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Sowing Dates and Fertilizer Application on Growth and Yield of Muskmelon (*Cucumis melo* L.) at Ado-Ekiti

Matthew Aluko[1*]

[1]*Department of Crop, Horticulture and Landscape Design, Ekiti State University, Ado-Ekiti, Nigeria.*

Author's contribution

The sole author designed, analysed, interpreted and prepared the manuscript.

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ABSTRACT

Information on some agronomic practices are required for muskmelon production as there is no record of its production in Ado-Ekiti. A field study of 3 x 2 factorial experiment of sowing dates (January, May and September) and NPK 15:15:15 fertilizer application (0 and 333 kg ha^{-1}) was laid out in a Randomized Complete Block Design in three replicates at the Teaching and Research Farm of Ekiti State University, Ado-Ekiti, Nigeria. Data collected on the number of leaves and branches, leaf area, vine length, day to flowering, 50% flowering, number of fruit, fruit size and yield were subjected to analysis of variance and treatment means separated by Duncan's Multiple Range Test at 5% probability. Dates of sowing did not significantly influence growth but muskmelon planted in May gave a higher number of leaves $plant^{-1}$, leaf area and vine length. Fertilized plants produced better growth and earlier flowering than unfertilized plants. The number of fruits ha^{-1}, average fruit weight and fruit yield ha^{-1} of 11606, 0.78 kg and 9.09 t ha^{-1} respectively were produced by fertilized plants which were significantly higher than 10036.70, 0.28 kg and 2.44 t ha^{-1} from unfertilized plants. Muskmelon planted in September produced a higher number of fruits and fruit yield of 12418 and 11.29 t ha^{-1} while muskmelon planted in May produced higher fruit weight (0.94 kg) but these did not differ significantly from other sowing dates. Planting muskmelon under the rain-fed condition with adequate fertilizer application gave better performance and is thereby recommended for muskmelon production in Ado-Ekiti.

**Corresponding author: Email: matthew.aluko@eksu.edu.ng;*

Keywords: Muskmelon; sowing date; fertilizer application; growth and yield.

1. INTRODUCTION

Muskmelon (*Cucumis melo* L.) is an important horticultural crop cultivated in form of many varieties such as cantaloupe, honeydew, casaba, Persian melon and Crenshaw in the tropics, sub-tropics and temperate regions of the world [1] with a world production of about 28 million ton [2]. It is a member of the plant family Cucurbitaceae and cultivated mainly for nutritional and pleasant aroma aside various healthy usefulness. The fruit of muskmelon contains 90 percent water which makes consumption of the refreshing and sweet pulp with pleasant aroma useful in preventing dehydration, especially during dry and hot seasons and reducing constipation. It is rich in vitamin C, carotene, folic acid, potassium, and several health-bioactive compounds. The folic acid helps to create healthy fetuses in pregnant women and prevent cervical cancer and osteoporosis while the potassium (K) is associated with the lowering of blood pressure [3].

The period of sowing in the crop, especially under field conditions influences, crop growth and yield. This had made farmers especially in developing countries to mostly practice rain-fed agriculture due to lack of adequate irrigation facilities as muskmelon is mostly cultivated under irrigation [4]. Time of sowing has been observed to have a significant effect on muskmelon production [5,6,7]. Although Khan, et al. [6] reported early sowing resulted in seed up germination days, flowering and fruit set, Dufault, et al. [8] showed earliness (sowed in February) has no advantage over the plants sowed in March as both reached melon harvest within the same time. Oloyede and Adebooye [9] report on the pumpkin (Cucurbita pepo Linn.) and Nwofia, et al. [10] on cucumber (Cucumis sativus) under rain-fed condition showed early sowing dates yielding higher fruit yield than the late sowing dates.

The success of crop production enterprises depends on mineral nutrition and the use of organic and inorganic fertilizers as sources of nutrients to boost the growth and yield of cucurbits is well documented [11]. The increases in growth and yield due to the application Nitrogen (N), phosphorus (P) and potassium (K) are similar for all cucurbit under field conditions [12]. NPK has significantly affected the fruit weight, the number of fruits, vine length and fruit yield per hectare [13-16]. The reports of the application of NPK fertilizer by Oloyode and Adebooye [9] on the pumpkin (Cucurbita pepo Linn.) and Awere and Onyeacholem [17] on watermelon (*Citrullus lanatus*) indicated significant growth and yield from unfertilized plants.

Ado-Ekiti in southwest Nigeria is an agrarian community with the evidence of cucurbit production except muskmelon cultivation which is scarcely known by the community farmers. Therefore information is required on the agronomy practices of muskmelon to affect its production in the community. This study is, therefore, aim at providing such information on the sowing date and fertilizer application to enhance muskmelon production in Ado-Ekiti.

2. MATERIALS AND METHODS

2.1 Study Area

The trial was carried out at the experimental site of the Department of Crop, Horticulture and Landscape Design in the Teaching and Research Farm, Ekiti State University, Ado-Ekiti. The trial site laid between 7°31'N and 5°13'E at 530 m above sea level. Ado-Ekiti is located in the rain forest zone and experiences a tropical climate characterized by two main seasons: the rainy season extends from March to October, with a short 2-3 weeks break in August (August break) and the dry season that lasts from November to February. The total mean annual rainfall is 1334 mm with the lowest average rainfall of 9 mm in January and the highest at 235 mm in September. The annual temperature range between 19.0°C and 32.8°C with the lowest average of 22.9°C in August and the highest in March at 27.1°C.

2.2 Experimental Design

A level portion of field was plowed, harrowed and divided into 4 x 4 m subplot separated by 1 m paths to which soil samples were randomly collected and analyzed in the laboratory using the procedure of Udo, et al. [18] to determine soil pH, particle sizes distribution, organic matter, total N, available P, exchangeable cations and exchangeable acidity. The seeds of muskmelon (reticulatus group) obtained from Jungle Seeds

Limited, United Kingdom were used for the study. Three sowing dates (January, May, and September) and NPK 15:15:15 fertilizer applications (0 and 333 kg NPK ha^{-1}) in 3 x 2 factorial experiment laid out in Randomized Complete Block Design (RCBD) in three replicates were designed. The seeds were planted at 1 x 1 m spacing (10000 plant ha^{-1}) in the sub-plot and seedling thin to 1 $hill^{-1}$ after emergence. Hand weeding was done fortnightly and plants were sprayed with Kombat 2.5 EC (25 g of Lambda Cyhalothrin l^{-1}) insecticide twice before flowering. NPK 15:15:15 fertilizer (333 kg NPK ha^{-1}) were applied four weeks after sowing (WAS).

2.3 Data Collection

Data were collected on the number of leaves and branches, leaf area (Leaf area = 3.30 + 0.63 (W2) where W is leaf width) [19]), vine length, number of flowers and day to first flowering and day to 50 % flowering. The number of fruits per plant, fruit length, and width, fruit weight, fruit pulp width, number of seeds and seeds weight were collected for yield and yield components analysis.

2.4 Statistical Analysis

All data were subjected to analysis of variance and treatment means separated by Duncan's Multiple Range Test at a 5% level of probability using the generalized linear model of SAS.

3. RESULTS AND DISCUSSION

3.1 Characteristics of the Soils Used for the Studies

The characteristics of the soil in the experimental sites are shown in Table 1. The soil was a loamy sand containing 821.2, 100.0 and 78.8 g kg^{-1} sand, silt, and clay respectively and with pH, at 5.06, 13.2 and 0.70 g kg^{-1} organic matter and total N and 25.1 mg kg^{-1} available P. The exchangeable K, Ca, Mg and Na contents were 0.20, 6.22, 0.65 and 0.09 cmol kg^{-1} respectively. Loamy sand soil is suitable for vegetable crops especially when supplied with adequate water and nutrient. Although soil test interpretation is not available for vegetables, the critical N level at 1.1 mg g^{-1} established for crop production in Nigeria [20], show that the soils are low in total N with values at 0.7 and 0.8 mg g^{-1} while the available P and exchangeable K values are medium-high compared to critical levels at 10 gm kg^{-1} and 0.20 cmol kg^{-1} respectively.

Table 1. Physical and chemical properties of the soil used for the studies

Soil properties	Values
pH (H_2O)	5.06
Oganic carbon (g kg^{-1})	7.60
Organic matter (g kg^{-1})	13.2
Total nitrogen (g kg^{-1})	0.70
Available phosphorus (mg kg^{-1})	25.10
Exchangeable bases (cmol kg^{-1})	
K	0.20
Ca	6.22
Mg	0.65
Na	0.09
Sand (g kg^{-1})	821.2
Silt (g kg^{-1})	100.0
Clay (g kg^{-1})	78.8
Textural class	Loamy sand

3.2 Effects of Sowing Dates and NPK 15-15-15 Fertilizer Application on Some Growth Parameters of Muskmelon

The growth parameters of muskmelon as affected by NPK 15-15-15 fertilizer application are shown in Table 2. The muskmelon fertilized with 333 kg ha^{-1} as NPK 15-15-15 fertilizer produced the number of leaves $plant^{-1}$, leaf area, stem vine length, branch length and the number of branches $plant^{-1}$ which were significantly different from the non-fertilized plants (control). At 10 WAS, fertilized muskmelon plants produced 71.11 average number of leaves $plant^{-1}$, 124.03 cm^2 leaf area, 115.69 cm stem vine length, 5.67 number of branches and 108.56 cm branch length which were significantly higher than 47.78 average number of leaves $plant^{-1}$, 86.75 cm^2 leaf area, 86.06 cm main vine length, 4.00 number of branches and 64.86 cm branch length produced by the control.

Table 3 shows the effect of fertilizer application on muskmelon established at different sowing dates. The application of 333 kg NPK ha^{-1} as NPK 15-15-15 to muskmelon at all sowing dates produced a higher number of leaves compared to the control (0 kg NPK ha^{-1}). The muskmelon sowed in May produced the highest number of leaves over the period of measurement but the application of 333 kg NPK ha^{-1} did not significantly differ from the control treatment except at 10 WAS where the 46.67 leaves in the control were significantly lower and represented 56.0% of the 83.33 leaves produced in the fertilizer treatment. The effect of fertilizer application was not significant on the number of leaves of muskmelon sowed in January while only the sowing in September showed a significant difference between 333 kg NPK ha^{-1} and the control at 6 WAS.

The muskmelon sowed in January and given 333 kg NPK ha^{-1} produced the least number of leaves over 5-8 WAS period but this was reversed at 9-10 WAS as the September sowing gave the least values. The muskmelon sowed in May produced plants with significantly higher leaf area than those sowed in January and September at all the weeks of measurement and the values increased with fertilizer application which was significant only at 8-10 WAS. The largest leaf area of 162.94 cm^2 recorded at 10 WAS represented a 69.9% increase above the value for the control. The fertilizer application had no significant effect on leaf area development of muskmelon sowed in January over the sampling period while the effect for September sowing was significant only at 6 WAS.

The sowing of muskmelon in May produced plants with the longest stem vines at all periods of measurement and the values increased with application of fertilizer overtime being significant at 6-8 WAS but the effect at 10 WAS where 333 kg NPK ha^{-1} gave the highest vine length (134.50 cm) that was 42.83% increase over the control treatment. Fertilizer application did not have a significant effect on vine length of muskmelon sowed in January throughout the period of measurement but this reflected only at 5 WAS for muskmelon sowed in September.

The application of fertilizer increased the number of vine branches at each sowing date but the effect was not significant at 5 WAS. The same trend was observed with fertilizer application for each sowing date over the period of measurement but 333 kg NPK ha^{-1} for September sowing gave the highest number of branch vines at 6 and 7 WAS after which muskmelon sowed in January with fertilizer application gave the highest number at 8 to 10 WAS that did not differ from September sowing at the same treatment.

The application of 333 kg NPK ha^{-1} to muskmelon sowed in September produced the longest branch vine (11.00 cm) that was not significantly different from sowing in January and May at 5 WAS. Thereafter, the branch vines from fertilized muskmelon sowed in May were longest and significantly different from the others. The branch lengths of muskmelon planted in January and September were not significantly different with or without fertilizer.

Table 2. Effects of NPK 15-15-15 fertilizer application on some growth parameters of muskmelon at Ado-Ekiti

Rate	Weeks after sowing					
(kg ha^{-1})	5	6	7	8	9	10
Number of leaves						
0	8.22a	11.83b	19.78b	30.11b	44.11b	47.78b
333	10.28a	19.67a	29.50a	44.72a	56.89a	71.11a
Leaf area (cm^2)						
0	37.28b	54.11b	70.13b	77.29b	95.15b	86.75b
333	64.69a	94.28a	101.18a	111.65a	119.77a	124.03a
Stem vine length (cm)						
0	6.50b	11.53b	25.09b	46.90b	72.28b	86.06b
333	11.04a	30.80a	48.36a	76.56a	98.04a	115.69a
Branch vine length (cm)						
0	1.83b	10.85b	23.13b	46.77b	77.13b	64.86b
333	7.86a	23.07a	40.49a	67.88a	95.33a	108.56a
Number of branches						
0	1.00b	2.44a	3.22a	3.78b	4.00b	4.00b
333	2.00a	3.22a	4.11a	5.22a	5.33a	5.67a

Means with the same letter(s) on the same column for each parameter are not significantly different at 5% probability using Duncan's Multiple Range Test

Table 3. Effects of NPK 15:15:15 fertilizer application and sowing dates on muskmelon growth parameters at Ado-Ekiti

Sowing date	Fertilizer rate (kg ha^{-1})	Weeks after sowing					
		5	6	7	8	9	10
Leaf number							
January	0	5.67b	10.50bc	20.33ab	39.00ab	50.33a	59.33ab
	333	8.17ab	11.33bc	19.17ab	37.83ab	63.67a	80.67a
May	0	13.67a	19.67ab	27.00ab	38.33ab	42.33a	46.67b
	333	14.33a	27.00a	39.00a	54.33a	64.00a	83.33a
September	0	5.33b	5.33c	12.00b	13.00b	39.67a	37.33b
	333	8.33ab	20.67ab	30.33ab	42.00ab	43.00a	49.33b
Leaf area (cm^2)							
January	0	37.19ab	54.70b	67.79a	77.17b	85.23b	78.30c
	333	47.18ab	56.99b	71.41a	86.38ab	96.32b	96.97bc
May	0	44.33ab	71.08ab	89.67a	97.09b	111.03b	95.89bc
	333	76.33a	95.79ab	120.48a	139.48a	156.62a	162.94a
September	0	30.31b	36.55b	52.91a	57.60b	89.19b	86.04bc
	333	70.56ab	130.05a	111.63a	109.08ab	106.37b	112.19b
Stem vine length (cm)							
January	0	5.00b	12.58b	26.18bc	52.40bc	60.83a	71.33b
	333	8.62ab	16.87b	27.20bc	50.43bc	87.27a	93.23ab
May	0	7.67ab	10.67b	22.70c	35.97c	78.33a	94.17ab
	333	10.83ab	46.03a	67.37a	94.90a	113.20a	134.50a
September	0	6.93b	11.33b	26.40bc	52.33bc	77.67a	92.67ab
	333	13.67a	29.50ab	50.50ab	84.33ab	102.67a	119.33a
Number of vines (Branches)							
January	0	1.00a	2.00b	3.33b	5.33a	6.00a	5.33bc
	333	2.00a	3.00ab	3.67ab	6.00a	6.67a	7.00a
May	0	1.00a	2.00b	2.33b	2.33b	2.33b	2.67d
	333	2.00a	3.33ab	3.33b	4.00ab	3.67b	4.33bc
September	0	1.00a	2.33ab	3.37ab	3.67ab	4.00b	4.00cd
	333	2.00a	4.33a	5.67a	5.67a	5.67a	5.67ab
Branch vine length (cm)							
January	0	0.00b	8.88b	19.23b	37.82b	63.40b	73.90b
	333	5.82ab	11.10b	23.40b	50.63b	67.10b	88.02b
May	0	0.00b	14.20b	29.33b	38.67b	107.00ab	51.67b
	333	6.43ab	40.77a	68.90a	109.50a	142.23a	152.00a
September	0	5.50ab	9.67b	16.67b	51.00b	61.00b	69.00b
	333	11.33a	17.33b	33.33b	56.33b	76.67b	85.67b

Means with the same letter(s) on the same column for each parameter are not significantly different at 5% probability using Duncan's Multiple Range Test

The dates of sowing had little or no effect on the growth of muskmelon as there were no significant differences in the number of leaves, leaf area, vine length and number of flowers but it appeared that the availability of water from rainfall enhanced the performance of muskmelon sowed in May which had better growth parameters - higher number of leaves, longer vines, more flowers, and early flowering. The May-June period is the peak of early planting season in Ado-Ekiti such that exposure of the muskmelon to adequate rain enhanced better growth performance and caused earlier flowering and fruiting than in plants sowed in September which flowered late due to limited water availability. Muskmelon reacts adequately to moisture which explains why the cultivations were practiced mostly under irrigation [4]. Oloyede and Adebooye [9] had noted that sowing pumpkin at the beginning of the rainy season gave better growth parameters and yield. Kirnak, et al. [21] observed that muskmelon which received a 100% water regime from irrigation gave the best growth parameters.

The investigation of Olaniyi [22] on egusi melon revealed that despite higher growth parameters observed in the sole applications of 80 kg N and 17.2 P ha^{-1}, it did not differ significantly from 60 kg N and 13.2 kg P ha^{-1}. While Oloyede, et al. [23] observed increased in pumpkin (Cucurbita pepo Linn.) growth with the application of 100 kg ha^{-1} NPK 15:15:15 fertilizer, Awere and Onyeacholem [18] reported significant higher vine length in watermelon (*Citrullus lanatus*) with the application of 400 kg ha^{-1} of NPK 20-10-10. Kacha, et al. [24] observed an increase in the number of branches and nodes $plant^{-1}$ as well as vine length of watermelon with the application of 125 kg N ha^{-1}, 100 kg P ha^{-1} and 60 kg K ha^{-1}. Wahocho, et al. [16] studied on muskmelon showed significant positive responses in vegetative traits to N level with 50 kg N ha^{-1} producing longest vines and more branches which the application of 333 kg ha^{-1} NPK 15:15:15 fertilizer in this study have proved to be effective on muskmelon.

3.3 Effects of Sowing Dates and NPK 15-15-15 Fertilizer Application on Flowering of Muskmelon

The effects of NPK 15-15-15 fertilizer application and sowing dates on muskmelon flowering are shown in Tables 4 and 5. The muskmelon owed in May flowered earlier than sowing in January and September but fertilizer application tended to reduce the time to flowering by 2-4 days. Half of the fertilized muskmelon plants had flowers at 35 DAS which was significantly lower than 40 days after sowing for the control. The number of flowers produced was higher in fertilized muskmelon than in the control treatment (Table 5). The number of flowers produced was not significantly affected by sowing date and fertilizer application at 5 WAS despite the highest number obtained from the muskmelon sowed in January with 333 kg NPK ha^{-1} application. The number of flowers increased in all treatments with the age of the plants to a maximum value and decrease thereafter. Thus, the highest flower production was at different sowing dates being May at 6 and 10 WAS, September at 7 WAS and January at 8 and 9 WAS. The maximum flower produced at 7 WAP for fertilized muskmelon sowed in September (8.67) was significantly different ($P < 0.05$) from only January sowing but not the plants sowed in May. In all the treatments, the fertilized muskmelon produced more flowers at different times of measurement. Refai [7] reported that sowing muskmelon early in the season was associated with the production of first female flowers and plants established in summer resulted in earlier fruiting due to better performance as a result of optimum water availability. Maluki, et al. [25] noted that N had positive significant effect on days to flowering, and number of fruits per plant and fruit weight which the results from this study agreed with as application of 333 kg ha^{-1} NPK 15:15:15 reduced the day to flowering and day to 50% flowering by 4 and 6 % respectively.

Table 6 shows the effects of NPK 15-15-15 fertilizer application and sowing dates on muskmelon fruit production at Ado-Ekiti. The number of fruits plant-1 was negligible at 6 WAS, only muskmelon sowed in May had some fruits but none at 7 WAS. The muskmelon sowed in September had fruits at 7 WAS, increased to a maximum at 8 WAS and declined until harvest. The application of fertilizer ensured more fruits plant-1 which did not differ significantly from the control treatment. The number of fruits from fertilized muskmelon plants reduced from 3.67, 1.33 and 4.00 at 8 WAS to 1.07, 1.15 and 1.26 at harvest for January, May and September planting dates respectively. At 12 WAS, the highest mean number of fruits plant-1 produced (1.26) was not different from the other sowing dates.

3.4 Effects of Sowing Dates and NPK 15-15-15 Fertilizer Application on Yield and Yield of Muskmelon

The yield and yield components of muskmelon in response to the application of 333 kg ha^{-1} as NPK 15-15-15 fertilizer show that the muskmelon produced fruit yield and yield components which were significantly higher than the unfertilized plants (control) (Table 7). The fertilized muskmelon plants produced 11606.00 fruits ha^{-1} which was significantly higher than 10036.70 fruits ha^{-1} in the control. The fertilized muskmelon produced 9.09 t ha^{-1} fruit yield and fruits which averaged 0.78 kg, 15.57 cm long and 10.06 cm in diameter which were significantly higher than 2.44 t ha^{-1} fruit yield and fruits that had 0.24 kg mean weight, 10.29 and 7.68 cm fruit length and diameter respectively in the control treatment. The fertilized muskmelon plants produced 2.38 cm mean fruit pulp width, 484.44 mean the number of seeds $fruit^{-1}$ and 2.37 g means seed weight which was significantly higher than 1.87 cm fruit pulp width, 268.11 seeds fruit-1 and 1.57 g mean seed weight in the control.

The effects of NPK 15-15-15 fertilizer application and sowing dates on the fruit yield and yield components of muskmelon are shown in Table 8. The September sowing with fertilizer application gave the highest number of fruits (12418 fruits ha^{-1}) which did not differ significantly from 10867 and 11533 fruits ha^{-1} produced from plants sowed in January and May respectively. Also, the application of fertilizer did not significantly increase the number of fruits produced in all the sowing dates. The application of fertilizer to muskmelon sowed in May produced the longest fruits (16.67 cm) which differed significantly different from other sowing dates. The muskmelon sowed in January and fertilized gave the highest mean fruit diameter (10.85 cm) which did not differ significantly from the sowing in May and September with fertilizer application. The fruits of muskmelon sowed in May and fertilized were bigger with mean size at 0.94 kg which was not significantly different from the fruit size from fertilized plants sowed in January and September. The combination of fruit number and size ensured that muskmelon sowed in September and fertilized resulted in the highest fruit yield (11.29 t ha^{-1}) which did not differ

Table 4. Effects of NPK 15:15:15 fertilizer application and sowing dates on flowering of muskmelon at Ado-Ekiti

Sowing date	Fertilizer rate (kg ha^{-1})	Day to first flowering	Day to 50% flowering
January	0	33.33c	40.33bc
	333	30.00de	36.46c
May	0	31.00d	36.00c
	333	28.00e	33. 33d
September	0	42.33a	47.00a
	333	40.00b	43.67b

Mean with the same letter(s) on the same column are not significantly different at 5% probability using Duncan's Multiple Range Test

Table 5. Effects of NPK 15-15-15 fertilizer application and sowing dates on flower production by muskmelon at Ado-Ekiti

Sowing date	Fertilizer rate (kg ha^{-1})	Weeks after sowing					
		5	6	7	8	9	10
January	0	0.67a	2.67abc	3.67b	3.67b	5.33a	1.67ab
	333	2.33a	3.00abc	5.00b	7.33a	8.33a	2.67ab
May	0	0.33a	1.67c	2.67b	4.00b	4.67a	5.67a
	333	0.33a	6.67a	5.33ab	5.00ab	7.33a	6.00a
September	0	1.00a	2.33bc	5.67ab	3.33b	0.33b	0.00b
	333	1.33a	4.67ab	8.67a	5.67ab	1.00b	0.33b

Mean with the same letter(s) on the same column are not significantly different at 5% probability using Duncan's Multiple Range Test

Table 6. Effects of NPK 15-15-15 fertilizer application and sowing dates on the number of fruits plant-^{1} at Ado-Ekiti

Date of sowing	Fertilizer (kg NPK ha^{-1})	Week after sowing				
		6	7	8	9	12
January	0	0.00a	0.00c	1.33cd	2.67ab	1.01a
	333	0.00a	0.00c	3.67ab	2.67ab	1.07a
May	0	0.33a	0.00c	0.00d	1.03c	0.90a
	333	0.67a	0.00c	1.33cd	1.33abc	1.15a
September	0	0.00a	1.00b	2.33bc	1.33abc	1.07a
	333	0.00a	2.33a	4.00a	3.33a	1.26a

Means with the same letter(s) on the same column are not significantly different at 5% probability using Duncan's Multiple Range Test

Table 7. Effects of NPK 15-15-15 fertilizer application on fruit yield and yield components of muskmelon at Ado-Ekiti

Rate (kg ha^{-1})	Number of fruits ha^{-1}	Fruit length (cm)	Fruit diameter (cm)	Mean fruit weight (kg)	Total fruit weight (t ha^{-1})	Number of seeds	Fruit pulp width (cm)	Seed weight (g)
0	10036.70b	10.29b	7.68b	0.24b	2.44b	268.11b	1.87b	1.57b
333	11606.00a	15.57a	10.06a	0.78a	9.09a	484.44a	2.38a	2.37a

Means with the same letter(s) on the same column for each parameter are not significantly different at 5% probability using Duncan's Multiple Range Test

Table 8. Effects of NPK 15:15:15 fertilizer application and sowing dates on yield and yield components of muskmelon at Ado-Ekiti

Date of planting	Fertilizer (kg NPK ha^{-1})	Number of fruits ha^{-1}	Fruit length (cm)	Fruit diameter (cm)	Mean fruit weight (kg)	Total fruit weight (t ha^{-1})	Number of seeds	Fruit pulp width (cm)	Seed weight (g)
January	0	10067a	11.23c	8.67b	0.29b	2.92b	249.67c	1.57b	2.03b
	333	10867a	15.00b	10.85a	0.85a	9.25a	358.33bc	2.67ab	2.92a
May	0	9861a	8.13d	6.30c	0.13b	1.28b	315.00c	1.93ab	1.26c
	333	11533a	16.67a	9.83ab	0.94a	10.73a	520.00ab	2.13ab	2.13b
September	0	10182a	11.50c	8.07b	0.31b	3.11b	293.67c	2.10ab	1.41bc
	333	12418a	15.03b	9.50ab	0.91a	11.29a	575.00a	2.73a	2.06b

Mean with the same letter(s) on the same column are not significantly different at 5% probability using Duncan's Multiple Range Test significantly from sowing in May and January with fertilizer application. The number of seeds fruit^{-1} was highest from fertilized muskmelon sowed in September (575.00) which did not differ from sowing in May with fertilizer.

Fertilizer application influenced yield and yield component as it causes significant increases in the number of fruits, fruit size, and fruit yield. This study agreed with previous studies on cucurbit that NPK application influenced fruit yield [16,26, 27,28] which resulted in higher accumulation of biomass and distribution of dry matter [29]. The date of sowing influenced the yield performance of muskmelon through the increase in the number of fruits, average fruit size, and fruit weight ha-1 but the values for each parameter were not significantly different. A similar report by Refai, et al. [7] indicated significant differences among planting dates in growth and yield parameters. In this study, the sowing in September gave the highest fruit yield (number of fruits and total fruit weight ha^{-1}) followed by May and January. This agrees with Rodriguez, et al. [30] who reported that the yields of muskmelon established from August to December were better than the yields obtained by Shaw, et al. [31] for the plants sowed from October to February in the same location. The number of muskmelon fruits produced in this study ranges from 9861 to 12418 ha^{-1} which fell within the range proposed by Meena, et al. [32] under proper management. The sowing date influences the number of fruits in cucurbits. Changes in number of fruits plant-1 were reported in cucumber [5, 11], gourd [6], pumpkin [10], and muskmelon [7, 8] which resulted in higher fruit yield ha^{-1}especially under rain-fell condition or adequate irrigation.

4. CONCLUSION

Better growth and yield obtained from the application of 333 kg NPK ha^{-1} to muskmelon at the varying sowing dates have shown the essential nutrient for optimum performance of muskmelon. The time of maturity was also reduced as there were earlier flowering with the application of NPK fertilizer. This implied that sowing muskmelon under the rain-fed condition with adequate fertilizer application influences growth and yield. Farmers in Ado-Ekiti are thereby advised to plant muskmelon during the rainy period as there were inadequate irrigation facilities within the community.

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COMPETING INTERESTS

Author has declared that no competing interests exist.

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