



Research Article

GROWTH AND YIELD ATTRIBUTES OF GUAVA (*Psidium guajava* L.) VARIETIES UNDER WEST BENGAL CONDITION

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Abstract- The study revealed highest tree height, tree volume, stock girth, and scion girth and in Sweta variety; while lowest stock girth, scion girth and tree volume was in Kohir Safeda. Sweta was first to flower, while the duration of flowering was longer in Allahabad Safeda, followed by Lalit and shortest in Arka Amulya. Sweta was superior to all other varieties in terms of yield attributes as it registered highest fruit yield and fruit set. Among the various physical characters studied, fruit weight (137.33 gm) and fruit volume (153.33 ml) was highest in Philipines variety, on the other hand, specific gravity was highest in Hisar Safeda. In Arka Amulya variety highest number of seeds/fruit (306.33) was obtained, and lowest seed number was observed in Sweta. In terms of tree vigorous, flowering, yield with less number of seeds. The Sweta variety was well performed under West Bengal condition.

Keywords- Guava, Variety, Vegetative Growth, Reproductive Growth, Yield.

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Introduction

Guava (*Psidium guajava* L.) belongs to the family Myrtaceae with chromosome no. $2n=2x=22$ and is a perennial tree believed to be originated in Central America and the southern part of Mexico [1]. It is grown throughout the tropics and sub-tropics of the world because of its wider adaptability. It is commercially cultivated in Pakistan, Bangladesh, India, Thailand, Mexico, Brazil, USA and several tropical and subtropical countries of the world [2]. Guava has good nutritive value, pleasant aroma, good flavour and also important use in the processing industry. With its unique flavour, taste, and health-promoting qualities, the fruit easily fits in the new functional foods category, often called "Super-fruits". Fruits are rich in vitamin C, pectin, phosphorus, iron etc [3]. It was considered to be one of the most important and nutritionally valuable fruit crop in India. It is easily available from rural to urban people and is popularly known as 'apple of the tropics'. Guava is a hardy fruit crop thriving well under a wide range of soil. In West Bengal, 24-Parganas (North and South) and Nadia districts soil is good fertile due to alluvial in nature and irrigation is not a problem, so mostly guava has cultivated in those regions. The cultivated area of West Bengal is 14.73 thousand ha with 190.60 thousand MT production [4]. In West Bengal, so many local cultivars are grown successfully but need to grow new cultivars are also important for wider adaptability of the crop. An attempt has already been made to find out suitable cultivars in red and laterite zone of West Bengal with 21 cultivars [5].

Material & Methods

Treatments and experiment design

The present investigation was undertaken at Horticultural Research Station, Mondouri, BCKV, situated at 23.5° North latitude and 89° East longitudes, with an altitude of 9.75 m above the MSL using 5 years old of guava varieties viz., Lalit, Allahabad Safeda, L-49, Sweta, Philipines, China, Kohir Safeda and Arka Amulya. Trees are planted in the square system at a distance of 5m x 5 m with eight

cultivars, as eight treatments with three replications. The experiment was laid out in Randomized Block Design. The data was analyzed by analysis of variance (ANOVA) and CD was calculated at $P \leq 0.05$ [6].

Data collection and observation recorded: Observation on growth parameters were taken at the beginning of trial, whereas observations on fruit characters were recorded at the time of harvesting. The tree volume was calculated by the formula [7]:

$$V = \frac{4}{3} \pi r^2 h;$$

Where, r = spread from east-west (m) and north-south (m), h = height of the tree (m), v = volume of the tree (m³).

The opening of minimum 20 numbers of flowers/plant on a particular date was considered as the start of flowering and when the availability of below 20 numbers of flowers /plant on a particular date was considered as the end of flowering. The duration of flowering was calculated from the first day of flower opening to the last day of flowering in each crop season. The number of flowers was counted on the four randomly selected shoots and an average number of flowers/shoots was calculated. The total number of flowers which set into fruit was counted and percent of fruit set/shoot was calculated on the basis of number of flowers emerged. The fruit set was calculated by the formula;

$$\text{Fruit set} = \frac{\text{Number of set fruits}}{\text{Total number of flowers}} \times 100$$

The average number of fruits per plant was recorded at that time of harvesting from the tagged plants. The total yield per tree was obtained through the number of fruits retained on the trees and weighing the fruits by electronic balance. Fruit

volume was determined by water displacement method, whereas the fruit size was recorded by measuring length and breadth of fruit with the help of vernier caliper. Specific gravity was calculated by the formula;

$$\text{Specific gravity} = \frac{\text{Weight of fruit (gm)}}{\text{Volume of fruit (ml)}}$$

The total number of seeds per fruit was calculated by separating the seeds by using a sieve (20 mm) and then counting of seeds per fruit.

Result and Discussion

The study in [Table-1] revealed that the highest tree height (4.27m), tree volume (78.11 m³), stock girth (20.33 inch), and scion girth (16.03 inch) was found in Sweta variety, while lowest tree height (3.40 m), stock girth (3.40m), and scion girth (14.60 inches) was found in variety Kohir Safeda. The guava varieties under study were found to have different growth habit. The variations in plant growth characters in different varieties could be a generic feature of individual genotype or a varietal character as well as environmental influence [8,9]. The perusal data in [Table-2] revealed that Sweta was first to flower, while the duration of flowering was longer in Allahabad Safeda, followed by Lalit and shortest in Arka Amulya. Apart from the varietal differences, time and duration of flowering is influenced by the environment conditions in guava [9]. The data in [Fig-1] revealed that the Sweta variety was superior to all other varieties in terms of yield attributes as it registered highest fruit set (93.77%) and yield (16.66 kg/plant) followed by L-49 with fruit set (90.49%) and yield (16.54 kg/plant). The higher yield from L-49 (33.06 kg plant⁻¹) variety was grown at Jammu [10]. Among the various physical

characters studied, fruit weight (137.33gm) and fruit volume (153.33 ml) were highest in Philipines followed by Sweta variety. The Highest numbers of seeds (306.33) per fruit were observed in variety Arka Amulya, followed by Philipines (302.33), whereas lowest seed number was observed in Sweta (242). The highest number of seeds per fruit in Arka Amulya (380.25) followed by Pant Prabhat (300.50), whereas the seed number was lowest in Lalit (205.75) observed by Dolkar *et al.*, [10]. There was a non-significant difference among the growing sites/cultivars for specific gravity at harvesting stage. The highest Specific gravity (0.93) was in Philipines variety. The guava varieties under study were found to have different growth habit and yield. The variations in plant growth characters in different varieties could be a generic feature of individual genotype or a varietal character as well as environmental influence [8].

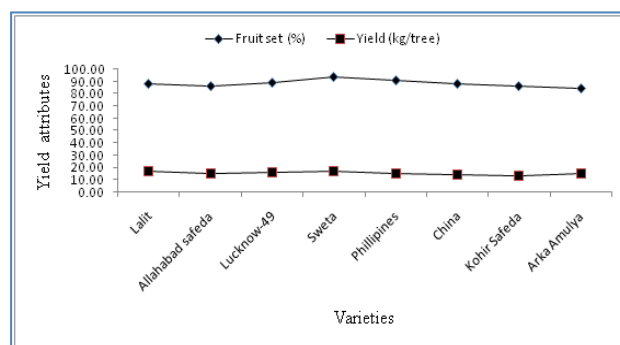


Fig-1 Fruit set and yield of different guava cultivars.

Table-1 Tree height, plant spread, tree volume, stock girth, scion girth and stock: scion ratio of different guava cultivars.

Varieties	Tree Height (m)	Plant spread (m)		Tree Volume (m ³)	Stock girth (inch)	Scion girth (inch)	Stock: Scion ratio
		East-west	North-south				
Lalit	4.03	4.10	3.87	66.75	14.97	13.45	1.11
Allahabad Safeda	3.85	4.30	4.43	69.08	15.07	14.31	1.22
L-49	3.55	3.73	4.00	57.75	15.47	15.09	0.83
Sweta	4.27	4.27	4.10	78.11	20.33	16.03	1.43
Philipines	3.46	3.17	3.40	40.74	14.73	13.26	1.11
China	3.91	3.33	3.41	48.73	18.40	15.63	1.15
KohirSafeda	3.40	3.73	3.93	54.71	14.60	12.65	1.15
ArkaAmulya	3.69	3.63	3.67	49.63	14.70	12.86	1.14
SEm(±)	0.18	0.07	0.14	2.18	0.70	0.79	0.11
C.D. (0.05)	0.55	0.21	0.44	6.66	2.14	2.39	NS

NS: Non-Significant

Table-2 Date of flowering, date of full blossom, date of end of flowering and duration of the flowering of different guava cultivars.

Varieties	Date of First Flowering	Date of Full blossom	Date of end of flowering	Duration of flowering (days)
Lalit	last week of February (28)	last week of March (29)	Last week of April (22)	65
Allahabad Safeda	last week of February (28)	last week of March (25)	1 st week of April (05)	69
L-49	1 st week of march (02)	last week of March (31)	Last week of April (30)	59
Sweta	last week of February (26)	Last week of March (25)	last week of April (28)	63
Philipines	last week of February (27)	last week of March (29)	last week of April (29)	63
China	1 st week of March(06)	1 st week of April (06)	2 nd week of May (9)	64
kohirSafeda	2 nd week of March (12)	1 st week of April (06)	2 nd week of May (12)	61
ArkaAmulya	2 nd week of March (11)	2 nd week of April (10)	1 st week of May (06)	56

Figures in the parenthesis denote date

Table-3 fruit weight, fruit size, number of seeds/fruit, fruit volume and specific gravity of different guava cultivars.

Varieties	Fruit weight (g)	Fruit size (cm)		Number of seeds /fruit	Fruit Volume (ml)	Specific gravity (gm ⁻¹)
		Length	Diameter			
Lalit	102.33	6.45	6.84	256.00	114.33	0.89
Allahabad Safeda	121.00	6.70	6.77	295.67	133.00	0.91
L-49	122.33	6.95	7.05	252.00	135.67	0.90
Shweta	134.33	6.30	6.37	242.00	150.33	0.91
Philipines	137.33	7.22	6.94	302.33	153.33	0.93
China	126.33	6.08	6.25	268.67	138.00	0.91
KohirSafeda	117.33	6.10	6.07	262.33	128.67	0.91
ArkaAmulya	114.33	6.07	5.91	306.33	126.00	0.91
SEm(±)	5.96	0.23	0.19	0.82	0.21	0.01
C.D.(0.05)	18.40	0.70	0.58	27.62	0.63	0.21

Conclusion

In view of the economic importance of the guava cultivation under West Bengal, there is need to identify the promising varieties either through selection or hybridization among the existing cultivars of the superior genotype by involving the suitable cultivars. In the present investigation, the variety Sweta, Lucknow-49 and Philipines has been found superior.

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Abbreviations: gm.: Gram; ml.: Millilitre; no.: Number; etc: et cetera; ha: Hectare; MT: Metric tonne; m: Metre; /: Per; %: Percentage; m³: metre cube; kg: Kilogram; viz.,: Namely; CD: Critical difference; SEm: Standard error mean; et al: and others.

Conflict of Interest: None declared

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