



# Varietal Evaluation of Bottle Gourd on Growth and Yield under Prayagraj Conditions or Respective Agro Climatic Zone

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## Authors' contributions

This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

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## ABSTRACT

The experiment was carried out in the SHUATS horticulture department field, which is located in the Prayagraj agroclimatic zone in Uttar Pradesh. The study, "Varietal Evaluation in Bottle Gourd," used a combination of treatments on 12 different varieties of bottle gourd, including 2021/BOGVAR -1 TO BOGVAR-12, MAHASHAKTI, and Faizabadhi long. The primary conclusions were vine length, where MAHASHAKTI showed the highest growth and 2021/BOGVAR-03 showed the lowest. The 2021/BOGVAR-06 shows the most node growth, while the 2021/BOGVAR-10 shows the lowest. In terms of fruit weight the maximum weight was seen in 2021/BOGVAR-07(1200g) and

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the minimum weight was observed in 2021/BOGVAR-02(492.5g), in terms of fruit yield per ha the maximum yield was seen in 2021/BOGVAR-07, 2021/BOGVAR-08 and the minimum weight was observed in 2021/BOGVAR-02, 2021/BOGVAR-03.

**Keywords:** Varietal; fruit weight; vine length; fruit yield; bottle gourd.

## 1. INTRODUCTION

The bottle gourd (*Lagenaria siceraria*), also referred to as "lauki," is a member of the Cucurbitaceae family and has chromosomal number  $2n=22$ . One of the most significant vegetables, it is grown in nearly all of India's states. It's also one of the most sought-after and profitable veggies in Indian marketplaces. Because of the conventional methods used in bottle gourd farming, many farmers were unable to obtain a good yield and profit. It contains sufficient amounts of minerals and vitamins. 95.54% moisture, 10.1 g of vitamin C, 16 IU of vitamin A, 0.029 g of thiamine, 0.022 g of riboflavin, 0.022 g of niacin, 3.39 g of carbohydrates, 0.02 g of lipids, and 150 mg of potassium per 100 g of fruit are found in its fruit (USDA, 2018). It is perfect for adding to animal feed or for use as human food (Ogunbusola et al., 2010). Since it is quickly absorbed, it is advised throughout the convalescent phase. The bottle gourd is a highly helpful vegetable in reducing digestive issues like constipation because of its high dietary fiber content. Reduction and fiber consumption have been proven to be positively correlated. It is common knowledge that veggies are important for human nourishment. Vegetables are an excellent and very inexpensive source of vitamins and minerals, which are vital for human nutrition. Vegetables are valued for their nutritional content, but there is now growing interest in their functional and therapeutic advantages for human health. When consumed in appropriate amounts, vegetables give flavor, palatability, boost appetite, and contain a reasonable amount of fiber [1-3]. Vegetables with cucurbits are a decent source of riboflavin and thiamine [4-6]. The bottle gourd is India's most popular vegetable crop, valued by Indian farmers for its greatest output and favorable returns.

## 2. MATERIALS AND METHODS

Department of Horticulture, Naini, SHUATS, Prayagraj conducted the current study, " Varietal Evaluation of Bottle Gourd on growth and yield under Prayagraj conditions or respective agro climatic zone." There are twelve different types in

the randomized block design experiment. 150 cm by 60 cm was the spacing. There are 36 plots in all, with 12 plants in each treatment. The irrigation and subirrigation are 1.0 m and 0.5 m in length and breadth, respectively. The experiment was carried out in the Zaid season [7]. At various growth phases, observations were made regarding quality parameters like TSS and vitamin C content as well as vine length, days to flower emergence, fruit length, and yield per plot. The Fisher and Yates method was used to statistically analyze the data.

## 3. RESULTS AND DISCUSSION

### 3.1 Days to First Male and Female Flowering and Days to First Fruit Harvest

Days to first male flower emergence were measured, with FAIZABADI LONG (S-1) showing the highest growth and 2021/BOGVAR-02 showing the lowest. Days to initial female flower emergence showed highest growth in 2021/BOGVAR-07 and smallest growth in 2021/BOGVAR-01. Regarding fruit production per hectare, 2021/BOGVAR-07 and 2021/BOGVAR-08 had the highest yields, while 2021/BOGVAR-02 had the lowest weight. Genetic and environmental variables can explain why certain varieties do better than others in terms of flowering and maturity earlier [8]. Varieties that have shorter vegetative growth stages or early maturation genes, for example, can show rapid blooming initiation and subsequently maturing. These genetic features can also encourage early flowering. Flowering time can also be influenced by environmental variables as temperature, photoperiod, and nutrition availability [9]. Varieties that have been deliberately cultivated for early flowering or those that are genetically.

### 3.2 Fruit Length, Fruit Diameter and Fruit Weight

The information on fruit length, diameter, weight, and quantity of fruits per plant is displayed in Table. Fruit length was found to be at its highest in 2021/BOGVAR-09 (52 cm) and at its lowest in

**Table 1. Performance of various bottle gourd varieties in terms of quality and yield metrics**

Notation	Varieties Details	Length (cm)	Nodes	First male Flowering	Female Flowering
V1	2021/BOGVAR-1	3.81	12.67	41.72	46.78
V2	2021/BOGVAR-2	2.91	13.17	40.90	53.13
V3	2021/BOGVAR-3	3.76	13.37	42.77	53.33
V4	2021/BOGVAR-4	3.72	13.87	43.03	53.88
V5	2021/BOGVAR-5	3.06	14.17	43.12	53.90
V6	2021/BOGVAR-6	3.34	14.67	43.47	54.77
V7	2021/BOGVAR-7	4.00	15.47	43.99	54.80
V8	2021/BOGVAR-8	3.71	15.67	45.23	55.97
V9	2021/BOGVAR-9	2.66	16.63	46.85	58.76
V10	2021/BOGVAR-10	2.49	16.67	48.67	59.86
V11	Mahashakti	5.32	17.17	49.93	61.98
V12	Faizabadi long S-1	3.75	18.67	53.74	64.67
<b>'F' Test</b>		S	S	S	S
<b>SE (d)</b>		0.20	0.57	1.47	1.64
<b>C.D. at 5%</b>		1.94	1.68	4.32	4.80
<b>C. V.</b>		6.1	6.6	5.6	5.1

**Table 2. Performance of various bottle gourd treatment combination in terms of quality and yield metrics**

Treatment	Treatment Combination	Number of Fruits/Vine	Fruit Weight (g)	Fruit Diameter (cm)	Total Fruit Yield/Plot (kg)	Fruit Length (cm)	Fruit Yield (t/ha)
T1	2021/BOGVAR-1	6.93	633.80	11.07	25.28	26.1	50.16
T2	2021/BOGVAR-2	7.79	726.2	16.74	17.36	25.86	58.08
T3	2021/BOGVAR-3	5.58	420.40	14.3	22.12	18.0	66.35
T4	2021/BOGVAR-4	6.80	470.43	11.86	35.92	23.26	77.75
T5	2021/BOGVAR-5	8.21	654.81	14.0	49.30	15.8	87.89
T6	2021/BOGVAR-6	7.79	614.40	13.65	32.95	27.96	98.85
T7	2021/BOGVAR-7	8.82	892.87	19.09	36.92	23.5	137.18
T8	2021/BOGVAR-8	7.80	814.03	10.73	26.68	24.53	110.77
T9	2021/BOGVAR-9	8.57	707.36	11.46	42.38	28.53	122.03
T10	2021/BOGVAR-10	6.23	552.03	11.56	45.65	23.6	127.15
T11	Mahashakti	8.33	569.5	10.65	39.84	26.23	143.32
T12	Faizabadi long S-1	7.56	610.2	10.83	55.22	27.9	136.96
<b>F-Test</b>	S	S	S	S	S	S	
<b>S. Ed.</b>	0.66	22.73	0.48	3.03	1.28	6.97	
<b>CD at 5%</b>	1.94	1.96	1.42	8.89	3.76	20.46	
<b>CV%</b>	6.1	13.7	5.3	6.1	15.2	11.9	

2021/BOGVAR-01 (28 cm). In terms of fruit weight, 2021/BOGVAR-07 had the highest weight (1200g), while 2021/BOGVAR-02 had the lowest weight (492.5g). The Average fruit weight ranged from 420.40 g (2021/BOGVAR-3) to 892.87 (2021/BOGVAR-7). Maximum number of fruits weight was recorded in the genotype 2021/BOGVAR-7 (892.87 g). However, statically at par with 2021/BOGVAR-8 (814.03 g). Genotype 2021/BOGVAR-3 (420.40 g) were noted for lowest fruit weight. Fruit was 10.65 cm

(Mahashakti) to 19.09 cm (2021/BOGVAR-7) in diameter. The genotype 2021/BOGVAR-7 has the largest fruit diameter (19.09 cm). Statistically, nevertheless, comparable to 2021/BOGVAR-2 (16.74 cm). Fruit diameter minimums were recorded for Genotype Mahashakti (10.65 cm). The fruits' diameter can be a result of their hybrid vigor and adaptability to the agroclimatic conditions of Allahabad. The significant variation in weight of fruits might have been due to fruit set percentage, fruit length, number of fruits per vine

**Table 3. Cost of cultivation of bottle gourd**

S.NO.	Particulars	Unit	Qty.	Rate/Unit (Rs)	Cost (Rs/ha)
1	Ploughing	Hrs.	4	1000	4000
2	Labour for field preparation	Labour	25	300	7500
3	Cost of seed	Kg	4	5500	22000
4	Sowing	Hrs	2	500	1000
5	Labour for fertilizer application	labour	10	300	3000
6	Three weeding	Labour	20	300	6000
7	Harvesting/picking	Labour	20	300	6000
8	Disease and pest control	Labour	5	300	1500
10	Thinning	Labour	10	300	3000
13	Insecticide		1L.	1000	1000
14	Land rent	3 Month	1 ha.	3000	10500
<b>Total Cost (Rs)</b>					<b>65000</b>

and fruit width, genetic nature, environmental factor and vigour of the crop and higher uptake of nutrient Genetic and environmental factors may play a role in why one variety performs better than another in terms of yielding more fruits per plant.

### 3.3 Vine Length (m)

Vine length was measured and statistically analyzed for several bottle gourd genotypes. Notably, the T2 treatment reported the shortest vine length (2.91 m). which were comparable to one another, with the T11 treatment (5.32 m) recording the longest vine length and getting Mahashakti. T7 treatment (4.00 m), which is getting 2021/BOGVAR-7, came next. Vine length may have increased as a result of improved photosynthetic and other metabolic activities, local circumstances, genetic traits, increased nutrient utilization efficiency, and an increase in numerous plant compounds that cause cell division and elongation. The genetic makeup of various genotypes, as well as the intrinsic qualities and vigor of the crop, may be the cause of the variance in vine length.

### 3.4 T.S.S. [°Brix] and Vitamin C Content (mg/100g)

The TSS (B) in different genotypes of bottle gourd was recorded, statistically analysed and presented. Significantly the Genotype 2021/BOGVAR-7 was recorded for maximum TSS i.e. 2.53 °Brix. However, statically at par with 2021/BOGVAR-9 (2.26 °Brix), 2021/BOGVAR-4 (2.26 °Brix). Minimum TSS was recorded in 2021/BOGVAR-3 (1.03 °Brix). The better performance of one variety over another in terms of better Ascorbic acid and TSS content can be attributed to genetic factors and

environmental conditions. Varieties with genetic traits that promote higher Vitamin C synthesis and accumulation in fruits can result in increased Ascorbic acid content. Additionally, environmental factors such as sunlight exposure, temperature, and nutrient availability can influence the production of Vitamin C in fruits. Varieties that are genetically predisposed or have been selectively bred for higher Ascorbic acid content may demonstrate superior performance in terms of producing fruits with a better concentration of this essential nutrient [10,11].

## 4. CONCLUSION

The result from the investigation “Varietal evaluation in Bottle gourd (*Lagenaria Siceraria*) under Prayagraj agroclimatic conditions” concluded that Bottle gourd variety 2021/BOGVAR-07 and FAIZABADI- LONG s-1 was recorded with maximum no of fruits , fruit weight, average fruit yield ,fruit yield per /ha.Powdery and downy mildew were observed in the present experiment , however few insects viz., red bottle guard beetles, fruit fly and aphids were observed during last harvesting of Bottle Gourd.

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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 manuscripts.

### COMPETING INTERESTS

Authors have declared that no competing interests exist.

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