha^{-1} was recorded in IC-371747-1 (1132.21 q) followed by IC-382258 (848.199 q) and IC-398541 (845.33 q). While as, the lowest fruit yield ha^{-1} was recorded in IC-522878 (211.83 q) followed by Pusa Naveen (220.30 q) and SKUA-BG-7 (241.78 q). The average fruit yield ha^{-1} for all the genotypes was 430.78 q.

Key words: Bottle gourd, fruit yield, genotypes, mean performance

Introduction

Bottle gourd "*Lagenaria siceraria"* (2n=2x=22) belongs to family Cucurbitaceae and is one of the most ancient crops cultivated during summer throughout the world. The genus Lagenaria is derived from the latin word *lagena*, meaning the bottle. It is also known as Calabash, Doodhi and Lauki in different parts of India (Deore *et al*., 2009). Its primary centre of origin is Africa (Singh, 1990). The fossil records indicate its culture in India even before 200 B.C. It has been found wild in India, the Moluccas and Ethiopia. It has spread to western countries from India and Africa. The genus Lagenaria includes six species that are distributed in Africa, Madagascar, Indo-Malaysia and the neotropics. There is only one cultivated species, *Lagenaria siceraria*, which is annual and monoecious. The five other species are wild, perennial and dioecious, occurring in East Africa and Madagascar. The tender fruits are also used to prepare sweets, rayata and pickles. The dried shells of mature fruits are extremely hard and are used as containers, utensils, musical instruments, floats of fishnets or ornamental items. The leaves are also used to prepare vegetable and they have higher nutritive value than fruits, in respect of protein, fat, minerals, fibre, carbohydrate, energy, calcium and phosphorus content. Different plant parts of bottle gourd have several putative medicinal properties. It is suggested for consumption during convalescence because it is easily digestible. The bottle gourd is a very beneficial vegetable in avoiding digestive issues like constipation due to the dietary fiber it contains. Consuming fiber has been linked positively to a decline in the incidence of diabetes and coronary heart disease (Hemeda *et al*., 2008). Along with being a potent thirst quencher, bottle gourd juice has been used traditionally as a medicine to cure ulcers, indigestion and acid reflux. The natural remedy is thought to be effective against certain poisons and scorpion stings. It also has laxative and cooling properties. The fruit is used in the treatment of asthma and other bronchial illnesses because it is thought to have the potential to reduce pain and is efficient against fever. It is a good source of organic antioxidants as well. Due to its high dietary fiber

and low fat and cholesterol content, it aids in weight loss quickly (Parle and Kaur, 2011). Jaundice can be treated with a decoction produced from leaves. To decrease the effects of heat during the hotter months, people massage the cut surface of tiny fruit on their hands and feet. Bottle gourd is recommended for the treatment of diabetes, hypertension, flatulence, liver illnesses, excessive weight problems and other conditions in Ayurveda. The edible portion of bottle gourd contains about 95.54% moisture and is rich in vitamins, minerals, antioxidants and dietary fibres. Its fruit contains Vitamin C (10.1 mg), Vitamin A (16 IU), Thiamine (0.029 g), Riboflavin (0.022 g), Niacin (0.320 g), Carbohydrates (3.39 g), Fats (0.02 g), Potassium (150 mg), Calcium (26mg) and Iron (0.20mg)/100g (USDA, 2018).

In India the total area under its cultivation is 187 thousand hectares with an annual production of 3165 thousand MT (NHB, 2020-21). Nonetheless, in Jammu and Kashmir it is grown over an area of 1.60 thousand hectares with a production 36.17 thousand MT (Department of Agriculture, 2020). Major gourd growing states in India are Bihar, Uttar Pradesh, Madhya Pradesh, Haryana, Chhattisgarh and West Bengal (NHB, 2021-22).

Materials and methods

The present research study was carried out at the experimental field of Urban Technological Park, Habbak, Srinagar, Jammu and Kashmir during *kharif*-2022. It is situated at an altitude of 1608 meters above mean sea level lying between 34.16º North latitude and 74.83º East longitude. The climate is temperate characterized by mild summers. The mean minimum and maximum temperatures at the research location are recorded in January and June (respectively), indicating a temperate climate. Rainfall is maximum in March and April. The material used for research work consisted seventy-seven genotypes of bottle gourd which were procured from different sources. The experiment was laid out in accordance with Augmented Randomized Block Design comprising of seventy-seven treatments and three blocks. Recommended agronomic practices were followed to raise a good crop. Observations recorded were node number at which 1st male flower appeared, node number at which 1st female flower appeared, days to appearance of 1st male flower, days to appearance of 1st female flower, days to anthesis of 1st male flower, days to anthesis of 1st female flower, number of male flowers plant^{-1}, number of female flowers plant^{-1}, days to 1st fruit harvest, days to last fruit harvest, vine length (m), number of primary branches, number of fruits plant^{-1}, fruit weight (kg), fruit length (cm), fruit diameter (cm), fruit yield plant^{-1} (kg), fruit yield ha^{-1} (q). The observations on different quantitative parameters were recorded from three randomly selected plants from each germplasm line of all blocks.

Results and discussion

In this study genotypes showed wide range of variability for most of the quantitative traits (Table-1, 2 and 3). The estimates of mean values revealed that no genotype was superior for all the characters under consideration. However, genotypes like SKAU-BG-2 (6.14) followed by IC-276153 (6.21) and SKAU-BG-5 (6.25) were found superior for node number at which 1st male flower appeared; IC-536894-1 (7.24) followed by IC-331981 (7.25) and IC-310206-1 (7.27) were superior for node number at which 1st female flower appeared; Pusa Naveen (41.62 days) followed by IC-294891-1 (41.68 days) and SKUA-BG-4, IC-418491-A (41.91 days) for days to appearance of 1st male flower; IC-385816-1 (46.08 days) followed by IC-276153 (46.40 days) and Pusa Naveen (46.42 days) for days to appearance of 1st female flower; Pusa Naveen

(45.88 days) followed by IC-385816-1 (46.04 days) and SKUA-BG-3 (46.09 days) for days to anthesis of 1st male flower; IC-276153 (48.99 days) followed by SKUA-BG-4 (49.93 days) and Pusa Naveen (49.95 days) for days to anthesis of 1st female flower. Similar results have also been reported by Harika *et al.* (2012), Jain *et al.* (2016), Rambabu *et al*. (2017) and Rashid *et al.* (2020).

Table 1: Mean performance of Bottle gourd (*Lagenaria siceraria*) genotypes for various quantitative characters

S. No.	Genotypes	Node No. at which 1st male flower appears	Node No. at which 1st female flower appears	Days to appearance of 1st male flower	Days to appearance of 1st female flower	Days to anthesis of 1st male flower	Days to anthesis of 1st female flower
1.	Pusa Naveen	6.80	9.76	41.62	46.42	45.88	49.95
2.	Pusa Santushti	6.61	8.33	42.15	47.03	47.08	50.14
3.	SKUA-BG-1	7.64	9.16	44.87	49.75	49.33	52.85
4.	SKUA-BG-2	6.14	7.92	48.84	54.27	54.26	57.42
5.	SKUA-BG-3	8.13	10.28	42.23	47.04	46.09	49.99
6.	SKUA-BG-4	6.99	8.34	41.91	47.34	46.73	49.93
7.	SKUA-BG-5	6.25	8.70	43.25	47.89	48.08	51.04
8.	SKUA-BG-6	6.66	9.79	45.39	49.33	50.25	52.82
9.	SKUA-BG-7	6.90	11.55	42.82	47.42	47.05	50.94
10	SKUA-BG-8	8.33	11.92	50.08	55.20	55.82	58.39
11	IC-047045	7.55	9.26	48.89	54.05	53.67	57.17
12	IC-262868	6.84	10.45	44.17	49.09	49.42	52.29
13	IC-256053	6.33	10.92	51.14	56.17	56.04	58.04
14	IC-256052	7.33	8.88	51.06	56.05	55.82	58.56
15	IC-256051	8.26	12.05	50.00	55.08	54.96	58.07
16	IC-256043	6.42	9.13	48.73	53.77	53.81	56.64
17	IC-284953	7.25	10.28	44.34	49.42	49.98	52.46
18	IC-284895	7.01	7.56	50.94	55.87	55.79	58.90
19	IC-284874-1	6.54	8.02	48.95	54.09	53.82	56.39
20	IC-284874	8.12	12.10	47.91	52.99	52.28	55.93
21	IC-284816	7.31	7.69	50.62	55.94	56.16	58.83
22	IC-276552	7.72	11.37	48.85	53.78	54.05	56.64
23	IC-276153	6.21	8.99	41.92	46.40	46.33	48.99
24	IC-294891	6.85	9.40	45.68	50.79	50.93	53.52
25	IC-294891-1	7.64	7.78	41.68	46.76	46.46	50.15
26	IC-319460	7.07	11.88	43.75	48.78	48.88	51.72
27	IC-316017-1	8.16	8.44	49.66	54.58	55.17	58.04
28	IC-318883-1	8.31	11.04	42.33	47.77	46.83	50.45
29	IC-310206-1	6.33	7.27	44.64	49.37	49.24	52.52
30	IC-310206	6.33	9.23	51.48	56.03	56.30	59.10
31	IC-307077	7.19	8.15	42.45	46.74	47.15	49.98
32	IC-310188	7.83	11.99	45.20	51.03	50.37	54.11
33	IC-306422	7.34	11.11	42.99	47.94	47.58	51.07
34	IC-297846	7.04	8.77	45.37	50.54	50.56	53.64

35	IC-306128-A	6.62	10.25	50.03	54.94	55.23	57.99
36	IC-418491	6.84	9.25	43.81	48.42	48.86	51.73
37	IC-385816	6.71	7.85	48.82	53.42	53.66	57.02
38	IC-382258	7.54	8.47	47.14	52.34	52.33	55.89
39	IC-371747-1	8.32	8.79	42.03	47.52	46.11	50.73
40	IC-371747	8.04	11.05	50.11	55.31	55.04	58.86
41	IC-392392	7.72	7.75	48.90	54.48	54.44	58.86
42	IC-522868-1	7.45	9.65	44.73	48.63	49.31	52.62
43	IC-371697	7.29	8.77	44.24	49.18	47.80	52.93
44	IC-522866	7.32	10.53	50.21	55.09	54.99	58.65
45	IC-522856	6.92	11.14	45.27	51.01	50.72	54.97
46	IC-426990	6.95	8.74	48.10	53.48	53.03	58.20
47	IC-424502	6.63	8.17	50.02	55.50	54.84	58.59
48	IC-411915	6.78	7.84	49.58	54.62	54.48	57.77
49	IC-522868	7.15	8.21	48.46	53.38	52.74	57.47
50	IC-522876	7.22	10.32	46.74	51.72	50.95	54.60
51	IC-522878	6.74	7.44	48.38	53.35	53.44	56.96
52	IC-385816-1	6.88	11.24	42.44	46.08	46.04	50.56
53	IC-394736	7.98	11.95	43.62	47.57	47.44	51.64
54	IC-394857	8.16	9.85	45.78	51.08	50.98	54.70
55	IC-398541	8.32	7.66	44.67	49.52	49.65	53.53
56	IC-417705	7.75	8.55	49.98	54.86	54.99	58.37
57	IC-421962	7.66	10.35	42.49	47.66	47.56	51.69
58	IC-418491-A	6.82	7.95	41.91	46.68	46.96	50.05
59	IC-342078	6.62	11.99	43.77	48.34	48.66	54.30
60	IC-321121	8.15	11.11	44.60	49.69	49.68	53.76
61	IC-341390	7.62	9.08	50.06	55.98	55.99	58.50
62	IC-339209	7.08	8.54	47.19	51.97	52.20	56.00
63	IC-536894-1	7.27	7.24	42.38	47.50	47.30	51.57
64	IC-331981	6.79	7.25	41.95	46.60	46.92	51.06
65	IC-330999	8.26	11.61	42.70	47.34	47.82	50.12
66	IC-321460	7.44	10.12	46.38	51.52	51.27	54.07
67	IC-325973	7.53	11.98	43.50	48.68	47.98	51.30
68	IC-321559	7.97	9.69	42.99	48.09	47.06	51.40
69	IC-321412	6.76	7.54	44.51	49.21	49.61	52.63
70	IC-321414-1	8.55	8.32	50.49	55.26	55.12	58.48
71	IC-312410-1	6.73	8.74	49.96	55.06	54.98	58.08
72	IC-321410	8.51	10.35	50.10	55.03	55.23	58.22
73	IC-330987	7.56	7.75	51.28	55.06	56.01	58.46
74	IC-331121	7.88	11.86	50.45	55.26	55.52	58.33
75	IC-342080	6.77	9.15	47.69	52.84	52.64	55.76
76	IC-546151	7.14	12.54	50.02	55.37	55.21	58.14
77	IC-536594	6.84	9.15	48.43	53.76	52.63	56.24
Mean		7.24	9.52	46.38	51.37	51.24	54.64
C.V		5.32	3.91	1.66	1.28	1.18	1.01
C.D. 5%		0.82	0.60	1.24	1.06	0.97	0.89

Genotypes like IC-316017-1 (159.20) followed by IC-307077 (155.90) and IC-276552 (150.10) were found superior for number of male flowers plant^{-1}; IC-310206 (18.64) followed by IC-306422 (18.24) and IC-382258 (16.82) for number of female flowers plant^{-1}; IC-294891-1 (61.06 days) followed by SKUA-BG-4 (61.57 days) and Pusa Naveen (61.67 days) for days to 1st fruit harvest; IC-424502 (147.78 days) followed by IC-385816 (147.57 days) and IC-321410 (147.33 days) for days to last fruit harvest; SKUA-BG-8 (8.98 m) followed by IC-321121 (8.53 m) and SKUA-BG-3 (8.19 m) for vine length; IC-371747-1 (21.33) followed by IC-398541 (21.31) and IC-536594 (21.22) for number of primary branches. This is in conformity to the findings of Jain *et al.* (2016), Rambabu *et al*. (2017) and Kandasamy *et al*. (2019), Khan *et al.* (2020) and Rashid *et al.* (2020).

Table 2: Mean performance of Bottle gourd (*Lagenaria siceraria*) genotypes for various quantitative characters

S.No.	Genotypes	No. of male flowers plant^{-1}	No. of female flowers plant^{-1}	Days to 1st fruit harvest	Days to last fruit harvest	Vine Length (m)	No. of Primary Branches
1	Pusa Naveen	98.73	14.09	61.67	135.89	4.45	10.50
2	Pusa Santushti	99.17	14.12	65.03	136.90	7.92	17.33
3	SKUA-BG-1	148.69	15.95	62.47	140.36	7.49	18.24
4	SKUA-BG-2	134.55	16.02	75.60	145.57	5.42	15.74
5	SKUA-BG-3	149.75	16.63	62.64	139.55	8.19	19.88
6	SKUA-BG-4	143.21	17.88	61.57	134.77	8.09	18.37
7	SKUA-BG-5	97.79	13.94	70.78	140.68	4.84	12.38
8	SKUA-BG-6	122.28	15.26	62.75	137.11	5.13	14.35
9	SKUA-BG-7	137.87	15.33	62.57	137.83	4.01	10.40
10	SKUA-BG-8	148.03	14.92	68.56	139.99	8.98	19.10
11	IC-047045	141.17	15.66	74.74	142.66	7.79	20.16
12	IC-262868	100.92	14.37	71.62	144.12	4.96	14.79
13	IC-256053	135.74	15.08	77.54	146.31	6.16	13.70
14	IC-256052	122.70	15.32	73.66	143.04	4.41	13.41
15	IC-256051	100.45	14.33	75.50	145.33	3.92	14.69
16	IC-256043	124.24	13.79	75.27	147.00	3.46	12.09
17	IC-284953	149.60	14.96	62.32	139.53	5.39	14.87
18	IC-284895	139.55	13.94	75.66	142.89	4.90	15.65
19	IC-284874-1	131.04	14.60	74.21	144.94	5.32	16.42
20	IC-284874	147.60	15.12	74.78	140.98	5.59	16.61
21	IC-284816	139.00	14.27	74.52	143.74	5.46	14.63
22	IC-276552	150.10	15.98	72.06	145.44	4.93	15.54
23	IC-276153	114.72	14.89	62.23	137.89	4.44	12.72
24	IC-294891	134.46	15.00	72.31	143.77	5.23	13.73
25	IC-294891-1	134.70	15.13	61.06	138.44	4.95	14.91
26	IC-319460	143.01	15.71	75.26	143.74	6.13	18.59
27	IC-316017-1	159.20	15.95	72.27	141.77	6.36	17.72
28	IC-318883-1	136.20	16.44	62.13	135.83	6.73	20.33

29	IC-310206-1	124.29	13.96	75.75	144.80	6.66	19.99
30	IC-310206	150.08	18.64	77.45	146.82	6.75	20.35
31	IC-307077	155.90	15.65	65.64	138.94	5.49	17.00
32	IC-310188	130.05	15.38	75.18	145.20	6.71	18.73
33	IC-306422	140.88	18.24	74.13	143.90	6.17	17.11
34	IC-297846	146.50	15.76	75.62	145.47	5.02	13.58
35	IC-306128-A	134.10	14.85	75.78	146.14	6.68	18.62
36	IC-418491	121.36	15.72	67.32	140.09	5.42	17.70
37	IC-385816	101.99	15.78	77.10	147.57	5.45	18.64
38	IC-382258	120.96	16.82	77.19	147.16	6.74	18.98
39	IC-371747-1	131.58	14.89	77.04	146.95	6.76	21.33
40	IC-371747	136.70	14.04	77.16	146.61	5.27	20.36
41	IC-392392	113.89	16.66	72.24	140.99	5.47	19.75
42	IC-522868-1	120.75	17.51	62.42	136.58	5.41	18.44
43	IC-371697	127.60	16.08	63.16	135.71	6.18	20.59
44	IC-522866	119.28	15.12	72.86	142.73	5.33	18.63
45	IC-522856	140.76	16.56	76.20	145.63	5.26	17.88
46	IC-426990	134.90	13.67	76.43	146.19	3.71	11.16
47	IC-424502	120.69	13.68	77.18	147.78	4.80	14.48
48	IC-411915	132.57	14.73	71.85	142.18	4.94	15.71
49	IC-522868	140.04	15.56	76.64	144.67	5.25	17.42
50	IC-522876	144.00	14.40	77.92	146.74	4.72	15.16
51	IC-522878	100.59	14.37	75.97	145.35	3.42	11.80
52	IC-385816-1	139.50	13.95	76.07	144.79	5.08	15.32
53	IC-394736	142.70	14.27	76.25	145.99	5.23	16.59
54	IC-394857	124.47	13.83	76.35	146.06	4.87	14.75
55	IC-398541	114.88	14.36	73.91	141.82	6.75	21.31
56	IC-417705	125.73	13.97	76.66	145.53	5.09	14.07
57	IC-421962	111.76	13.97	74.93	143.47	5.28	16.80
58	IC-418491-A	149.90	14.99	75.56	146.18	5.20	17.43
59	IC-342078	105.04	13.13	76.34	147.10	5.44	17.16
60	IC-321121	125.64	13.96	75.24	145.95	8.53	19.44
61	IC-341390	110.80	13.85	77.81	146.59	7.85	21.12
62	IC-339209	127.44	14.16	74.78	144.62	6.76	17.49
63	IC-536894-1	143.00	14.30	73.85	145.31	5.53	16.59
64	IC-331981	136.00	13.60	74.87	146.56	5.76	16.39
65	IC-330999	136.56	15.14	75.19	146.06	7.70	17.22
66	IC-321460	118.86	14.77	75.78	145.80	5.15	18.04
67	IC-325973	133.91	14.86	75.11	145.95	6.00	20.25
68	IC-321559	125.89	13.99	76.18	144.73	6.59	19.95
69	IC-321412	109.45	13.64	75.22	143.64	6.41	20.05
70	IC-321414-1	136.33	13.64	76.33	145.56	5.74	18.91
71	IC-312410-1	122.29	15.45	76.19	146.91	7.22	17.79
72	IC-321410	116.83	14.62	76.96	147.33	7.23	16.94
73	IC-330987	145.64	16.17	76.78	147.21	6.79	20.84
74	IC-331121	124.51	13.76	77.82	147.00	8.10	21.17
75	IC-342080	106.01	13.18	71.37	142.92	8.05	20.36

76	IC-546151	135.99	13.58	76.97	146.78	6.68	20.85
77	IC-536594	148.13	14.81	75.73	145.59	7.62	21.22
Mean		129.78	14.97	72.82	143.58	5.90	17.12
C.V		1.93	3.07	0.70	0.38	6.16	5.76
C.D. 5%		4.04	0.74	0.82	0.88	0.58	1.59

IC-310206 (8.6) followed by SKUA-BG-4 (8.2) and SKUA-BG-3 (7.4) were found superior for number of fruits plant^{-1}; IC-382258 (4.40 kg) followed by IC-371747-1 (4.36 kg) and IC-398541 (4.17 kg) for fruit weight; IC-382258 (63.54 cm) followed by SKUA-BG-1 (61.46 cm) and IC-316017-1 (56.16 cm) for fruit length; IC-421962 (16.43 cm) followed by IC-319460 (16.42 cm) and Pusa Santushti (16.00 cm) for fruit diameter; IC-371747-1 (22.64 kg) followed by IC-382258 (16.96 kg) and IC-398541 (16.93 kg) for fruit yield plant^{-1}; IC-371747-1 (1132.21 q) followed by IC-382258 (848.199 q) and IC-398541 (845.33 q) for fruit yield ha^{-1}. Similar findings were observed by Jain *et al.* (2016), Rambabu *et al*. (2017), Kandasamy *et al*. (2019), Rashid *et al.* (2020), Sohi *et al.* (2021) and Dubey *et al.* (2022).

Table 3: Mean performance of Bottle gourd (*Lagenaria siceraria*) genotypes for various quantitative characters

S. No.	Genotypes	No. of Fruits plant^{-1}	Fruit Weight (kg)	Fruit Length (cm)	Fruit Diameter (cm)	Yield plant^{-1} (kg)	Yield ha^{-1}(q)
1.	Pusa Naveen	4.9	0.89	31.83	6.35	4.363	220.307
2.	Pusa Santushti	3.5	3.48	42.81	16.00	12.368	618.638
3.	SKUA-BG-1	5.4	2.24	61.46	5.00	12.262	612.829
4.	SKUA-BG-2	5.2	1.38	32.80	7.23	7.189	361.071
5.	SKUA-BG-3	7.4	1.65	44.77	5.72	12.482	630.362
6.	SKUA-BG-4	8.2	1.48	37.13	5.64	12.315	616.282
7.	SKUA-BG-5	4.3	1.23	43.50	6.15	5.286	265.729
8.	SKUA-BG-6	5.1	1.17	38.19	5.04	5.970	301.489
9.	SKUA-BG-7	6.0	0.79	41.16	6.14	4.763	241.783
10.	SKUA-BG-8	5.3	2.57	44.43	7.13	13.889	694.981
11.	IC-047045	5.9	1.88	48.23	5.22	11.461	573.328
12.	IC-262868	3.5	1.72	48.46	6.15	6.027	303.511
13.	IC-256053	4.1	1.99	26.22	8.01	8.160	409.141
14.	IC-256052	5.2	1.43	53.13	6.18	7.429	372.610
15.	IC-256051	3.4	1.59	38.70	6.00	5.461	275.802
16.	IC-256043	3.5	1.41	43.39	5.50	4.989	251.782
17.	IC-284953	4.3	1.50	54.76	5.40	6.446	323.767
18.	IC-284895	3.5	1.62	42.71	5.31	5.667	284.353
19.	IC-284874-1	3.7	1.69	53.05	5.88	6.248	313.895
20.	IC-284874	4.5	2.01	51.76	5.49	9.043	453.235
21.	IC-284816	3.6	1.92	49.81	5.37	6.972	352.276
22.	IC-276552	4.4	1.50	51.74	5.72	6.603	331.097

23.	IC-276153	3.7	1.59	53.84	5.90	5.884	295.424
24.	IC-294891	3.6	2.25	45.67	7.99	8.083	404.612
25.	IC-294891-1	3.6	1.70	36.52	8.70	6.112	306.699
26.	IC-319460	5.3	1.87	12.67	16.42	10.161	508.480
27.	IC-316017-1	5.4	2.16	56.16	5.61	12.162	607.856
28.	IC-318883-1	6.8	2.05	51.14	7.52	13.861	693.116
29.	IC-310206-1	3.7	3.70	53.49	8.29	13.786	690.066
30.	IC-310206	8.6	1.50	42.04	5.81	13.000	651.134
31.	IC-307077	5.2	1.51	36.70	6.23	7.903	397.826
32.	IC-310188	3.8	4.26	43.90	8.28	16.428	822.145
33.	IC-306422	6.7	1.61	38.00	12.64	10.849	544.290
34.	IC-297846	4.4	1.41	39.00	6.89	6.213	313.190
35.	IC-306128-A	5.3	2.52	34.93	8.13	13.224	661.778
36.	IC-418491	4.1	1.69	33.80	6.63	6.988	351.761
37.	IC-385816	4.9	1.76	40.90	6.07	8.623	432.624
38.	IC-382258	3.8	4.40	63.54	8.97	16.964	848.199
39.	IC-371747-1	5.2	4.36	47.00	9.51	22.648	1132.212
40.	IC-371747	3.4	2.13	46.20	9.14	7.241	362.883
41.	IC-392392	6.9	1.25	40.90	6.86	8.626	432.728
42.	IC-522868-1	6.2	1.26	51.50	6.04	7.815	392.025
43.	IC-371697	5.5	2.10	37.90	8.81	11.627	582.166
44.	IC-522866	5.4	1.63	35.70	8.36	8.857	445.228
45.	IC-522856	4.6	1.44	34.10	7.80	6.627	332.308
46.	IC-426990	3.6	1.52	36.90	7.83	5.471	274.403
47.	IC-424502	3.5	1.78	43.14	6.19	6.291	317.501
48.	IC-411915	3.7	2.03	32.20	10.64	7.513	376.660
49.	IC-522868	4.4	1.49	44.10	5.70	6.557	328.624
50.	IC-522876	3.5	1.52	41.30	5.58	5.319	267.444
51.	IC-522878	3.6	1.17	48.90	5.25	4.211	211.839
52.	IC-385816-1	4.1	1.94	47.20	6.27	8.021	404.137
53.	IC-394736	3.7	1.75	42.70	6.86	6.477	324.993
54.	IC-394857	3.5	1.49	45.95	6.92	5.216	261.952
55.	IC-398541	4.1	4.17	51.00	7.95	16.938	845.332
56.	IC-417705	3.8	1.90	51.00	7.52	7.221	362.053
57.	IC-421962	3.9	1.99	22.50	16.43	7.760	375.605
58.	IC-418491-A	4.1	1.79	52.40	6.45	7.338	368.234
59.	IC-342078	3.7	1.56	48.30	5.11	5.837	294.502
60.	IC-321121	3.8	3.16	44.20	9.07	11.913	598.087
61.	IC-341390	3.7	2.43	46.10	5.90	9.023	456.043
62.	IC-339209	3.9	1.99	47.20	6.57	7.839	394.227
63.	IC-536894-1	4.0	1.56	51.70	5.60	6.251	314.105
64.	IC-331981	3.4	1.50	34.43	5.62	5.150	259.388
65.	IC-330999	4.3	1.64	39.90	5.32	7.109	357.914
66.	IC-321460	4.2	1.58	38.40	5.11	6.700	338.102
67.	IC-325973	4.5	1.79	41.50	6.11	8.116	408.479
68.	IC-321559	4.2	1.86	45.00	6.32	7.811	391.790

69.	IC-321412	3.7	1.82	51.93	6.31	6.793	342.531
70.	IC-321414-1	3.7	1.76	41.00	5.79	6.509	326.426
71.	IC-312410-1	4.4	1.91	40.50	6.48	8.483	427.269
72.	IC-321410	4.3	1.77	40.60	5.79	7.668	385.156
73.	IC-330987	5.0	1.65	40.00	5.59	8.322	418.657
74.	IC-331121	4.6	1.97	41.00	6.18	9.147	459.926
75.	IC-342080	3.9	2.03	44.60	6.26	7.984	402.047
76.	IC-546151	3.8	2.22	49.50	7.46	8.450	424.293
77.	IC-536594	4.4	1.95	48.90	7.10	8.658	435.659
Mean		4.52	1.92	43.50	7.07	8.58	430.78
C.V		2.98	9.26	3.06	8.26	9.11	9.00
C.D. 5%		0.21	0.28	2.15	0.94	1.26	62.56

Conclusion

In the present study to evaluate the germplasm collection the mean of seventy-seven genotypes with two checks for 18 characters is presented in Table-1, 2 and 3. Wide range of variation in mean performance of genotypes was observed for all the characters under study. Since no genotype could be identified to have superior performance for all the characters, the genotypes with diverse characteristics could be used in a well-planned hybridization programme to select superior performing lines in the successive segregating lines. Based on mean performance of the genotypes, it was observed that highest yield ha^{-1} was recorded in IC-371747-1 (1132.21 q) followed by IC-382258 (848.19 q) and IC-398541 (845.33 q) whereas, the lowest yield ha^{-1} was recorded in IC-522878 (211.83 q) followed by Pusa Naveen (220.30 q) and SKUA-BG-7 (241.78 q).

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