

## Research Article

# Evaluation Studies of Bitter Gourd (*Momordica charantia* L.) Genotypes based on Growth, Yield and Yield Attributing Characters

N Mounica\*, Priyadarshani P Mohapatra, A Pushparani Devi, D Triveni and Y Sudha rani

Department of Horticulture, M.S.Swaminathan School of Agriculture, Centurion University of Technology and Management, Parlakhemundi – 761211, Odisha, India

## Abstract

Bitter gourd is most popular vegetable in terms of nutritive and medicinal value among cucurbits, it is gaining popularity due to its high market demand, and the study was conducted on growth, yield, and yield attributing characters of 23 different genotypes of bitter gourd under agro climatic conditions of Gajapati district, village Bagusala of southern Odisha. The experiment was laid out in a RBD design with three replications. All 23 genotypes differ significantly related to growth, yield and yield attributing characters. The results revealed that the genotype “Muricata” recorded highest vine length (4.59m). Primary branches are maximum (6.89) in the genotype “Galaxy selection-9” and “Kantedar” genotype. Early harvest is seen in the genotype “Amanshri” (50DAS). Fruit length is maximum in genotype “Maina 379” (15.78cm). The highest fruit weight was observed in genotype “Amanshri” (57.56g). Fruit circumference is maximum in genotype “Dhaniakhali” (13.60cm).

Fruit Diameter was maximum in genotype “Special bolder uchha” (4.91cm). “Amanshri” produced the highest number of fruits/plant, average fruit weight, and fruit yield/plant. followed by “Galaxy Selection-9”. These bitter gourd genotypes could be utilized for further crop improvement program.

**Keywords:** Bitter gourd genotypes, growth, yield, yield attributes

## \*Correspondence

Author: N Mounica

Email: nammimounica980@gmail.com

## Introduction

Bitter gourd (*Momordica charantia* L.),  $2n=22$ , is an annual, climber vine and major cucurbitaceous vegetables of the family Cucurbitaceae is grown throughout India for its immature fruits. Indian production of bitter gourd is about 853.45 Thousand tons and Orissa production is 106.81 Thousand tons. It is highly cross pollinated due to monoecy [1]. It is considered as prized cucurbitaceous vegetable due to its high nutritional value, different amount of nutrients such as protein (1.5-2%), carbohydrates (4.0-10.5), fats (0.2-1.0%), minerals (0.5-1.0%) and vitamins (Vit-B2). It contains 83-92% of water and 0.8 to 1.7 of fibers [2]. Tender fruits are rich in vitamin-C, iron, ripe fruits are rich in vitamin-A and bitterness of fruit is due to the cucurbitacin like alkaloids momordicine and triterpene glycosides. Bitter gourd has high medicinal value with antidiabetic hypoglycemic principle called “Charantin”. Since globalization, the demand for fresh vegetables for export is increasing, to meet this increasing demand of export as well as super markets, different high yielding bitter gourd genotypes have been evolved for cultivation. Keeping in view of these facts, a total of 23 bitter gourd genotypes were evaluated for the study of growth, yield and yield attributing characters.

## Materials and Methods

The field experiment was conducted during summer season of 2018 at Bagusala Farm (23°39' N latitude, 87°42' E longitude) of M. S. Swaminathan School of Agriculture, Centurion University of Technology and Management, Parlakhemundi, Gajapati district, Odisha under typical sub-humid and sub-tropical climatic conditions. During the period of experimentation, the maximum and minimum temperature ranged from 43 to 49°C and 15 to 18°C respectively. Crops received negligible rainfall during February to May in 2018. The soil of the experimental plot was sandy loam in texture, slightly acidic in reaction (pH 5.5-6.5). Twenty three different bitter gourd genotypes (T-1) Shivam S-12, (T-2) Green long, (T-3) Kantedhar, (T-4) Special bolder uchha, (T-5) Galaxy S-4, (T-6) Maghdut korela, (T-7) Contai bolder uchha, (T-8) Dhaniakali, (T-9) Galaxy S-9, (T-10) Uchha big bolder, (T-11) Eluru local, (T-12) Amanshri, (T-13) Mahaan, (T-14) Maina-379, (T-15) Nakora, (T-16) B-Bioseed, (T-17) Bankai local, (T-18) BG-1346501, (T-19) West Godavari (long), (T-20) West Godavari (short), (T-21) Muricata, (T-22) Meghana-2, (T-23) Pathapatnam local, were grown in Randomized Block Design with three replications. Spacing was maintained 1.25cm between the rows and 50cm between the plants. Plot size was maintained 3m in length and 1.5m in breadth.

Soil was ploughed with mouldboard plough followed by rotavator. Farm yard manure and half N, and full doses of P and K was applied as basal dose. Weeding was done at 15-day intervals and surface flood irrigation was provided based on the moisture of the soil. In each replication, genotypes were represented by 2 rows and each row contains 5 plants. Data were collected randomly from 5 plants for vine length(m), primary branches, 1<sup>st</sup> picking (DAS), fruit length(cm), average fruit weight(g), fruit diameter(cm), fruit circumference(cm), number of fruits/plant, fruit yield/plant (kg).

## Results and Discussion

### Growth, yield and yield attributing characters

Significant different results were observed for 9 traits of all the genotypes for growth, yield and yield attributing characters shown in **Table 1**.

**Table 1** Mean performance study in Bitter gourd genotypes on the basis of growth, yield and yield attributing traits

Treatments	VL (m)	PB (No.)	1 <sup>st</sup> pick (DAS)	FL (cm)	Avg FW(g)	FD (cm)	FC (cm)	F/P (No.)	FY/plant (kg/plant)
1	4.23	6.00	63.67	7.79	27.17	4.36	11.81	21.90	0.31
2	3.33	4.22	63.00	9.37	26.94	3.70	10.47	20.60	0.22
3	3.49	6.89	66.00	7.66	36.22	4.01	11.18	19.23	0.31
4	3.52	6.44	57.67	7.52	33.78	4.91	13.46	25.33	0.40
5	3.97	5.56	59.67	9.02	37.78	3.87	11.38	22.80	0.36
6	3.61	4.00	64.00	7.85	44.28	4.06	10.51	21.33	0.32
7	3.68	4.00	63.67	7.68	50.44	4.54	11.21	22.13	0.26
8	3.12	4.89	68.00	11.48	35.06	3.57	13.60	19.43	0.32
9	4.28	6.89	51.67	6.71	48.78	3.97	10.70	27.80	0.47
10	3.79	4.33	54.67	8.84	38.44	4.17	11.70	21.27	0.33
11	2.73	2.89	70.67	9.37	28.67	3.61	12.24	17.30	0.13
12	3.25	4.00	50.00	13.61	57.56	4.21	11.56	30.63	0.56
13	2.93	4.56	56.00	11.97	40.83	3.88	10.79	22.27	0.41
14	2.92	3.56	59.33	15.78	47.61	3.67	13.16	18.33	0.28
15	3.65	5.89	60.00	8.36	29.72	4.01	10.56	21.97	0.35
16	1.93	2.22	76.33	6.12	21.89	3.30	8.76	11.20	0.04
17	3.02	4.33	59.00	9.61	26.50	4.36	12.94	22.90	0.29
18	4.05	6.00	53.67	14.05	30.67	4.30	9.62	24.63	0.52
19	2.66	3.89	59.00	14.81	35.17	4.24	12.36	17.50	0.18
20	2.69	3.56	54.00	8.13	31.00	3.92	11.90	18.47	0.15
21	4.59	5.22	57.67	8.02	38.83	4.10	11.94	26.20	0.43
22	3.53	3.78	58.67	6.56	43.44	4.80	11.48	22.40	0.19
23	3.97	5.89	61.00	8.52	38.50	4.03	12.04	20.33	0.31
C.D.	0.53	1.04	4.33	1.65	4.49	0.31	2.02	2.43	0.15
SEM±	0.19	0.37	1.52	0.58	1.58	0.11	0.71	0.85	0.05
C.V.	9.39	13.36	4.36	10.52	7.40	4.61	10.64	6.85	28.57

**VL**- Vine Length; **PB**- Primary Branches; **1<sup>st</sup> pick**- Days to first picking; **FL**- Fruit Length; **Avg FW**- Average Fruit Weight; **FD**- Fruit Diameter; **FC**- Fruit Circumference; **F/P** – Fruits/Plant; **FY/P**- Fruit Yield/Plant.

### Vine length

Vine length was recorded after fruiting period was over by measuring the length of main vine from the base of the plant up to the tip in metres with the help of metre scale. Among all genotypes the highest vine length (4.59m) was recorded in Muricata (T-21) and lowest (1.93m) was recorded in B-Bioseed (T-16). Vine length ranged from (2.89-5.97m) by Thakur Vandana *et al.* (2018) [3].

### Primary branches per plant

Observation of this trait was taken at the end of crop duration by counting the number of branches arising from the main stem of each genotype. The maximum number (6.89) was recorded in Galaxy Selection-9 (T-9), Kantedar (T-3)

and minimum number (2.22) was recorded in B-Bioseed (T-16). Primary branches per plant ranged from (6.63-10.49) was given by Moharana Durga Prasad, (2015) [4].

### ***Days to first picking***

The number of days taken from the date of sowing to the first occurring marketable fruits. The early fruiting i.e., (50DAS) was observed in Amanshri (T-12) and late fruiting i.e., (76.33DAS) was observed in B-Bioseed (T-16). Days to first picking range from (53.03-65.43) was given by kasera Saurabh *et al.* (2016) [5].

### ***Fruit length***

Observation of this trait was taken by randomly selected five fruits lengths measured from the peduncle end of the fruit to the blossom end point in centimetre. Sum of five fruits length was taken and average was calculated. The maximum value (15.78cm) is observed in Maina-379 (T-14) and minimum value (6.12cm) is observed in B- Bioseed (T-16). Fruit length ranged from (7.42cm-16.04cm) was given by Durga Prasad Moharana (2015).

### ***Average fruit weight***

Ten fruits were randomly taken from each genotype per replication and the average fruit weight was measured in grams. The highest fruit weight (57.56g) was observed in Amanshri (T-12) and the lowest fruit weight (21.89g) was observed in B-Bioseed (T-16). Sahoo Subhasmita (2015) [6] observed average fruit weight is ranged from (10.74-109.40g).

### ***Fruit diameter***

Fruits were cut almost middle in halves and the diameter was measured with the help of digital vernier callipers. Average diameter of fruits was calculated. The maximum fruit diameter (4.91cm) is recorded in Special bolder uchha (T-4) and the minimum (3.30cm) is in B-Bioseed (T-16). Fruit diameter ranged from (2.50-4.57cm) given by kasera Saurabh *et al.* (2016) [5].

### ***Fruit circumference***

Five randomly selected fruits per replication of each genotype was taken and average was calculated. The maximum value (13.60cm) was recorded in Dhaniakhali (T-8) and minimum value (8.76cm) was recorded in B-Bioseed (T-16). Moharana Durga Prasad, (2015) [4] observed fruit circumference ranged from (7.98cm-13.56cm).

### ***Fruits/plant***

The number of fruits/plant was obtained by adding the number of fruits of all pickings from the selected plants in each plot and average was calculated. The maximum number of fruits/plant (30.63) was observed in Amanshri (T-12) and minimum (11.20) was observed in B-Bioseed (T-16). Thakur Vandana *et al.* (2018) [3] observed among all genotypes number of fruits/plant ranges from (6.5-21.78).

### ***Fruit yield/plant***

Observation for this trait was recorded by taking the fresh weight of total number of fruits harvested at different pickings till marketable harvest. The maximum value (0.56 kg) was recorded in Amanshri (T-12) and minimum value (0.04 kg) was observed in B-Bioseed (T-16). Moharana Durga Prasad, (2015) [4] observed yield of fruits yield per plant ranged from 0.34 to 1.23 kg.

## **Conclusion**

On the basis of observations collected regarding different quantitative parameters all the twenty-three genotypes which were used in experiment showed significant variation in their results. Among all twenty-three genotypes Amanshri and Galaxy Selection-9 were found as early genotype and showed relatively best performance for their growth, yield and yield attributing traits.

## **Reference**

- [1] B. Singh, A. K. Singh and S. Kumar, (2013) Genetic Divergence Studies in Bitter Gourd (*Momordica charantia* L.). *Academic Journal of Plant Sciences*; 6(2): 89-91.
- [2] M. R. Islam, M. S. Hossain, M. S. R. Bhuiyan, G. N. Hasan, A. Syed, (2010) Multivariate analysis of bitter gourd (*Momordica charantia* L.). *Middle-East Journal of Scientific Research*; 5(2): 89-90.
- [3] Thakur Vandana, Sushil Kumar, Tiwari Rajni and S. R. Chormule, (2018) Yield and yield contributing traits of bitter gourd (*Momordica charantia* L.) genotypes. *Journal of Pharmacognosy and Phytochemistry*; 7(3): 844-846.
- [4] Moharana Durga Prasad, (2015) Genetic evaluation for yield and yield attributes in elite genotypes of bitter gourd (*Momordica charantia* L.). Thesis Master of Science (Agriculture) In Horticulture, Institute of Agricultural Sciences, Varanasi.
- [5] Kasera Saurabh, V. B. Singh, Verma Moolchandra, Abhijeet, (2016) Selection parameters in bitter gourd (*Momordica charantia* L.) for yield and yield contributing traits. *Indian Journal of Ecology*; 43(1): 173-175.
- [6] Sahoo Subhasmita, (2015) Variability studies in Bitter gourd (*Momordica charantia* L.). Thesis Master of Science (vegetable science) Orissa University of Agriculture and Technology, Bhubaneswar.

© 2018, by the Authors. The articles published from this journal are distributed to the public under “**Creative Commons Attribution License**” (<http://creativecommons.org/licenses/by/3.0/>). Therefore, upon proper citation of the original work, all the articles can be used without any restriction or can be distributed in any medium in any form.

#### Publication History

Received 04<sup>th</sup> May 2019

Revised 20<sup>th</sup> May 2019

Accepted 04<sup>th</sup> Jun 2019

Online 30<sup>th</sup> Jun 2019