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Research Article

EVALUATION OF VEGETATIVE GROWTH AND YIELD PERFORMANCE OF BOTTLE GOURDS (*Lagenaria siceraria* L.)

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Abstract: A field experiment was carried out to study the vegetative growth and yield performance of Bottle Gourds- All India Co- ordinated Vegetable Improvement Project (AICVIP) varietal trials (AVT-I) were conducted from 2013 to 2014 at the Department of Vegetable Crops, Horticultural College and Research Institute, Tamil Nadu Agricultural University, Coimbatore. The experiment was laid out in Randomized Block Design (RBD) with three replications, which included the seeds of the Bottle Gourds entries *viz*. 2012/BOGVAR-1, 2012/BOGVAR-2, 2012/BOGVAR-3, 2012/BOGVAR-4, 2012/BOGVAR-5, 2012/BOGVAR-6, 2012/BOGVAR-7, 2012/BOGVAR-8, NDBG-104 (C) and CO1 (LC) were chosen for this study. The Bottle gourd genotypes were sown with care in the field during the year 2013 to 2014 at the spacing of 300 X 75cm with the plot size of 7.5 m X 3.0 m. Significant differences were observed among the genotypes for growth and yield parameters. Among the different bottle gourds genotypes tested (AVT-I), the highest fruit yield (253.6 q/ha) was recorded in 2012/BOGVAR-5 followed by 2012/BOGVAR-8 (240.3 q/ha). Whereas the checks, NDBG-104 (C) and CO1-(LC) recorded the yield of 225.5 and 226.4 q/ha respectively.

Keywords: *ICAR-AICVIP-VC, Bottle Gourds Entries (AVT-I), Vegetative Growth, Yield*

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Introduction

Bottle gourd [*Lagenaria siceraria* (Mol.) Standl.] is an important gourd having wide range of uses and is largely cultivated in the tropics and subtropics for its edible fruits. Tender fruits are used as vegetable and also for preparation of sweets and pickles especially in the hills. It has a cooling effect and prevents constipation and has diuretic and cardio-tonic properties. Fruit pulp is used as antidote against certain poisons. Externally the pulp is applied as poultice and cooling application to the saved head delirium and also rubbed on the flat of the feet and hands to diminish the effect of heat. The bitter fruits are poisonous and are used as a strong purgative. The bitter fruit ash when mixed with honey is useful application to eyes for night blindness. The leaves in the form of decoction with sugar are used for curing jaundice. The hard shells of the mature fruits are used in making various types of musical instruments, jugs, domestic utensils for storage of liquid and food materials and floats for fishing nets. Bottle gourd (*Lagenaria siceraria* L.) belongs to the family Cucurbitaceae, is an important and popular vegetable in Bangladesh. High genotypic coefficient of variation values for yield/plant, number of fruits/plant, fruit length and fruit breadth and wider range of variation indicate more opportunity for selection of better genotypes [1, 2]. In nature, bottle gourd exhibits great morphological and genetic variability and could wide environmental adaptation [3]. Bangladeshi farmers used different local cultivars and released (from different organization) bottle gourd variety. But their yield is not in satisfactory level. Varietal performance might be helpful to overcome this problem. Considering these circumstances the present study was undertaken with a view to evaluate the growth and yield performance of Ten bottle gourd entries have been received from the Project Coordinator, AICVIP-Vegetable Cops, IIVR- Varanasi and these bottle gourd varietal trial entries were evaluated at the Department of Vegetable Crops, Horticultural College and Research Institute, Tamil Nadu Agricultural University, Coimbatore.

Materials and Methods

The experimental material i.e. seed packets of all the bottle gourds entries (AVT-I) received from the Project Coordinator, AICRP (Vegetable Crops), IIVR, Varanasi, Uttar Pradesh (India), were sown during the year 2013 to 2014 at the Department of Vegetable Crops, Horticultural College and Research Institute, Coimbatore. The seeds of the bottle gourds entries *viz*. 2012/BOGVAR-1, 2012/BOGVAR-2, 2012/BOGVAR-3, 2012/BOGVAR-4, 2012/BOGVAR-5, 2012/BOGVAR-6, 2012/BOGVAR-7, 2012/BOGVAR-8, NDBG-104 (C) and CO1 (LC) were used as the planting material and the vines were grown in the main field in pits of 1 x 1' size, arranged at 300 X 75cm with the plot size of 7.5 m X 3.0 m. The field was irrigated immediately after planting. The crop was raised as per the TNAU recommended packaging practices of Apply 10 kg of FYM (20 t/ha), 100 g of NPK 6:12:12 mixture/pit as basal and 10 g of N/pit 30 days after sowing. Apply *Azospirillum* and Phosphobacteria @2 kg/ha and Pseudomonas 2.5 kg/ha along with FYM 50 kg and neem cake @ 100 kg before last ploughing. Application of potassium in the form of potassium sulphate will increase quality of fruits. Need based manual hand weeding was done and the plots were kept free of weeds. The crop was immediately irrigated after planting using 'Thala" method to avoid transplanting shock. Subsequent irrigations were given at 3-5 days interval depending upon the moisture condition of experimental plot to maintain uniform soil moisture throughout crop growth period. Staking of plants is done using available wild bushes individually to each plant to ensure individual plant data. Need based plant protection measures were taken up to keep the plot free from pest and diseases and raise a healthy crop. Observations on five plant characters viz. Vine growth habit (Short/medium/long viny), Days to 50 % flowering, Node no. at which first female flower appears, Days to first harvest, Fruitshape (Eliptical/elongate/oblong/clubshaped/top/globular/dumbell/kamandal/Lengthened/ Cylindrical /round), Fruit skin colour (light green/green/Dark

Table-1 Performance of growth, yield and quality of Bottle gourds (AVT-I)

Name of the entry	Vine growth habit (Short/ medium/ long viny)	Days to 50 % flowering	Node no. at which first female flower appears	Days to first harvest	Fruit shape (Eliptical/elongate/ oblong/ club shaped/ top/ globular/ dumbell/kamandal/ Lengthened/ Cylindrical /round)	Fruit skin colour (light green / green/Dark green / patchy or spotted green)	Fruit length (cm) (Average of 5 fruits)
2012/BOGVAR-1	Medium	52.0	20.7	74.7	Cylindrical	Light green	36.7
2012/BOGVAR-2	Long	53.0	19.0	70.7	Cylindrical	Light green	26.7
2012/BOGVAR-3	Long	53.7	18.3	72.3	Cylindrical	Light green	29.8
2012/BOGVAR-4	Medium	53.0	18.7	73.3	Cylindrical	Light green	28.7
2012/BOGVAR-5	Long	50.3	20.3	70.0	Cylindrical	Light green	32.5
2012/BOGVAR-6	Long	51.7	16.3	72.0	Cylindrical	Light green	33.5
2012/BOGVAR-7	Medium	52.6	18.0	71.7	Club shaped	Light green	33.7
2012/BOGVAR-8	Long	53.6	15.7	73.0	Club shaped	Light green	17.5
NDBG-104 (C)	Medium	50.0	18.0	72.3	Cylindrical	Light green	35.4
CO1 (LC)	Long	51.3	19.3	73.3	Club shaped	Light green	24.2
CD (p=0.05)	-	3.83	2.36	2.83	-	-	1.67
CV%	-	4.25	7.48	2.29	-	-	3.27

Table-2 Performance of growth, yield and quality of Bottle gourds (AVT-I)

Name of the entry	Fruit girth/circumference (cm) (Average of 5 fruits)	Average fruit weight (g) (Average of 5 fruits)	Number of fruits/plant (Average of 5 plants)	Yield/plot (kg)	Yield/ (q/ha)	Duration of crop (sowing to last harvest
2012/BOGVAR-1	36.4	1750.0	3.00	47.14	209.5	130.33
2012/BOGVAR-2	26.7	1400.0	3.90	51.86	230.5	131.7
2012/BOGVAR-3	29.8	1300.0	4.10	49.59	220.4	129.7
2012/BOGVAR-4	28.7	1400.0	3.35	43.87	195.0	132.3
2012/BOGVAR-5	32.5	1200.0	4.93	57.06	253.6	127.7
2012/BOGVAR-6	33.5	2100.0	2.70	51.41	228.5	132.7
2012/BOGVAR-7	33.7	1900.0	2.86	52.31	232.5	131.6
2012/BOGVAR-8	17.2	1700.0	3.35	54.06	240.3	131.0
NDBG-104 (C)	35.4	1600.0	3.30	50.06	225.5	131.0
CO1 (LC)	24.2	1962.0	2.90	50.94	226.4	132.0
CD (p=0.05)	1.67	9.92	0.116	4.43	19.72	3.28
CV%	3.27	0.35	1.97	5.09	5.09	1.46

green/patchy or spotted green), Fruit length (cm) (Average of 5 fruits), Fruit girth/circumference (cm) (Average of 5 fruits), Average fruit weight (g)(Average of 5 fruits), Number of fruits/plant (Average of 5 plants), Yield/plot (kg), Yield/ (q/ha) and Duration of crop (sowing to last harvest) were recorded. For recording field observations on vegetative, yield and other yield attributing parameters, five randomly chosen plants were tagged from each genotype in each replication were used. Green fruit yield data were recorded picking wise and calculated on hector basis. Analysis of variance in respect of the various characters was done. The results of the bottle gourd entries (AVT-I) were presented in the Table 1, and 2.

Results and Discussion

Vegetative growth and yield performance of Bottle gourds - All India Co- ordinated Vegetable Improvement Project (AICVIP) varietal trials (AVT-I) was carried out during (2013-2014).The results revealed that (AVT-I), the highest fruit yield (253.6 q/ha) was recorded in 2012/BOGVAR-5 followed by 2012/BOGVAR-8 (240.3 q/ha). Whereas the checks, NDBG-104 (C) and CO1-(LC) recorded the yield of 225.5 and 226.4 q/ha respectively. Days to 50% of flowering for Bottle gourds AVT-I entries showed significant variations. Early 50% of flowering was found from NDBG-104 (C) (50days).Which was followed by 2012/BOGVAR-2 (50.3days). Days to first harvesting of Bottle gourds was found from 2012/BOGVAR-5 (70 days).Which was followed by 2012/BOGVAR-2 (70.2 days). Fruit length and girth showed significant variations among the cultivars. The maximum fruit length and girth was found from 2012/BOGVAR-1 (36.7cm), 2012/BOGVAR-1 (36.4 cm) respectively, while the minimum from 2012/BOGVAR-8(17.5cm), 2012/BOGVAR-8 (17.2 cm) respectively. Number of fruit per plant showed significant variations among the Entries. The maximum number of fruit per plant was found from 2012/BOGVAR-5 (4.99 Nos), which was followed by 2012/BOGVAR-3 (4.10 No). Average fruit weight varies among the cultivars. However, maximum average fruit weight was found from 2012/BOGVAR-6 (2100 g), followed by CO1 (LC) (1962g). Duration of crops showed significant variations among the cultivars. The maximum duration of crops was found from 2012/BOGVAR-6 (132.7 days), which was followed by 2012/BOGVAR-4 (132.3 days). Variation in sex ratio may be due to the adaptability of different genotypes was also reported in bottle gourd [4, 5]. Bottle gourd required maximum 60.67 days to minimum 48.17 days in different genotypic trial [6]. Similarly variation for the first female and male appearance in different bottle gourd genotype was also observed in bottle gourd [7, 8]. Fruit diameter ranges was observed from 16.3 cm to 6.47 cm and this range was found from different genotype of bottle gourds [6]. The increase in seed yield per fruit may be attributed to the pollinating agents which carried a good amount of pollen that led to pollination thereby, increasing seed yield and thus contributed for higher seed weight. The higher seed yield per vine and per hectare may be attributed to the number of fruits per plant which increased the yield. On the other hand, the lower seed yield may be because of fluctuating temperatures which resulted in poor fruit set and drying of ovaries and desiccation of tender fruits there by reducing the yields [9].Similar findings were reported in ridge gourd [10.11]. It is also found that maximum fruit length 58.92 cm and minimum 9.18 cm among twenty five genotypes [12]. Fruit diameter ranges was observed from 16.3 cm to 6.47 cm and this range was found from different genotype of bottle gourds [12].

Conclusion

From the above study, it could be concluded, among the Bottle gourds varietal trial entries tested (AVT-I), the highest fruit yield (253.6 q/ha) was recorded in 2012/BOGVAR-5 followed by 2012/BOGVAR-8 (240.3 q/ha). Whereas the checks, NDBG-104 (C) and CO1-(LC) recorded the yield of 225.5 and 226.4 q/ha respectively.

Application of research: The seeds of the Bottle Gourds varietal trial entries viz. 2012/BOGVAR-1, 2012/BOGVAR-2, 2012/BOGVAR-3, 2012/BOGVAR-4, 2012/BOGVAR-5, 2012/BOGVAR-6, 2012/BOGVAR-7, 2012/BOGVAR-8, NDBG-104 (C) and CO1 (LC) were chosen for this study. Among the Bottle gourds entries tested (AVT-I), the highest fruit yield (253.6 q/ha) was recorded in 2012/BOGVAR-5 followed by 2012/BOGVAR-8 (240.3 q/ha). Whereas the checks, NDBG-104 (C) and CO1-(LC) recorded the yield of 225.5 and 226.4 q/ha respectively.

Research Category: Vegetable Crops Science

Abbreviations:
ICAR- Indian Council of Agricultural Research
AICRP-VC - All India Coordinated Research Project on Vegetable Crops
AVT- Advanced Varietal trial
IIVR – Indian Institute of Vegetable Research Varanasi
BOGVAR – Bottle gourd Variety
NPK- Nitrogen, Phosphorus and Potash
LC – Local Check variety
C- Check (Variety)
G – Grams

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Study area / Sample Collection: Horticultural College and Research Institute, Tamil Nadu Agricultural University, Coimbatore, 641003, Tamil Nadu

Cultivar / Variety name: Bottle gourd - *Lagenaria siceraria* (Mol.) Standl.

Conflict of Interest: None declared

Ethical approval: This article does not contain any studies with human participants or animals performed by any of the authors.
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