

Evaluation of Yield and Yield Attributing Characters in Bottle Gourd (*Lagenaria siceraria* L.)

B. Sailaja, A. Mohanty, S. Srichandan, S. Sarkar

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ABSTRACT

A field experiment was conducted at All India Co-ordinated Research Project on Vegetable Crops, Odisha University of Agriculture and Technology, Bhubaneswar with seventeen genotypes of bottle gourd (*Lagenaria siceraria*) in Randomized Block Design with three replications during Post *rabi* 2018-19. Significant differences were recorded for all traits studied. Maximum fruit length was seen for NBBH-200 (49.76 cm) genotype. Shilpa showed maximum fruit circumference of 59.36 cm. Genotype

Yamla (13.20 cm) maximum fruit girth. Fruit weight was maximum for the genotype 2018/BOG HYB-7 (1.30 kg). Highest seeds per fruit was recorded in Yamla (529.86). Among the genotypes, genotype Arya (29.00), were earlier in flowering than the rest of the genotypes. Among the genotypes, genotype 2018/BOG HYB-1 (35.30) is found to be earliest in days to 50% flowering. The genotypes, Yamla (4.00 kg) produced maximum fruit yield per plant followed by 2018/BOG HYB-7 (3.83 kg) and Shilpa (3.80 kg). These high yielding genotypes can serve as potentially useful parents in further breeding program.

Keywords Bottle gourd, Mean performance, Genotypes, Yield, Fruit circumference.

B. Sailaja

Post Graduate Student, Department of Vegetable Science, College of Agriculture, Odisha University of Agriculture and Technology, Bhubaneswar 751003, India

A. Mohanty

Senior Vegetable Breeder, AICRP on Vegetable Crops, Odisha University of Agriculture and Technology, Bhubaneswar 751003, India

S. Sarkar

Vegetable Pathologist, AICRP on Vegetable Crops, Odisha University of Agriculture and Technology, Bhubaneswar 751003, India

S. Srichandan*

Senior Scientist and Head, Krishi Vigyan Kendra, Sambalpur, Chiplima, Odisha University of Agriculture and Technology, India
Email : subrataaradhya@gmail.com

*Corresponding author

INTRODUCTION

Bottle gourd (*Lagenaria siceraria*) belongs to the family Cucurbitaceae having somatic chromosome number $2n=22$. It is highly cross pollinated crop due to its monoecious and andromonoecious nature (Swiander *et al.* 1999). Bottle gourd was domesticated in Asia and at the same time indigenous to Africa (Whitaker and Davis 1962). Bottle gourd exhibits great morphological and genetic variability and wide environmental adaptation in nature (Uddin *et al.* 2014). Bottle gourd seed is a potential source of protein, lipid, micro and macronutrients (Hassan *et al.* 2008). Though it has various medicinal properties due attention has been not given towards need based crop improvement program. However in recent days

Table 1. Sources of bottle gourd genotypes (*Lagenaria siceraria* L.).

Geno- types	Name	Sources
V ₁	2018/BOG HYB-1	IET, AICRP on Vegetable crops,OUAT
V ₂	2018/BOG HYB-2	IET, AICRP on Vegetable crops,OUAT
V ₃	2018/BOG HYB-3	IET, AICRP on Vegetable crops,OUAT
V ₄	2018/BOG HYB-4	IET, AICRP on Vegetable crops,OUAT
V ₅	2018/BOG HYB-5	IET, AICRP on Vegetable crops,OUAT
V ₆	2018/BOG HYB-6	IET, AICRP on Vegetable crops,OUAT
V ₇	2018/BOG HYB-7	IET, AICRP on Vegetable crops,OUAT
V ₈	BBOG-3-1	AICRP on Vegetable crops,OUAT
V ₉	Malika	IET, AICRP on Vegetable crops,OUAT
V ₁₀	Kaveri	Collected from different sources
V ₁₁	NBBH-200 Ramdev	Collected from different sources
V ₁₂	Shilpa	Collected from different sources
V ₁₃	Gourav	Collected from different sources
V ₁₄	Yamla	Collected from different sources
V ₁₅	9004	Collected from different sources
V ₁₆	Yogi	Collected from different sources
V ₁₇	Arya	Collected from different sources

cultivation of bottle gourd is increased because of increasing awareness among consumers towards its medicinal and nutritive value. Bottle gourd is known to lower cholesterol, triglyceride, low-density lipoproteins, pain and inflammation (Ghule *et al.* 2006). It is gaining popularity as a health food because of its easy digestibility, diuretic and Cardiatonic effects (Rahaman *et al.* 2008).

MATERIALS AND METHODS

The experiment was carried out at All India Co-ordinated Research Project on Vegetable Crops, OUAT, Bhubaneswar, during *rabi*, 2018-19 with 17 bottle

gourd genotypes. The experiment was laid out in Randomized Block Design (RBD) with three replications. In each replication, each entry was grown in a plot having four basins with 3 plants basin⁻¹. From randomly selected 5 plants per each plot observations were recorded for fifteen characters viz., plant height (cm), internodal length (cm), leaf area (m²), leaf weight (kg), days to flowering, days to 50% flowering, node at which female flower appear, node at which male flower appear, fruit length (cm), fruit girth (cm), fruit circumference (cm), fruit weight(g), number of seeds fruit⁻¹, fruit yield plant⁻¹ (g) and fruit yield hectare⁻¹ (q).

RESULTS AND DISCUSSION

Vegetative growth and flowering parameters

The mean performances of 17 genotypes of bottle gourd in respect of vegetative growth and flowering parameters are presented in Table 2. Plant height was maximum for Yogi (728.86 cm) and minimum for Kaveri (350.00 cm). Yogi recorded significantly maximum leaf area (399.76 m²) and the lowest leaf area was observed in the genotype Yamla (260.33 m²). Shilpa showed maximum leaf weight of (0.07 kg), 2018/BOG HYB-3, recorded the lowest leaf weight of (0.03 kg). 2018/BOG HYB-5 recorded highest internodal length of (22.06 cm) and Lowest internodal length was found in Kaveri (9.60cm). Genotype Arya (29.00) was earlier in flowering and the genotype 9004 (40.90) was found to be late in flowering. The genotype 2018/BOG HYB-1 (35.30) is found to be earliest in days to 50% flowering and genotype Arya (51.30) was found to be late in days to 50% flowering. In 2018/BOG HYB-7 (36.40) is highest number node with female flower and least number node with female flower was found in 2018/BOG HYB-1 (20.80). In Kaveri (36.40) is highest node number with male flower and least node number with male flower was found in 2018/BOG HYB-1 (23.60). Similar to the present findings, investigations carried out earlier also revealed wide variations for various characters (Bharathi *et al.* 2006).

Yield and yield attributing parameters

The mean performances of 17 genotypes of bottle

Table 2. Mean performance for vegetative and flowering parameters in 17 bottle gourd genotypes.

Genotypes	Plant height (cm)	Leaf area (m ²)	Leaf weight (kg)	Inter-nodal length (cm)	Days to flowering	Days to 50% flowering	Node at which female flower appear	Node at which male flower appear
2018/BOG HYB-1	623.33	315.10	0.04	14.63	32.40	35.30	20.83	23.66
2018/BOG HYB-2	535.53	310.03	0.05	19.06	32.86	35.73	30.43	31.33
2018/BOG HYB-3	543.33	174.70	0.03	11.30	34.63	39.10	23.53	27.33
2018/BOG HYB-4	430.00	306.60	0.05	12.96	34.93	37.66	25.53	29.33
2018/BOG HYB-5	636.66	281.73	0.04	22.06	37.23	40.66	26.93	27.66
2018/BOG HYB-6	526.66	319.10	0.05	15.10	36.53	46.93	31.73	33.33
2018/BOG HYB-7	550.00	313.43	0.05	21.10	37.76	42.16	36.46	28.80
BBOG-3-1	703.33	308.53	0.04	10.93	36.00	39.83	26.10	31.80
Malika	440.00	315.40	0.04	17.46	36.53	42.26	25.16	27.40
Kaveri	350.00	310.70	0.05	9.66	39.86	45.26	31.83	36.46
NBBH-200	356.66	360.90	0.05	15.43	35.43	41.36	27.96	25.33
Shilpa	420.00	372.73	0.07	10.86	39.83	45.46	23.46	27.23
Gourav	530.00	390.26	0.06	17.86	39.66	45.43	30.73	27.20
Yamla	646.66	260.33	0.04	10.63	30.60	48.23	36.03	32.83
9004	573.33	364.90	0.06	11.66	40.90	46.36	26.33	25.86
Yogi	728.86	399.76	0.06	15.83	38.43	42.10	34.46	34.86
Arya	636.66	279.50	0.04	13.06	29.00	51.33	30.30	33.93
CD	48.11	51.58	0.04	3.21	5.58	5.36	4.21	5.44
SE(m)	16.62	17.82	0.01	1.11	1.93	1.85	1.45	1.88
SE(d)	23.51	25.21	0.02	1.57	2.73	2.60	2.06	2.66
CV	5.30	9.74	5.65	13.08	9.28	7.52	8.79	10.99

gourd in respect of yield and yield attributing parameters are presented in Table 3. The highest fruit length was recorded in NBBH-200 (49.76 cm) and lowest fruit length was observed in BBOG-3-1 (7.46

Table 3. Mean performance for yield and yield attributing parameters in 17 bottle gourd genotypes.

Genotypes	Fruit length (cm)	Fruit circumference (cm)	Fruit girth (cm)	Fruit weight (kg)	Seeds/fruit	Yield plant (kg)	Yield/hectare (q)
2018/BOG HYB-1	30.76	24.13	5.23	1.12	413.06	2.7	292.80
2018/BOG HYB2	39.90	23.93	6.90	1.00	268.50	2.76	336.00
2018/BOG HYB-3	45.46	24.16	6.30	1.05	318.43	2.60	290.40
2018/BOG HYB-4	40.80	23.80	6.36	1.17	522.60	3.50	387.60
2018/BOG HYB-5	33.36	25.66	6.76	1.16	274.30	2.90	309.60
2018/BOG HYB-6	40.40	25.40	7.00	1.02	379.53	3.20	354.00
2018/BOG HYB-7	31.36	25.50	6.70	1.30	372.50	3.83	411.60
BBOG-3-1	7.46	48.36	12.66	1.12	343.73	2.43	260.40
Malika	32.33	32.13	9.80	0.70	420.80	1.90	195.60
Kaveri	29.46	21.70	7.03	0.72	459.63	2.06	201.60
NBBH-200	49.76	25.66	6.76	1.05	449.30	2.80	303.60
Shilpa	14.83	59.36	12.36	1.21	424.63	3.80	403.20
Gourav	45.26	25.46	7.26	1.17	442.06	3.30	361.20
Yamla	24.70	50.80	13.20	1.24	529.86	4.00	439.20
9004	42.23	24.53	6.53	1.13	417.40	3.63	378.00
Yogi	20.20	50.80	12.90	1.15	435.06	3.70	400.80
Arya	14.50	52.00	11.50	0.80	405.53	2.20	247.20
CD	4.12	3.04	1.20	0.04	55.14	0.43	49.34
SE(m)	1.42	1.05	0.41	0.01	19.05	0.14	16.54
SE(d)	2.01	1.49	0.58	0.02	26.94	0.21	21.56
CV	7.74	5.50	8.43	2.33	8.15	8.53	8.74

Table 4. Qualitative characters of 17 genotypes of bottle gourd.

Varieties	Characters				
	Stem shape	Leaf shape	Flower color	Fruit color	Fruit shape
2018/BOG HYB-1	Angular	Cordate	Cream	Patchy green	Cylindrical
2018/BOG HYB2	Angular	Cordate	Cream	Whitish green	Cylindrical
2018/BOG HYB-3	Angular	Cordate	Cream	Light green	Cylindrical
2018/BOG HYB-4	Angular	Cordate	Cream	Green	Long
2018/BOG HYB-5	Angular	Cordate	Cream	Light green with patches	Bottle
2018/BOG HYB-6	Angular	Cordate	Cream	Green without patches	Cylindrical
2018/BOG HYB-7	Angular	Cordate	Cream	Green	Bottle
BBOG-3-1	Angular	Cordate	Cream	Green	Round
Malika	Angular	Cordate	Cream	Whitish green	Pear shape
Kaveri	Angular	Cordate	Cream	Light green with patches	Bottle
NBBH-200	Angular	Cordate	Cream	Light green	Cylindrical
Shilpa	Angular	Cordate	Cream	Green	Round
Gourav	Angular	Cordate	Cream	Light green with patches	Bottle
Yamla	Angular	Cordate	Cream	Patchy green	Peri norm
9004	Angular	Cordate	Cream	Light green with patches	Bottle
Yogi	Angular	Cordate	Cream	Green	Pear
Arya	Angular	Cordate	Cream	Light green with patches	Round

cm). The highest fruit circumference was observed in genotype Shilpa (59.36 cm) and lowest fruit circumference was recorded in Kaveri (21.70 cm). The highest fruit girth was observed in genotype Yamla (13.20 cm) and lowest fruit girth was recorded in 2018/BOG HYB-3 (5.23 cm). 2018/BOG HYB-7 recorded maximum fruit weight of (1.30 kg) and lowest fruit weight was observed in Malika (0.72 kg). Highest seeds per fruit was recorded in Yamla (529.86) and lowest seeds per fruit were recorded in 2018/BOG HYB-2 (268.50) genotype. Yamla (4.00 kg) produced maximum fruit yield per plant and lowest fruit yield per plant was observed in genotype, Malika (1.90 kg).

Qualitative characters of 17 genotypes of bottle gourd

Morphological characters like flower color, fruit shape, fruit color of all genotypes are given in Table 4. Flowers of all the seventeen genotypes were found to be cream color. Based on fruit shape, the 17 genotypes were divided into fruit shape as round (2 genotypes) and cylindrical (5 genotypes) bottle (5 genotypes), long (1 genotype) and pear shape (2 genotypes), peri norm (1 genotype). Based on fruit color, the 17 gen-

otypes were divided into different groups viz., light green with patches, green without patches, green, whitish green, patchy green. Among them, maximum genotypes are light green with patches and green, 2 genotypes whitish green, 1 genotype is green without patches and 1 is patchy green.

CONCLUSION

Among the genotypes studied, three genotypes viz., Yamla, 2018/BOG HYB-7 and Shilpa showed significantly higher fruit yield per plant. There is need to evaluate these high yielding genotypes in large plots and over multi locations in Odisha for their commercial utilization in breeding program.

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