

# **C**OMPARATIVE EFFECTS OF NITROGEN PUSPHURUS POTASSIUM (NPK) FERTILIZER AT DIFFERENT LEVEL ON THE GROWTH PERFORMANCE OF MORINGA OLEIFERA.

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## **ABSTRACT**

**T**his study was carried out to assess the growth performance of *Moringa oleifera*. A pot experiment was conducted to investigate the effects of inorganic fertilizers N.P.K 15:15:15 at two different levels: N P K 5g and 3g with three treatments replicated three times. The experimental design was completely randomized design (CRD) and data collected were analyzed using analysis of variance (ANOVA), means were separated using Duncan multiple range test (DMRT). Growth parameters measured include number of leaves per plant, plant height (cm) and stem girth cm.

## **Introduction:**

*Moringa Oleifera* Belongs to the family *Moringacea* its common name is dumsticle, and it is originated from the foothills of the Himilay as in north eastern India and it is cultivated throughout the tropics (Bharali et al, 2003). *Moringa* can be cultivated in a wide range of soil types but grow best in well drained loam to clay loam soil, it cannot withstand prolonged water logging. *Moringa* is very useful in the following areas as alley cropping, animal forage, biogas, domestic

*the result shows that 5g NPK 15:15:15 at week 8 produced more leaves of 129, tallest plant of 63.75, and highest stem girth value of 1.73cm as compared to other treatments. The result conceded that application of NPK at 5g best supported the vegetative growth of Moringa Oleifera which is statistically significant at ( $P < 0.05$ ) as compared to other treatment.*

**Keywords:** *Inorganic growth Moringa Oleifera*

**C**leaning agent, green manure, gum, medicine, ornamental plants, and water purification (Farnsworth et al, 1985). Moringa leaves, seed and roots are also used in treating diseases like lung diseases, hypertension and skin infection (Fugile, 1999; Agbo et al. 2005).

The response of plant growers, not much is known presently of the early seeding growth of non food crops. The use of \*PK fertilizer has resulted in the improvement of the growth and yield of crops. Due to increasing demand of moringa for biofuel and medicinal uses (Krishappa, 1989). It is therefore necessary to investigate ways to improve the growth of the seedlings at nursery stage.

## Materials and method

### Description of Experiment site

The experiment was conducted at the biological garden of the department of biological science Usmanu Danfodiyo university sokoto in 2018.

### Collection of soil for analysis

Top soils (0-15) were collected from the garden site. The soil was sieved with a 2mm mesh.

### Experimental design

The experimental design was a completely randomized design (CRD) with three treatments replicated three times. Two levels for N.P.K 15:15:15 (5g and 3g) and zero level for control experiment were applied to the plant.

### Planting Operation

*Moringa (Moringa Oleifera)* seeds were first soaked in water for 24 hours to allow the seeds to absorb the moisture required for sprouting. The seeds were removed from the water, wrapped in a wet to well and stored in a warm dark place. The towel was kept dumped to allow maximum germination and prevent tonight. Top soil was filled in to each of the mine polythene bags. One seed was planted each into each of the polythene bags at a depth of 3cm, the soil was affirmed and watered immediately for proper plant establishment. Each seeding received 400 ml of water two times daily until they were 17 days old when the treatments began. *Moringa oleifera* growth was assessed by the number of leaves per plant, plant height (cm) and stem girth (cm). the plant height was determined using meter rule, stem girth by Vernier caliper while the number of leaves per plant was determined by counting.

### Fertilizer application

N P K fertilizer was applied two weeks after planting at the rate of 5g and 3g per pot.

### Spacing

The pots were arranged at a distance of 60cm x 60cm between and within rows. A total number of 9 pots were used for the experiment.

### Collection of data

Growth parameters such as plant height, number of leaves, and stem girth were measured at 4,6, and 8 weeks after planting the sprouted seeds.

### Analysis of data

Data collected were subjected to analysis of variance (ANOVA) using Genstat version 8.1 statistical passage. Mean were separated using Duncan multiple range test (DMRT) at 5% level of significance.

## RESULT AND DISCUSSION

### Number of leaves per plant.

Average number of leaves per plant tends to increase across all treatments over the weeks irrespective of the fertilizer used. NPK 15:15:15 (5g) produced the highest number of leaves 129 at week 8 while the lowest leaves of 29 were obtained from control plant at week 4 the differences in

leaves yield between N.P.K 15:15:15 5g, 3g and control is statistically significant ( $P < 0.05$ ) using Duncan multiple range test (Table 1).

**Table 1: Response of number of leaves of moringa to different leave of NPK 15:15:15 application.**

		Weeks		
Treatments (g)		4	6	8
T1	5g	84 <sup>e</sup>	98 <sup>d</sup>	129 <sup>d</sup>
T2	3g	50 <sup>a</sup>	96 <sup>e</sup>	126 <sup>e</sup>
C	0	29 <sup>d</sup>	46 <sup>a</sup>	89 <sup>a</sup>

Source: Field experiment 2018

a,b,c,d,e means within a column with different super-scripts are significantly different ( $P < 0.05$ )

**Table 2: Response of moringa height (cm) to different level of NPK 15:15:15 Application**

		Weeks		
Treatments (g)		4	6	8
T1	5g	47.35 <sup>d</sup>	56.5 <sup>e</sup>	63.75 <sup>e</sup>
T2	3g	43.00 <sup>b</sup>	52.15 <sup>d</sup>	58.35 <sup>d</sup>
C	0	73.33 <sup>e</sup>	40.75 <sup>c</sup>	45.55 <sup>c</sup>

Source: Field experiment 2018

a,b,c,d,e means within a column with different super-scripts are significantly different ( $P < 0.05$ )

### Plant height (cm)

Application of NPK 15:15:15 increased the height of moringa plant over the weeks. Tallest plant of 63.75 cm at week 8 was produced by 5g N.P.K 15:15:15 while the shortest plant of 37.33cm by control plant. The differences in height yield between NPK 15:15:15 (5g,3g) and control is statistically significant ( $P < 0.05$ ) using DMRT (Table 2).

**Table 3: Responses of Moringa stem girth (cm) to different level of N.P.K 15:15:15 Application.**

Treatments (g)		Weeks		
		4	6	8
T1	5g	1.00 <sup>c</sup>	1.32 <sup>c</sup>	1.73 <sup>a</sup>
T2	3g	0.90 <sup>b</sup>	1.28 <sup>d</sup>	1.63 <sup>a</sup>
C	0	0.89 <sup>b</sup>	1.20 <sup>a</sup>	1.06 <sup>a</sup>

Source: Field experiment 2018

a,b,c,d,e means within a column with different super-scripts are significantly different ( $P < 0.05$ )

### Stem girth

The stem girth tends to increase as growth progressed irrespective of fertilizer application. The highest stem girth value of 1.73 cm at week 8 was observed in plant that received 5g of NPK 15:15:15 while the lowest stem girth value of 0.89 cm was observed at week 4 in control plant. However, there is no significant difference ( $P < 0.05$ ) between the stem girth observed in NPK fertilizer (5g,38) and that of control at week 8 (Table 3).

### DISCUSSION

The application of N.P.K (15:15:15) fertilizer significantly increased the vegetative growth of moringa plant and this finding agreed with earlier work done (Makinde, 2013). It was reported that the application of NPK fertilizer significantly ( $P < 0.05$ ) increased the vegetative growth of moringa which was also observed from the experiment (Law-Ogbomo et al, 2013).

The used of NPK fertilizer at 5g was observed to produced the highest number of leaves which was significantly higher than the control using Duncan multiples range test ( $P < 0.05$ ). similarly, it was reported by Shibairo (2010), that application of nitrogen and phosphorus to moringa tress will encourage development of root as well as growth of leaf canopy. In the study of the height and stem girth of the moringa plant, the seedlings treated with NPK 15:15:15 (5g) was significantly higher than controls across all the weeks. The tallest plant (63:75cm) treated with NPK fertilizer (5g) at week 8 is lesser than that obtained from poultry manure (65:47) as reported by (Imoro et al., 2012)

## CONCLUSION

The comparative effects of NPK and control at different levels on growth of moringa seedling was investigated. This study concludes that N.P.K 15:15:15 is a valuable sources of fertilizer for the growth of *Moringa Oleifera* because it has greatly improved performance of treated plant over the control through production of better attributes such as leaves count, stem girth and plant height than its counter parts produced.

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