



RESEARCH ARTICLE

Evaluation of some growth and yield parameters of eight varieties of Watermelon *Citrullus lanatus* (Thunb) in Nsugbe area of Anambra State Nigeria

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ABSTRACT

A field experiment was carried out in the 2023 and 2024 cropping seasons to assess some growth and yield parameters of eight varieties of water melon (Biggie, Koloss, Charleston gray, Kaolack, Crimson Sweet, Lagoon, sugar baby and sweet Sangria) at the Teaching and Research Farm of the Department of Agricultural Education, Nwafor Orizu College of Education, Nsugbe Anambra State Nigeria. The experiment was carried out in a Randomized Complete Block Design (RCBD) consisting of eight treatments replicated three times. Data were collected on Vine Length, Number of leaves, fruit length, fruit girth, fruit weight and fruit yield were collected at physiological maturity. The result of the study showed that there was significant difference ($p < 0.05$) among the different varieties evaluated on the growth and yield parameters. The result of the two-year evaluation indicated that Biggie variety was superior at 4 and 8 weeks in the parameters tested with mean vine length of 140cm and 286cm respectively, mean number of leaves 26 and 58 respectively; mean fruit length of 40cm and 42 cm respectively; mean fruit girth of 36cm and 38cm respectively, mean fruit weight of 6.6 kg and 6.8kg respectively and fruit yield of 66 and 68 tons/ha. Based on the findings of this study, it was recommended that farm in the study area grow biggie variety for increase growth & yield of water melon.

1. Introduction

Watermelon *Citrullus lanatus* Thunb belongs to the family of *Cucurbitacea* in the plant kingdom. According to Food and Agricultural Organization (FAO, 2023) statistics, China is the world's leading producer of watermelon; the top twenty leading producers of watermelon produced a collective volume of approximately 102.9 million metric ton in 2023 of which China produced 60.8%. India, Turkey, Algeria and Brazil commanded a production share of the 20-leading producer of 3.6%, 3.1%, 2.5% and 1.8% respectively in 2023.

Watermelon is a warm season crop that is cultivated worldwide because of its numerous nutritional benefits. Watermelon can be made into wine or other traditional brews. In Sudan and Egypt, for example, watermelon seeds can be roasted, salted and eaten as snacks. Watermelon fruits are used as a source of drinking water during drought season in some parts of the world as watermelon is highly relished as fresh fruit because of its thirst-quenching attribute in addition to many other identified nutritional values and advantages. Quantitative assessment indicates that watermelon has 46% calories, 20% vitamin C, and 17% vitamin A and has higher lycopene than tomato (Biswanet *et al.*, 2017). According to Maoto *et al.*, (2019), it contains lycopene, vitamin A, B6, C, carotenoids and antioxidants. Thus, its consumption has increased, owing to its nutritional profile and allied health benefits. The fruit is effective



in reducing cancer, cardiovascular disorders, diabetes, blood pressure and obesity (Lum *et al.*, 2019).

Watermelon is one of the most cultivated and consumed fruits in Nigeria, particularly in Anambra State (Adekunle *et al.*, 2018). The crop is a valuable source of income for many farmers in the region, and its production plays a significant role in the local economy (Uzo *et al.*, 2019). However, despite its importance, watermelon production in Anambra State is often constrained by various factors, including poor soil fertility, inadequate rainfall, and limited access to improved varieties (Nwofia *et al.*, 2015).

The evaluation of growth and yield parameters of different watermelon varieties is essential for identifying high performance varieties that can thrive in the local environment (Akande *et al.*, 2017). Several studies have reported significant variations in growth and yield parameters among different watermelon varieties (Adeyeye *et al.*, 2020; Oloyede *et al.*, 2018). For example, a study by Oloyede *et al.* (2018) found that the variety “sugar baby” exhibited superior growth and yield performance compared to other varieties in a study conducted in South-Western Nigeria.

In Anambra State, there is limited information on the performance of different watermelon varieties, and most farmers rely on traditional varieties that may not be suited to the local environment. Therefore, this study aims to evaluate the growth and yield parameters of eight watermelon varieties in Nsugbe area of Anambra State, Nigeria.

2. Material and Methods

The study was conducted in 2023 and 2024 cropping seasons at the Teaching and Research farm of the Department of Agricultural Education, Nwafor Orizu College Education, Nsugbe. Nsugbe is situated in Anambra East Local Government Area of Anambra State and is bounded on the North by Omambala River, on the South by Nkwelle Ezunaka Town, on the West by Onitsha town and on the East by Umueri town. Nsugbe is Located in the rainforest agro- ecological zone of Nigeria on latitude $06^{\circ} 14^{\circ}\text{N}$ and longitude $06^{\circ} 49^{\circ}\text{E}$ of the equator, with annual rainfall range of 1500mm to 2000mm. The distribution is bimodal with peak in July and September coupled with low period of precipitation in August and the mean temperature of 30°C , relative humidity is 73%, while sunshine stood at 5.0 bars (NIMET, 2022).

The experiment was carried out in a Randomized Complete Block Design (RCBD) with three replicates. Eight varieties of watermelon were sown (Biggie, Koloss, Charleston gray, Kaolack, Crimson sweet, logon, Sugar baby and Sweet Sangria). Poultry manure was uniformly incorporated at the rate of 30 tons/ha into the soil two weeks before planting. The eight varieties were sourced from Agro-Allied Seed Company (AfriAgri Product Ltd and KUCH-99) and sown on the plots at 2 seeds per hole at a depth of 2.5cm using a spacing of 100cm x 100cm, with 1m Alley pathway. The plot size was 4m x 5m (20m^2). Sowing of seeds were done in May in both cropping seasons. Regular weeding was done around the base, along and head of the vines using hoe. Six middle stands were used as sample population. Data were collected on vine length and number of leaves at 4 and 8 weeks after planting, while fruit length, fruit girth, fruit weight and fruit yield were measured at harvest. Data collected were analysed using analysis of variance and treatment means were compared using Duncan Multiple Range Test at 5% level of significance.

3. Results and Discussion

3.1 Growth parameters of watermelon

The results revealed that significant differences ($P < 0.005$) were observed among the different varieties of watermelon evaluated on vine length and number of leaves of watermelon in 2023 and 2024 cropping seasons (Table 1). Vine length and number of leaves were all significantly higher in Biggie variety than all other varieties assessed in both

cropping seasons and across all the sampling periods (4 weeks and 8 weeks after planting). The higher mean value of vine length of Biggie variety over other watermelon varieties tested may be attributed to differences in its genetic constitution with respect to higher growth rate of the vine, and to suitability of Nsugbe agro-ecological conditions for the variety. This is similar to the findings of Ibrahim *et al.*, (2000); Sajjan *et al.*, (2002), who reported that genetic constitution of crop varieties influences their growth characters.

Also, number of leaves of Biggie variety was higher than that of other varieties investigated possibly because Biggie variety had higher photosynthetic activities, better distribution of leaf surface, superior leaf arrangement and chlorophyll content, and more active photosynthetic enzymes. This is similar to the findings of Enujeke (2013) who attributed the differences between the growth characters of crop varieties to photosynthetic activities of leave, differences in distribution of leaf surface and crop canopy, leaf arrangement, differences in chlorophyll content and activity of photosynthetic enzymes.

Table 1: Some growth attributes in eight varieties of water melon planted in Nsugbe Area of Anambra State, Nigeria at weeks after planting in 2023 and 2024 cropping seasons.

Varieties	Vine length (cm)			
	2023		2024	
	4	8	4	8
Biggie	140 ^a	286 ^a	142 ^a	288 ^a
Kaolack	120 ^b	246 ^b	121 ^b	250 ^b
Sugar baby	110 ^{ab}	224 ^b	112 ^c	228 ^c
Koloss	108 ^b	210 ^{bc}	109 ^c	212 ^c
Crimsom Sweet	100 ^b	200 ^c	102 ^c	204 ^d
Charleston gray	98 ^c	198 ^c	99 ^{cd}	200 ^d
Sweet Sangria	94 ^c	182 ^c	97 ^d	196 ^d
Logon	90 ^c	178 ^c	93 ^d	190 ^d
Number of leaves				
Varieties				
Biggie	26 ^a	58 ^a	24 ^a	59 ^a
Kaolack	20 ^b	42 ^{ab}	18 ^b	41 ^b
Sugar baby	18 ^a	32 ^b	16 ^b	31 ^b
Koloss	16 ^{ab}	28 ^c	15 ^b	27 ^b
Crimsom Sweet	14 ^b	26 ^c	14 ^b	25 ^b
Charleston gray	13 ^b	24 ^c	13 ^b	23 ^b
Sweet Sangria	12 ^b	22 ^c	12 ^b	21 ^{bc}
Logon	11 ^b	20 ^c	11 ^b	19 ^{bc}

Mean in the same column with the same letters are not significantly different at ($P < 0.05$) level of probability using DMRT

3.2 Yield and yield components of watermelon

Fruit length, fruit girth, fruit weight and fruit yield were significantly ($p < 0.05$) higher in Biggie variety than any other varieties of watermelon in both cropping seasons (Table 2). This is probably due to the fact that Biggie variety combined its good genetic make-up to exploit the newly found favourable agro-ecological conditions of the study area for proper growth and development. Also, the higher yield and yield components observed in Biggie variety may be attributed to its stomatal conductance value, better partitioning of photosynthetic material towards economic yield (sink), better genetic structure and higher potential transport photosynthetic material within plants. The higher yield and yield components observed in Biggie variety is an indication of its potential for commercial production in Nsugbe area of Anambra State, Nigeria. The result is in contradiction with the findings of Adeyeye *et al.*, (2020); Akande *et al.*, and Oloyede *et al.*, (2018) who reported that sugar baby variety

exhibited higher growth and yield performance compared to other varieties in a study conducted in South-Western, Nigeria.

Table 2: Some yield and yield components in eight varieties of water melon planted in Nsugbe Area of Anambra State, Nigeria in 2023 and 2024 cropping seasons

Varieties	Fruit length (cm)		Fruit girth (cm)		Fruit weight (kg)		Fruit yield (tons/ha)	
	2023	2024	2023	2024	2023	2024	2023	2024
Biggie	40 ^a	42 ^a	36 ^a	38 ^a	6.6 ^a	6.8 ^a	66 ^a	68 ^a
Kaolack	34 ^b	36 ^b	30 ^b	32 ^b	4.4 ^{ab}	4.6 ^b	44 ^b	46 ^b
Sugar baby	32 ^a	30 ^a	28 ^a	26 ^b	4.0 ^{ab}	4.2 ^b	40 ^b	42 ^b
Koloss	28 ^b	27 ^b	26 ^a	25 ^b	3.8 ^{ab}	3.7 ^c	38 ^c	37 ^c
Crimsom	26 ^b	25 ^b	24 ^a	23 ^b	3.6 ^b	3.5 ^c	36 ^c	35 ^c
Sweet Charleston	24 ^b	23 ^b	22 ^b	21 ^b	3.4 ^b	3.3 ^c	34 ^c	33 ^c
gray								
Sweet Sangria	22 ^b	21 ^b	20 ^b	19 ^{bc}	3.2 ^b	3.0 ^c	32 ^c	30 ^c
Logon	20 ^b	21 ^b	18 ^b	17 ^{bc}	2.6 ^c	2.4 ^d	26 ^d	24 ^{cd}

Mean in the same column with the same letters are not significantly different ($p < 0.05$) level of probability using DMRT

4. Conclusion and Recommendation

This study was carried out to assess some growth yield and yield attributes of eight watermelon varieties in Nsugbe Area of Anambra State, Nigeria. It was conducted in a Randomized Complete Block Design (RCBD) with three replicates. The parameters assessed to achieve the objective of the study were vine length, number of leaves, fruit length, fruit girth, fruit weight, and fruit yield of the different varieties of water melon. The results obtained revealed that Biggie variety was superior in the parameters investigated. Based on the findings of the study, it was recommended that farmers in the study area plant Biggie variety of watermelon for enhanced growth and yield. The study highlights the importance of this variety selection for commercial watermelon production in Nsugbe.

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