

# Evaluation Trial on Bottle Gourd [*Lagenaria siceraria*] Under Prayagraj Agro-Climatic Conditions

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## ABSTRACT

The present investigation entitled "Evaluation trail on bottle gourd (*Lagenaria siceraria*) under Prayagraj Agro-climatic conditions was conducted at Horticulture Research farm at Department of Horticulture, SHUATS, Naini, Prayagraj from July to Oct 2019. The experimental soil was sandy loam in texture with a pH of 7.0 to 8.0, 0.480 organic carbon, and 280, 12.3, and 150 kg/ha<sup>-1</sup> of available N, P, and K, respectively. The main objective of the experiment is to find out the most suitable variety of bottle gourd for better growth under Prayagraj, Agro-climatic conditions. Twenty six bottle gourd varieties were evaluated for different quantitative characters using Randomized Block Design (RBD) with the aim to identify the most suitable variety. Among twenty six varieties, the variety 2016/BOGVAR-1exhibited days to first harvest (49.55DAT).

## Highlights

- Twenty six bottle gourd varieties were evaluated for different quantitative characters using Randomized Block Design (RBD) with the aim to identify the most suitable variety.

**Keywords:** Bottle gourd, varieties and yield

Bottle gourd [*Lagenaria siceraria* (Molina) Standl. 2n = 22] is an important cucurbitaceous crop grown throughout the country. It is a warm-season vegetable, which thrives well in a warm and humid climate, but it can be grown throughout the year in Nor then India plains as an off-season vegetable. The young and tender fruits of bottle gourd are mostly used as a vegetable. However, delicious preparations like *burfee*, *rayata*, *halwa*, *pathe* etc. are also common.

Dry shells of the mature fruits are used to make containers and musical instruments. Different parts of bottle gourd have got medicinal properties also. It contains 96.3% water, 2.9% carbohydrates, 0.2% protein, 0.5% fat, 0.5% mineral matter, 11 mg of vitamin C per 100g. Bottle gourd is a monoecious crop with an exceptional and andromonoecious sex form (Singh *et al.* 1996). It is a highly cross-

pollinated crop in which a large amount of variation is observed in many economically important traits. The crop is well suited for improvement through inbreeding followed by selection without significant loss in vigor. Therefore, high-yielding inbreeds can be developed with a desirable level of uniformity in agronomically important morphological traits.

India is considered the secondary centre of diversity for bottle gourd. It exhibits a great range of variability with respect to its morphological traits, maturity period, and fruit yield potential. The genotypes also differ with respect to adaptability to summer and cool seasons (Rakshit *et al.* 2020). Eastern Uttar Pradesh is one of the rich zones

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exhibiting the diversity of bottle gourd. Since this area remains frost-free, bottle gourd cultivation round the year is a common practice, although, during winter, it is mainly grown on thatches, huts, and roof-tops. Thus this region also exhibits genetic diversity with respect to cool-season adaptability.

During the last two decades, there has been constant progress in the development of improving varieties of bottle gourd by the public as well as private sectors, particularly in the number of hybrid varieties. However, the cultivation of bottle gourd mainly depends on local varieties and landraces in eastern Uttar Pradesh, Uttar Pradesh is mainly known for its Rice and Wheat growing areas. The agro-climatic condition of the state is also suitable for the cultivation of all kinds of vegetables. Among them, bottle gourd is also one of the important vegetables. There is a vast scope for cultivation of bottle gourd in Uttar Pradesh as there is a regular demand of crop for a vegetable as well as for medicinal uses. It is a highly remunerative crop which fetches sizeable income to the farmer within two or three months.

Uttar Pradesh is known for its biodiversity, particularly Prayagraj as it comes under Agro-climatic zone -V, which is the upper Gangetic plains region. In bottle gourd, maximum diversity is found for its fruit shape, fruit color, size, seed color, vine length, and duration.

Collection and evaluation of genotypes is a pre-requisite for their utilization, and detailed evaluation determines the potential of accession in a specific crop improvement program. Nowadays, farmers are demanding early maturing and high yielding varieties of bottle gourd. To meet out the needs of farmers, preliminary work should be initiated from the identification of high yielding genotypes, which can be utilized as a variety or further varietal development program. Therefore, a trial for evaluation of presently available bottle gourd genotypes was carried out entitled "Evaluation trial on bottle gourd [*Lagenaria siceraria*] under prayagraj agro-climatic conditions".

Keeping the above facts in view the present investigation, using the available varieties released from the different private sectors and local varieties. The investigation was taken up with the following -To find out the most suitable variety of bottle gourd for better growth and yield.

## MATERIALS AND METHODS

Department of Horticulture, Naini Agricultural Institute, SHUATS, Prayagraj, falls under the humid subtropical zone. Maximum rainfall was received during the period between July to the end of September. However, occasional showers are also very common in the month of June, December, and January. The winter month will usually cool and dry. The summer is hot, and dry western hot winds start from April and end at the onset of monsoon.

The study was conducted in the Research Field, Department of Horticulture, Naini Agriculture Institute, SHUATS, Prayagraj, located between 25.87° North latitude 81.15° East latitude. The altitude is 78 meters above the mean sea level during the season of 2019. The soil was sandy loam in texture having moderate water holding capacity with a pH of 7.0 to 8.0, 0.480 organic carbon and 280, 12.3, 150 kg/ha N, P, and K, respectively. Twenty-six bottle gourd varieties were evaluated for different quantitative characters using Randomized Block Design (RBD).

From the results, it is clearly observed that the seeds are sown in pits after the 8 days of land preparation in the 2<sup>nd</sup> week of July 2019 at a depth of 2.5 to 3 cm. The crop received a total rainfall of 1012.3cm during the period of experimentation. Observations on growth parameters of Bottle gourd were recorded and analyzed statistically.

## RESULTS AND DISCUSSION

Analysis of variance showed significant differences among the varieties for the different characters studied at 0.1% and 5% significance. The analysis of variance revealed a highly significant difference in the number of tillers/m<sup>2</sup> among treatments. Days to germination varied from 7.67 to 12.66 days. Maximum days of 12.66 required for germination was recorded in case of variety 2018/BOGHYB-5, Minimum days of 7.67 was recorded in case of 2018/BOGHYB-2 Maximum vine length was recorded in BOGVAR-3 (6.47) variety followed by variety BOGVAR-3 (6.33) at 90 DAS. The lowest vine length was recorded in SHIVA-60 (4.55m). Internodal length varied from 8.96 to 13.77m. Minimum internodal length 8.96 cm was recorded in case of variety 2018/BOGVAR-1, and Maximum internodal length was recorded in BOGVAR-4

Table 1: List of varieties used in the present investigation and the growth of Bottle gourd (*Lagenaria siceraria*) under Prayagraj agro-climatic conditions

Notation	Variety	Days to germination	Vine length (m)	Internodal length (cm)	No. of primary branches	Petiole length (cm)	Leaf length (cm)	Leaf width (cm)	Days to 1 <sup>st</sup> female flower appearance	Days to 1 <sup>st</sup> harvest
V	2018/BOGHYB-1	8.50	5.85	9.80	4.05	15.13	15.75	8.53	39.76	50.50
V2	2018/BOGHYB-2	7.67	5.70	12.03	4.75	10.07	11.17	13.25	44.15	56.07
V3	2018/BOGHYB-3	8.33	5.21	13.60	3.86	10.63	11.93	15.40	48.00	60.96
V4	2018/BOGHYB-4	9.00	5.63	12.97	5.17	9.30	9.11	13.43	45.20	57.40
V5	2018/BOGHYB-5	12.66	5.10	12.68	6.69	10.37	12.15	10.30	44.37	56.35
V6	2018/BOGHYB-6	8.00	5.57	10.70	4.49	9.86	13.57	13.78	44.94	57.07
V7	2016/BOGVAR-1	8.15	4.96	12.23	5.89	10.50	17.00	9.87	39.01	49.55
V8	2016/BOGVAR-2	9.33	5.62	12.67	5.51	15.47	13.47	12.13	46.46	59.00
V9	2016/BOGVAR-3	9.10	6.47	11.60	6.25	12.20	16.80	14.37	43.38	55.09
V11	2016/BOGVAR-5	9.81	4.91	11.30	4.89	12.50	16.33	14.56	48.64	61.77
V12	2016/BOGVAR-6	11.30	5.94	9.43	3.98	14.47	15.17	11.15	46.17	58.64
V13	2016/BOGVAR-7	8.00	5.30	11.90	5.33	16.13	10.80	13.33	46.60	59.18
V14	2016/BOGVAR-8	9.67	6.06	12.21	6.07	16.70	15.67	13.69	39.27	49.87
V15	2016/BOGVAR-9	10.50	5.40	9.17	4.62	10.50	16.93	14.17	40.81	51.83
V16	2018/BOGVAR-1	9.35	6.15	8.96	4.37	16.33	13.40	10.07	41.08	52.17
V17	2018/BOGVAR-2	9.64	5.64	11.90	5.68	8.67	10.87	13.50	43.12	54.76
V18	2018/BOGVAR-3	8.05	6.33	12.07	4.13	7.78	17.53	13.83	42.56	54.05
V19	2018/BOGVAR-4	10.67	5.10	12.83	5.08	8.35	12.46	11.76	45.43	57.70
V20	2018/BOGVAR-5	8.76	5.36	12.20	6.44	9.40	13.10	11.00	48.77	61.93
V21	2018/BOGVAR-6	8.25	5.70	10.50	5.53	14.27	17.77	14.70	46.20	58.67
V22	2018/BOGVAR-7	11.00	5.49	11.63	4.54	11.00	10.33	12.60	48.33	61.38
V23	KRISHNA	9.40	5.67	12.50	4.80	14.60	10.60	14.17	42.25	53.66
V24	999	9.00	5.40	13.37	6.30	10.93	15.73	12.23	38.76	49.22
V25	DEV	9.50	5.05	11.20	5.90	13.23	15.63	9.03	40.27	51.14
V26	SHIVA -60	9.96	4.55	10.27	4.24	14.30	17.50	9.56	39.01	49.55
F test		S	S	S	S	S	S	S	S	S
CD @5%		0.93	0.53	1.15	0.50	1.25	1.39	1.20	1.96	2.49
Sed		0.46	0.26	0.57	0.25	0.62	0.69	0.60	0.98	1.24

variety (13.77) followed by BOGHYB-3 (13.60). The results revealed that the growth parameters of bottle gourd significantly differed during the growth period. No. of primary branches varied from 3.86 to 6.69. Minimum no. of primary branches was recorded in case of varieties 2018/BOGHYB-3(V3), and the Maximum no. of petioles was recorded 6.69 in 2018/BOGHYB-5 variety. Petiole length varied from 7.78 to 16.70 cm. Minimum petiole length was recorded in case of varieties 2018/BOGVAR-3, and the maximum Petiole length of 16.70 cm was recorded in 2016/BOGVAR-8, followed by 2018/BOGVAR-1 variety with 16.33 cm petiole length. At the initial stage of plant growth, there was a minor deviation in leaf length, but during the growth period, the leaf length varied from 9.11 to 17.77 cm. The minimum of 9.11cm and maximum leaf length of 17.77 cm was recorded in the case of varieties

2018/BOGHYB-4 and 2018/BOGVAR-6 followed by 2018/BOGVAR-3 variety with 17.53 cm.

Significantly maximum leaf width was recorded 15.40 cm in the variety 2018/BOGHYB-3 followed by 14.37 cm in the variety 2016/BOGVAR-3, and the Minimum leaf width of 8.53 cm was recorded in the case of varieties 2018/BOGHYB-1. Days to first female anthesis varied from 38.76 to 48.77 days.

The maximum days (48.77) required to the first female flower anthesis was recorded in the case of variety 2018/BOGVAR-5 followed by 48.67 in the variety 2016/BOGVAR-5 and the minimum days. Recorded to first female anthesis was 38.76 in the variety 2018/BOGHYB-1. Significantly maximum days to 1<sup>st</sup> harvest of 61.93 was recorded in 2018/BOGVAR-5 and the minimum of 49.22 in the variety 999, and at par to the variety SHIVA -60 with 49.55.



## CONCLUSION

Analysis of variance revealed that there were significant differences among the varieties studied for all the characters. From the present investigation, it is concluded that among all the varieties 2016/BOGVAR-1 variety has shown minimum days to first harvest and has given at par performance in all the parameters. So varieties 2016/BOGVAR1 2018/BOGVAR-4, 2018/BOGHYB-2 can be recommended to eastern U.P. growers by few more conjunctive trials at different locations.

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