Lencil Nig. Ltd.

Fertilizer test protocol

Concentrated micronutrient fertilizers with biostimulant complex Nanoagricole

Nanoagricole (Nano orchard and garden), 2015

1. Subject: Concentrated chelated micronutrient fertilizers Nanoagricole
2. The purpose of the test: To determine the effect of foliar application of plants with the micronutrients Nanoagricole in the forest-savannah transition agro-ecology of Ibadan, south-western Nigeria.
3. Methods of research:
   3.1 Field method; with the objective of determining the effectiveness of object of the test (the liquid micronutrient fertilizer) relative to sole and combined application with the conventional NPK liquid foliar spray ("SUPER GROW") under natural factors;
   3.2 Measurement and weight – to determine the biometric parameters of plant growth and development;
   3.3 Mathematics and Statistics – for the evaluation of the results, illustrating the impact of the fertilizer treatments on productivity of watermelon, and general scientific methods.

In determining the efficacy of micronutrient Nanoagricole, the following materials and methods were employed:

(a) Test crop: Watermelon (*Citrillus lunatus* varieties Kaolack and Top Harvest)

(b) Fertilizer (Nano orchard and garden) treatments: There were four treatments –
   i. T_1: No fertilizer application - test crop / plants treated with neither Micronutrient Nanomix nor Macronutrient (NPK) Super-grow foliar sprays.
   ii. T_2: Micronutrient Nanomix.
   iii. T_3: Macronutrient (NPK) Super-grow foliar spray.
   iv. $T_4 = T_2 + T_3$: i.e. Micronutrient Nanomix + Macronutrient (NPK) Super-grow.

(c) The crop was planted on 28 May 2015. First emergence was observed on 3 June 2015. There were three replications of each treatment. The replicates were the "Blocks" (see field layout below). The four treatments were randomized completely within each block. This was to take care of variations in the soil. Hence, there were 12 plots for each of the varieties and a total of 24 experimental units on the whole.

	BLOCK 1	BLOCK 2	BLOCK 3
Variety KAOLACK	1. Control	9. Nanomix + SuperGrow	17. Nanomix
	2. Nanomix	10 Super Grow	18. Control
	3. Super Grow	11. Nanomix	19. Nanomix + SuperGrow
	4. Nanomix + SuperGrow	12. Control	20. SuperGrow
Variety TOP HARVEST	5. Control	13. Nanomix + SuperGrow	21. Nanomix
	6. Nanomix	14. Super Grow	22. Control
	7. Super Grow	15. Nanomix	23. Nanomix + SuperGrow

8. Nanomix + SuperGrow	16. Control	24. SuperGrow

Experimental Field Layout

4. The trial was carried out by: Ezekiel A. Akinrinde
5. Plant protection products used: Application of chemical fungicides (Forcelet at 1 g/1litre of water) was based on disease and pest control information.
6. Application process: Foliar nutrition by spraying of watermelon plants was conducted (usually in late in the evenings) with the solution Nanoagricole (Nano orchard and garden) as from 4 weeks after planting and subsequently (three times) at 2 week-intervals. The solution was prepared by diluting 2 ml of fertilizer in 1.0 litre of water.
   No application of nanoagricole was given to Zero (No) treatment (control) areas.
   Harvesting was done on 19 August 2015. The results of the trial are summarized in the Table below.

Results and Discussion

Absolute and relative (comparative) yields due to the influence of four fertilizer treatments on two varieties of watermelon

Crop	Variety	Plot Area Basis (ha)	Fruit yield (t / ha)				Increase (t/ha) and Relative yield (%)			Remarks
			Control (Not treated)	Nano-	Super Grow	Nano + SuperGrow	Nano	Super Grow	Nano + SuperGrow	
Watermelon	Kaolack	1	1.28	2.42	2.56	2.84	1.14 (52.9)	1.28 (50.0)	1.56 (45.1)	Treated plants had improved vigor.
	Top Harvest	1	1.47	2.33	2.77	2.99	0.86 (63.1)	1.30 (53.1)	1.52 (49.2)	

Crop	Variety	Plot Area Basis (ha)	Number of Fruits (t / ha)				Increase (in number) and Relative number (%)			Remarks
			Control (Not treated)	Nano-	Super Grow	Nano + SuperGrow	Nano	Super Grow	Nano + SuperGrow	
Water Melon	Kaolack	1	1007	1941	1778	2674	934 (51.9)	771 (56.6)	1667 (37.7)	Treated plants had improved
	Top		874	1852	1704	2874	978	830	2000	

	Harvest	1					(47.2)	(51.3)	(30.4)	vigor.

Analysis of variance

Variate: Fruit yield (t/ha)

Source of variation	d.f.	s.s.	m.s.	v.r.	F pr.
REPLICATE stratum	2	3.03226	1.51613	54.99	
REPLICATE.*Units* stratum					
VARIETY	1	0.08693	0.08693	3.15	0.098
Fertilizer_type	3	8.16910	2.72303	98.76	<.001
VARIETY.Fertilizer_type	3	0.08418	0.02806	1.02	0.414
Residual	14	0.38601	0.02757		
Total	23	11.75847			

Analysis of variance

Variate: Fruits_ha

Source of variation	d.f.	s.s.	m.s.	v.r.	F pr.
REPLICATE stratum	2	1444730.	722365.	37.71	
REPLICATE.*Units* stratum					
VARIETY	1	3477.	3477.	0.18	0.677
Fertilizer_type	3	10164980.	3388327.	176.88	<.001
VARIETY.Fertilizer_type	3	103271.	34424.	1.80	0.194
Residual	14	268189.	19156.		
Total	23	11984647.			

The above Analysis of Variance (ANOVA) and Table of means were obtained from running the experimental data using Genstat Statistical software (VSN1). The ANOVA Tables show that the observed differences are statistically significant (F pr < 0.001) and the mean yields obtained based on respective treatments are:

1. 1.28, 2.42, 2.56 and 2.84 t/ha for untreated (Control), Nano, SuperGrow (conventional) and Nano + SuperGrow treated “Kaolack” watermelon variety, respectively.

2. 1.47, 2.33, 2.77 and 2.99 t/ha for untreated (Control), Nano, SuperGrow (conventional) and Nano + SuperGrow treated “Top Harvest” watermelon variety, respectively.

The respective mean numbers of fruits harvested are also given in the second Table.

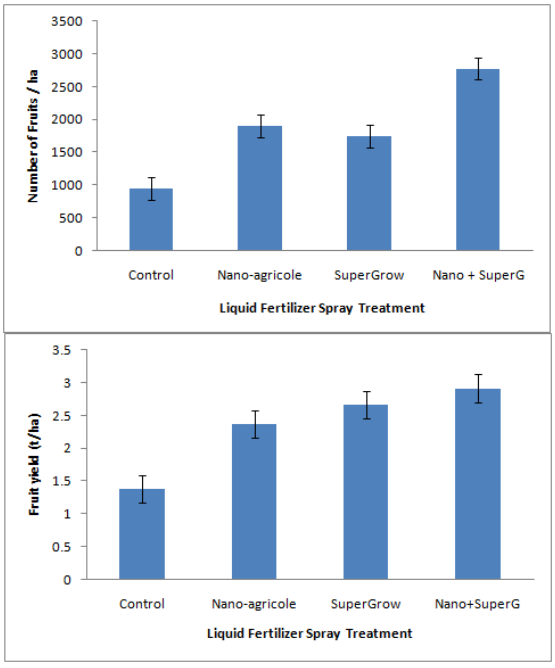
It is evident that in areas where Nanoagricole was applied, there was generally increased plant vigor and development compared with the untreated plants; and the fruit numbers and sizes from those areas were generally more (hence, improved overall yield).

The production of watermelon fruits were, in most cases, similar with the sole application of the conventional fertilizer spray (SuperGrow) and Nanomix. Improvement, however, occurred with their combined application.

More research would indicate if indeed the combined foliar sprays with Nanomix and SuperGrow would increases the number and weight of fruits per plant.

On the whole, watermelon yield in the untreated plots was only about 53.0 – 63.0 % of the yield obtained in areas treated with Nanoagricole fertilizer.

Consequently, chelated micronutrient fertilizer (Nanomix for orchard and garden) has positive impact on the yield of treated watermelon crop. This is further clarified in the Figure below.



7. Conclusion:
   i. Three-times spraying of crop vegetation with chelated micronutrient fertilizer Nanoagricole contributed to higher productivity of watermelon from an average of 1.28 – 1.47 t/ha to 2.33 - 2.42 t/ha (64.0 – 82.0 % increase) in Ibadan (forest-savannah transition agro-ecological zone) of south-west Nigeria.
   ii. The micronutrient fertilizer (Nanoagricole) gives obvious positive effect (increase) on crop yield. Therefore, it is evident that application of the product is profitable.

Affirmation has been performed and issued by:

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Signature