Original Research Article

Performance of bottle gourd (*Lagenaria siceraria* L.) genotypes for growth, yield and quality

Abstract:

An experiment on the "Performance of Bottle Gourd (*Lagenaria siceraria* L.) Genotypes for Growth, Yield and Quality" wasconducted during February to May. 2022, in field of Horticulture Research Farm, Department of Horticulture, Naini Agricultural Institute, Sam Higginbottom Universityof Agriculture, Technology and Sciences, Prayagraj (U.P.) India. The results of the present investigation, regarding the performance of 10 genotypes of Bottle Gourd *i.e.* (IET/2021/BOGVAR-1, IET/2021/BOGVAR-2, IET/2021/BOGVAR-3, IET/2021/BOGVAR-4, IET/2021/BOGVAR-5, IET/2021/BOVAR-6, IET/2021/BOGVAR-7, IET/2021/BOGVAR-8, IET/2021/BOGVAR-9 and IET/2021/BOGVAR-10) obtained from different sources evaluated for plant growth, yield and quality have been discussed and interpreted in the light of previous. research work done in India. The experiment was conducted in Randomized block design, were each replicated thrice. From the present experimental findings it was founded that the genotype IET/2021/BOGVAR-8 was recorded with the maximum number of female flowers (15.40), vine length (228.33cm), number of fruits/plant (10.80 fruits), yield per hectare (438.7 q/ha), TSS (4.13^{O} B).

Keywords: *Bottle gourd, Genotypes, Growth, Yield and Quality.*

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 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.

Materials and methods

The study was conducted during summer season at Horticulture Research Farm, SHUATS, Prayagraj (U.P.) India. The experiment consists of 10 genotypes namely IET/2021/BOGVAR-1, IET/2021/BOGVAR-2, IET/2021/BOGVAR-3, IET/2021/BOGVAR-4, IET/2021/BOGVAR-5, IET/2021/BOGVAR-6, IET/2021/BOGVAR-7, IET/2021/BOGVAR-8, IET/2021/BOGVAR-9, IET/2021/BOGVAR-10. The experiment was carried out with Randomized Block Design with 3 replications at 2.50 m x 0.60 m row to row and plant to plant spacing. All the recommended cultural practices were adopted to raise healthy crop. Data were recorded on five randomly selected plants with respect to characters *viz.*, days to first male and female flowers appear, node number at which first male and female flower appear, number of male and female flowers, days to fruit set, days to first fruit picking, vine length (cm), fruit weight (g), fruit length (cm), fruit diameter (cm), number of fruits per plant, fruit yield (q/ha) and TSS (^{0}B). The data were subjected to statistical and biometrical analysis **(A. husna *et al.* 2011, Harika *et al.* 2012, Padmakshi thakur 2015**).

Results and discussion

The analysis of variance of all the characters under study is presented in table 1 and 2. This analysis of variance revealed that mean sum of squares due to genotypes was highly significant for all characters. This is an indication of existence of sufficient variability among the genotypes for fruit yield and its components traits. Significant mean sum of squares due to fruit yield and attributing characters revealed existence of considerable variability in material studied for improvement for various traits. These findings are in general agreement with the findings of Bhardwaj et al. (2013) and Padmakshi thakur 2015).

Days to first male flower (DAT):

The minimum number of days to 1st male flower emergence was recorded in the genotype IET/2021/BOGVAR-5 (34) followed by the IET/2021/BOGVAR-3 (36.40) and maximum number of days to 1st male flower emergence was recorded in the genotype IET/2021/BOGVAR-10 (51.73). The Days to First Male flower emergence play an important role in deciding the earliness or lateness of crop in general. The variation in the first male flower emergence might have been due to internodal length, number of inter nodal and vigour of the crop. Similar finding were reported by **Sharma and Sengupta (2013), Padmakshi Thakur *et al.* (2015)** and **Singh *et al.* (2017)** in Bottle.

Days to first female flower (DAT):

The minimum number of days to 1st female flower emergence was recorded in the genotype IET/2021/BOGVAR-8 (55.33) followed by the IET/2021/BOGVAR-6 (56.66) and maximum number of days to 1st female flower emergence was recorded in the genotype IET/2021/BOGVAR-10 (76.60). The Days to First Female flower emergence play an important role in deciding the earliness or lateness of crop in general. The variation in the first female flower emergence might have been due to internodal length, number of inter nodal and vigour of the crop. Similar finding were reported by **Kumar *et al.* (2011), Sharma and Sengupta (2013),**

Table 1: Performance of bottle gourd (*Lagenaria siceraria* L.) genotypes for growth, yield and quality

Genotypes	Days to first male flower appear (DAT)	Days to first female flower appear (DAT)	Node number at first male flower appear	Node number at first female flower appear	Number of male flowers	Number of female flowers
IET/2021/BOGVAR-1	39.73	63.46	8.86	24.66	30.20	7.06
IET/2021/BOGVAR-2	40.80	69.26	9.80	24.73	29.06	10.80
IET/2021/BOGVAR-3	36.40	71.13	8.33	30.73	25.46	10.26
IET/2021/BOGVAR-4	41.40	67.00	8.93	23.53	20.60	10.13
IET/2021/BOGVAR-5	34.00	58.66	5.66	21.33	25.73	9.86
IET/2021/BOGVAR-6	41.20	56.66	7.40	16.60	31.33	13.93
IET/2021/BOGVAR-7	47.86	59.20	12.40	26.20	23.13	10.60
IET/2021/BOGVAR-8	42.20	55.33	9.20	19.20	37.73	15.40
IET/2021/BOGVAR-9	43.60	63.06	10.20	21.40	26.80	10.73
IET/2021/BOGVAR-10	51.73	76.60	17.26	19.13	21.33	11.33
F-Test	**S**	**S**	**S**	**S**	**S**	**S**
SE.d(±)	**1.39**	**5.25**	**1.24**	**3.15**	**2.65**	**1.43**
C.D at 5%	**2.91**	**11.02**	**2.61**	**6.63**	**5.57**	**3**
C.V.	**4.05**	**10.03**	**15.54**	**16.98**	**11.96**	**15.89**

Table 2: Performance of bottle gourd (*Lagenaria siceraria* L.) genotypes for growth, yield and quality

Genotypes	Days to fruit setting (DAT)	Days to first fruit picking (DAT)	Vine length (cm)	Fruit weight (g)	Fruit length (cm)	Fruit diameter (cm)	Number of fruits per plant	Fruit yield (q/ha)	TSS (^{0}B)
IET/2021/BOGVAR-1	65.60	73.40	185.40	875.43	27.63	5.40	4.93	259.2	2.58
IET/2021/BOGVAR-2	71.26	79.33	186.80	783.20	23.17	5.64	7.20	335.8	2.40
IET/2021/BOGVAR-3	73.13	81.66	178.33	568.68	22.95	6.11	6.60	224.6	3.56
IET/2021/BOGVAR-4	69.06	78.33	145.20	607.28	9.81	11.97	6.53	237.2	1.66
IET/2021/BOGVAR-5	60.66	71.06	145.86	582.75	10.40	11.83	6.26	218.8	2.29
IET/2021/BOGVAR-6	56.66	66.93	181.00	750.08	23.58	9.24	8.73	393.3	3.21
IET/2021/BOGVAR-7	61.06	67.13	176.33	946.18	11.72	14.53	6.73	383.7	1.75
IET/2021/BOGVAR-8	59.26	69.40	228.33	675.13	27.38	6.97	10.80	438.7	4.13
IET/2021/BOGVAR-9	67.40	76.53	152.00	643.86	21.74	5.83	6.66	257.8	3.06
IET/2021/BOGVAR-10	79.60	86.46	177.13	579.76	20.80	4.93	5.73	199.3	2.46
F-Test	**S**	**S**	**S**	**S**	**S**	**S**	**S**	**S**	**S**
SE.d(±)	**5.14**	**5.48**	**12.57**	**25.04**	**1.35**	**0.37**	**0.79**	**33.86**	**0.49**
C.D at 5%	**10.79**	**11.5**	**26.42**	**52.61**	**2.83**	**0.77**	**1.66**	**71.14**	**1.02**
C.V.	**9.48**	**8.94**	**8.77**	**4.37**	**8.29**	**5.43**	**13.81**	**14.06**	**21.93**

Node at first male flower appear:

The minimum number of node at 1st male flower emergence was recorded in the genotype IET/2021/BOGVAR-5 (5.66) followed by the IET/2021/BOGVAR-6 (7.40) and maximum number of node at 1st male flower emergence was recorded in the genotype IET/2021/BOGVAR-10 (17.26). The Node at which First Male appears is an important role deciding total number of male flowers. The view was supported by **Deepthi *et al.* (2016), Vaishali (2016)**, **Kunjam *et al.* (2016)** and **Mishra *et al.* (2019)** in Bottle gourd.

Node at first female flower appear:

The minimum number of node at 1st female flower emergence was recorded in the genotype IET/2021/BOGVAR-6 (16.60) followed by the IET/2021/BOGVAR-10 (19.13) and maximum number of node at 1st female flower emergence was recorded in the genotype IET/2021/BOGVAR-7 (26.20). The Node at which First Female appears is an important role deciding total number of male flowers. The view was supported by **Vaishali (2016), Kunjam *et al.* (2019)** and **Mishra *et al.* (2019)** in Bottle gourd and **B.R. Choudhary and Suresh Kumar (2014)** in bottle gourd.

Number of male flowers:

The minimum number of male flowers was recorded in the genotype IET/2021/BOGVAR-4 (20.60) followed by the IET/2021/BOGVAR-10 (21.33) and maximum number of male flowers was recorded in the genotype IET/2021/BOGVAR-8 (37.73). The results are conformity with the findings of **(Daryono *et al*. 2018).** Where, he concludes that ethepon treatment affected the formation of watermelon flower by increasing the number of female or hermaphrodite flower and decreasing the number of male flowers, especially in the concentration of 75 ppm and 100 ppm. **Poornima singh *et al*. (2020), Padmakshi Thakur *et al.* (2015).**

Number of female flowers:

The minimum number of female flowers was recorded in the genotype IET/2021/BOGVAR-1 (7.06) followed by the IET/2021/BOGVAR-5 (9.86) and maximum number of female flowers was recorded in the genotype IET/2021/BOGVAR-8 (15.40).

Days to fruits setting (DAT):

The minimum days to first fruit setting was recorded in the genotype IET/2021/BOGVAR-6 (56.66) followed by the IET/2021/BOGVAR-8 (59.26) and maximum days to first fruit setting was recorded in the genotype IET/2021/BOGVAR-10 (79.60). The fruit setting shows the days to setting of fruit from the female flower get pollination to become mature. The similar results were shown by **D.K. Samadia *et al.* (2002), Padmakshi Thakur *et al.* (2015), Poornima singh *et al*. (2020).**

Days to fruit picking (DAT):

The minimum days to first fruit picking was recorded in the genotype IET/2021/BOGVAR-6 (66.93) followed by the IET/2021/BOGVAR-7 (67.13) and maximum days to first fruit picking was recorded in the genotype IET/2021/BOGVAR-10 (86.46). It may be due to mobilization of food materials from source to sink in best treatment. Similar results were had also been obtained by **(D.K. Samadia *et al.* 2002), Kumar *et al.* (2011), Padmakshi Thakur *et al.* (2015), Kumar *et al.* (2018)** and **Mishra *et al.* (2019), (Poornima singh *et al.* 2020)** in Bottle gourd.

Vine length (cm):

The minimum vine length was recorded in the genotype IET/2021/BOGVAR-4 (145.20) followed by the IET/2021/BOGVAR-5 (145.86) and maximum vine length was recorded in the genotype IET/2021/BOGVAR-8 (228.33). The variation in plant height might be due to specific genetic makeup of different genotypes, inherent properties and vigour to crop. The variations of plant height in bottle gourd have also reported by **Thakur *et al.* (2013) Padmakshi Thakur *et al.* (2015), Kunjam *et al.* (2019),** in Bottle gourd.

Fruit weight (g):

The minimum fruit weight was recorded in the genotype IET/2021/BOGVAR-3 (568.68) followed by the IET/2021/BOGVAR-10 (579.76) and maximum fruit weight was recorded in the genotype IET/2021/BOGVAR-7 (946.18). The significant variation in weight of fruits might have been due to fruit set percentage, fruit length, number of fruits per vine, fruit weight and fruit width, genetic nature, environmental factor and vigour of the crop and higher uptake of nutrient. The findings were supported by **Husnan *et al.* (2013), (Sahu *et al* 2014), Padmakshi Thakur *et al.* (2015), Damor *et al* (2016), Sushil kumar *et al.* (2018)** and **Mishra *et al* (2019)** also reported more or less similar results in Bottle gourd.

Fruit length (cm):

The minimum fruit length was recorded in the genotype IET/2021/BOGVAR-4 (9.81) followed by the IET/2021/BOGVAR-5 (10.40) and maximum fruit length was recorded in the genotype IET/2021/BOGVAR-1 (27.63). The results are in agreement with the finding of **Kumar *et al.* (2011), Padmakshi Thakur *et al.* (2015), Kumar *et al.* (2018), (Sushil kumar *et al.* 2018) and Mishra *et al.* (2019)** in Bottle gourd.

Fruit diameter (cm):

The minimum fruit diameter was recorded in the genotype IET/2021/BOGVAR-10 (4.93) followed by the IET/2021/BOGVAR-1 (5.40) and maximum fruit diameter was recorded in the genotype IET/2021/BOGVAR-7 (14.53). Similar results have been reported **Husna *et al.* (2013), Padmakshi Thakur *et al.* (2015), Damor *et al* (2016), Kumar *et al* (2018), (Sushil kumar *et al.* 2018),** and **Mishra *et al* (2019)** in Bottle gourd.

Number of fruits per plant:

The minimum number of fruits per plant was recorded in the genotype IET/2021/BOGVAR-1 (4.93) followed by the IET/2021/BOGVAR-10 (5.73) and maximum number of fruits per plant was recorded in the genotype IET/2021/BOGVAR-8 (10.80). The results are conformity with the findings of **(A. husna *et al.* 2011), (Bhardwaj *et al* 2013), Padmakshi Thakur *et al.* (2015), Sushil kumar *et al.* (2018) and Manidh kumar *et al.* (2020).**

Fruit yield (q/ha):

The minimum yield per hectare was recorded in the genotype IET/2021/BOGVAR-10 (199.3) followed by the IET/2021/BOGVAR-5 (218.8) and maximum yield per hectare was recorded in the genotype IET/2021/BOGVAR-8 (438.7). The results are in agreement with the finding of **Kamal *et al*. (2012), Padmakshi Thakur *et al.* (2015), Deepthi *et al*. (2016) and (Sushil kumar *et al.* 2018)** in Bottle gourd.

TSS (^{0}B):

The minimum TSS was recorded in the genotype IET/2021/BOGVAR- 4 (1.66) followed by the IET/2021/BOGVAR-7 (1.75) and maximum TSS was recorded in the genotype IET/2021/BOGVAR- 8 (4.13). The results are conformity with the finding of **Harika *et al.* (2012), Chaurasiya *et al.* (2016), and Muhammad Iqbal *et al.* (2018).**

Conclusion:

The results from the present investigation concluded that Bottle gourd Genotype IET/2021/BOGVAR-8 was recorded maximum number of female flowers (15.40), vine length (228.33 cm), number of fruits per plant (10.80 fruits), average yield per plant (7.31kg/plant), average yield per hectare (438.7 q/ha), TSS (4.13 ^{o} B).

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