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Comparative Performance of Various Bottle Gourd [*Lagenaria siceraria* (Molina) Standl.] Genotypes

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A B S T R A C T

The present investigation was carried out at the Experimental Field, Division of Vegetable Science, SKUAST-K, Shalimar during Kharief 2018. The experiment was laid out in randomized complete block design (RCBD) with three replications. Thirty genotypes were evaluated for various quantitative and quality traits. Analysis of variance revealed significant differences among genotypes for all the traits. The maximum fruit yield plant^{-1} was recorded in Shalimar improved (7.57 kg) followed by SH-BG-72 (7.30 kg), SH-BG-17 (7.28 kg) and the minimum fruit yield plant^{-1} was recorded in SH-BG-53 (4.32 kg).

Introduction

Bottlegourd [*Lagenaria siceraria* (Molina) Standl.] (2n=2x=22) belongs to family Cucurbitaceae and is one of the most ancient crop cultivated during summer throughout the world. The genus *Lagenaria* is derived from the 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 2000 B.C. It has been found wild in India, the Moluccas and Ethiopia. In India the total area under its cultivation is 185 thousand hectares with an annual production of 3072 thousand MT (NHB, 2018).

However in Jammu and Kashmir it is grown over an area of 1.60 thousand hectares with a production of 36.17 thousand MT (Anonymous, 2018). It is a highly cross pollinated crop due to its monoecious and andromonoecious nature (Swiander *et al.*, 1994) and shows large amount of variation for various economic traits of which the most interesting variation

is found for size, shape and colour of fruits. Bottle gourd flowers are produced at leaf nodes and are solitary. Flowering starts from about 40 days after planting during summer, however this may be influenced by cultivar differences. Generally male flowers appear before female flowers (Morimoto *et al.*, 2004). Thereafter, a flush of male and female flowers occurs continuously. Male flowers remain open only for a few hours and eventually wither and die off, thus the flowering period is normally shorter in male flowers than in female flowers (Morimoto *et al.*, 2004). Flower opening occurs late in the afternoon and sometimes during the night (Sugiyama *et al.*, 2014).

Materials and Methods

The present investigation was carried out at Vegetable Experimental Farm, Division of Vegetable Science, SKUAST-Kashmir, Shalimar, srinagar during *Kharif* 2018. The altitude of the location is 1685 meter above mean sea level and situated 34^{o} N of latitude and 74.89^{o} E of longitude. The climate is temperate characterized by mild summers. The mean minimum and maximum temperatures are recorded in months of January and June (respectively). The maximum rain fall is received during March to April. Thirty genotypes of bottle gourd were evaluated for various yield and yield attributing traits.

A single factor experiment was laid out in randomized complete block design (RCBD) with three replications of each accession per plot. Plants from each genotype were transplanted at random to each block at spacing of 1 m between rows and 0.60 m between plants. Recommended package of practices were adopted to raise a healthy crop. The observations were recorded on node number at which first male flower appeared, node number at which first female flower appeared, days to anthesis of first male flower, days to anthesis of first female flower, days to first fruit harvest, days to last fruit harvest, fruit length, fruit diameter, number of fruits plant^{-1}, fruit yield plant^{-1}, fruit yield hectare^{-1}, dry matter content, total chlorophyll and total sugars. Observations were recorded on five randomly selected plants from each replication and mean was worked out.

Results and Discussion

In this study genotypes showed wide range of variability for most of the morphological, growth and fruit characters (Table-1). The estimates of mean values revealed that no genotype was superior for all the characters under study. However VRBG-1 (6.26) followed by IC-337078 (6.60) and VRBG-7 (6.66) were superior for node number at which first male flower appeared. VRBG-59 (7.13) followed by IC-383252 (7.2) and VRBG-1 (9.33) were superior for node number at which first female flower appeared, SH-BG-95 (41.53) followed by VRBG-59 (41.60) and IC-383252 (41.80) for days to anthesis of first male flower, IC-383252 (46.80) followed by SH-BG-95 (47.26) and SH-BG-88 (47.33) for days to anthesis of first female flower, SH-BG-72 (66.20) followed by IC-337078 (66.46) and SH-BG-83 (66.60) for days to first fruit harvest, SH-BG-72 (154.46) followed by VRBG-18, SH-BG-88, SH-BG-17 (153.00 each) for days to last fruit harvest, Shalimar Improved (74.53) followed by SH-BG-83 (71.95) and SH-BG-95 (71.46) for fruit length, VRBG-1 (10.88) followed by VRBG-7 (9.27) and VRBG-59 (8.41) for fruit diameter, SH-BG-10 (6.90) followed by SH-BG-17 (6.73) and SH-BG-72 (6.43) for number of fruits plant^{-1}, Shalimar improved (7.57) followed by SH-BG-72 (7.30) and SH-BG-17 (7.28) for fruit yield plant^{-1}, Shalimar improved (1261.06) followed by SH-BG-72 (1217.17) and SH-BG-17 (1213.20) for fruit yield hectare^{-1}.

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

S. No	Genotype	Node no. at which first male flower appeared	Node no. at which first female flower appeared	Days to anthesis of first male flower	Days to anthesis of first female flower	Days to first fruit harvest	Days to last fruit harvest	Fruit length (cm)	Fruit diameter (cm)	No. of fruits plant^{-1}	Fruit yield plant^{-1} (kg)	Fruit yield (qha^{-1})	Dry matter content (%)	Total Chlorophyll (mg100g^{-1})	Total sugars (%)
1.	IC-337078	6.60	10.26	45.00	50.60	66.46	145.13	55.26	4.70	4.60	4.97	827.74	5.10	56.81	1.45
2.	IC-339187	7.93	11.73	42.33	47.53	67.66	142.86	67.33	4.12	5.06	7.13	1188.84	3.86	40.00	1.26
3.	IC-331025	7.20	10.73	43.80	49.73	75.73	143.73	58.33	4.27	4.02	5.05	842.19	6.19	49.94	1.55
4.	IC-331088	8.20	11.20	43.13	48.66	69.26	148.46	62.26	4.32	4.73	5.63	937.74	5.24	60.72	1.42
5.	IC-383252	7.60	7.20	41.80	46.80	71.93	144.66	45.53	4.74	4.87	5.28	879.41	6.29	32.79	1.41
6.	SH-BG-1	7.86	11.13	51.26	55.66	67.13	141.80	61.42	4.78	4.60	5.30	883.30	6.47	47.79	1.55
7.	SH-BG-3	8.00	11.40	45.60	50.86	67.13	144.86	67.00	4.62	5.00	6.71	1117.73	5.58	41.33	1.42
8.	SH-BG-7	7.20	10.40	47.33	52.93	67.33	141.86	64.00	4.39	5.90	6.23	1037.74	5.46	39.90	1.79
9.	SH-BG-10	7.60	11.06	47.13	53.06	70.60	144.66	66.86	4.40	6.90	7.01	1167.73	6.23	49.70	1.93
10.	SH-BG-14	7.46	10.93	43.06	47.86	67.73	143.93	64.26	4.07	5.37	6.95	1157.73	5.26	65.25	2.00
11.	SH-BG-17	7.86	10.86	48.00	53.93	68.06	153.00	71.93	6.57	6.73	7.28	1213.28	6.31	51.54	1.41
12.	SH-BG-23	7.53	11.46	42.13	50.33	68.73	143.93	65.00	4.37	5.23	7.02	1170.51	4.93	29.99	1.61
13.	SH-BG-27	7.06	10.53	49.26	53.20	68.53	149.73	63.33	4.82	5.93	6.09	1014.96	5.06	44.43	1.66
14.	SH-BG-34	7.53	11.86	51.33	56.66	71.13	140.33	69.33	4.22	5.80	7.25	1207.73	5.15	34.24	1.96
15.	SH-BG-43	6.86	10.00	44.86	48.93	69.26	144.86	57.26	4.72	4.01	5.36	892.74	6.00	52.48	1.46
16.	SH-BG-48	7.86	11.33	46.26	54.93	69.60	151.73	60.40	4.21	5.88	5.27	877.74	5.43	35.38	1.83
17.	SH-BG-53	8.33	10.66	42.00	49.80	67.93	145.60	58.73	4.46	4.59	4.32	720.53	5.46	31.47	1.55
18.	SH-BG-64	7.46	11.20	43.80	49.26	68.06	145.20	67.86	4.05	6.17	7.04	1173.29	6.76	29.05	1.47
19.	SH-BG-72	7.80	10.86	42.86	47.33	66.20	154.46	71.93	4.32	6.43	7.30	1217.17	7.20	25.27	1.93
20.	SH-BG-83	7.66	11.00	42.13	48.20	66.60	148.93	71.95	4.92	5.33	7.02	1169.40	5.85	51.37	1.51
21.	SH-BG-86	8.06	11.26	49.06	53.86	68.73	146.53	56.06	4.03	5.10	5.51	917.74	7.16	26.57	1.48
22.	SH-BG-88	7.26	9.93	42.26	47.33	68.20	153.00	56.93	4.43	4.87	5.67	945.52	5.76	43.53	1.49
23.	SH-BG-91	6.86	12.00	47.06	53.60	69.53	144.13	58.46	4.34	4.73	5.67	944.96	5.56	57.86	1.81
24.	SH-BG-95	7.66	10.00	41.53	47.26	70.33	149.73	71.46	4.01	5.53	7.22	1203.29	5.80	45.17	1.44
25.	Shalimar improved	7.53	10.06	42.93	51.06	68.13	144.06	74.53	4.01	5.50	7.57	1261.06	6.03	37.47	1.90
26.	VRBG-1	6.26	9.33	44.26	50.60	67.46	142.06	25.06	10.88	4.62	7.13	1188.84	6.13	53.97	1.35
27.	VRBG-5	7.26	10.80	46.40	53.06	67.20	142.26	35.46	5.74	4.47	4.63	771.08	7.17	42.27	1.60
28.	VRBG-7	6.66	10.46	44.33	51.00	67.80	146.13	33.20	9.27	4.67	6.65	1108.29	7.16	45.36	1.77
29.	VRBG-18	7.06	9.93	43.46	50.80	67.73	153.00	49.06	7.39	4.07	7.05	1175.51	7.07	48.28	1.16
30.	VRBG-59	7.13	7.13	41.60	51.00	69.06	150.00	53.60	8.41	4.72	7.06	1177.18	7.16	55.73	1.95
Mean		**7.44**	**10.56**	**44.86**	**50.86**	**68.64**	**146.35**	**59.45**	**5.11**	**5.18**	**6.27**	**1046.36**	**5.96**	**44.19**	**1.60**
C.V.		**6.04**	**7.32**	**2.22**	**2.68**	**1.32**	**1.18**	**3.54**	**8.80**	**6.75**	**4.70**	**4.70**	**5.69**	**22.44**	**7.86**
C.D. 5 %		**0.73**	**1.26**	**1.62**	**2.23**	**1.48**	**2.84**	**3.40**	**0.71**	**0.37**	**0.27**	**46.45**	**0.55**	**16.21**	**0.20**

The maximum range was recorded for fruit yield hectare^{-1}, followed by fruit length, total chlorophyll and days to last fruit harvest. While the lowest range was observed for total sugars followed by node number at which first male flower appeared and number of fruit plant^{-1}. A wide range of variations existing for various quantitative traits has also been reported in bottle gourd by various workers like Prasad *et al., (*1993), Narayan *et al., (*1996), Singh *et al.,* (2008), Pandit *et al., (*2009) and Emina *et al., (*2012). Rahman *et al.,* (2002) and Fayeun *et al.,* (2012) in pumpkin.

In this study the genotypes showed wide range of variability for most of the morphological, growth and fruit characters (Table-1). Based on the overall performance of the genotypes under study the genotypes Shalimar Improved, SH-BG-72 and SH-BG-17 were found to be best with respect to yield indicating that these genotypes should be considered for further improvement.

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