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Effect of Urea on the Growth of Scent Leaf (*Ocimumbasilicum*L.)

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ABSTRACT
This research was conducted at the Centre for Ecological Studies, Abuja Campus, University of Port Harcourt, Rivers State. The study aimed to investigate the effect of Urea on the growth of scent leaf (*Ocimumbasilicum*). The experiment was laid out in a Randomized Complete Block Design (RCBD) at different concentrations (0, 10, 20, and 30 kg). A total of 12 pots were used, with four treatments and three replications. The blocks were spaced 1m apart for ease of movement during cultural operations. Data analysis were conducted on growth parameters (plant height, number of leaves, leaf length, fresh weight, dry weight, and nitrogen content) to assess the effect of Urea on scent leaf growth. Results showed that the application of treatments had significant influences (P=0.05) on all parameters studied. Inorganic fertilizer (Urea) enhances the supply of adequate nutrients to the plant, improves soil fertility and productivity, but can cause burns if not used properly. Based on the results, it can be concluded that Urea is effective in all parameters studied, making it a better fertilizer for *Ocimumbasilicum* production. Urea can be recommended as a good fertilizer for *Ocimumbasilicum* production as it provides the plant with nitrogen to enhance crop vegetative and productive growth. At the end of the experiment, the 30kg concentration of urea yielded the most favorable outcome.

Key words: Growth,Urea,Scent Leaf,*Ocimumbasilicum*, Treatments

I. INTRODUCTION

Basil, scientifically known as *Ocimumbasilicum L.*, is an annual herb from the mint family, Lamiaceae. It has been utilized in various culinary traditions for thousands of years and is a key ingredient in many dishes.

Basil easily cross-pollinates, resulting in an array of diversity and prompting some experts to reclassify sections of the genus(Agarwal et al., 2013*)*.

While *Ocimumbasilicum*, commonly known as sweet basil, is the most recognized variety, it has numerous cultivars with differences in flavor, scent, and uses.

Basil is considered a species with significant nutritional requirements, particularly for nitrogen fertilization, which significantly impacts leaf weight, chlorophyll concentration, and essential oil yield. Nitrogen fertilization in the form of urea enhances fresh basil herb weight and yield with increased nutrient concentrations. Additionally, potassium fertilization influences growth and yield quantity and quality. Maintaining proper proportions of essential nutrients like nitrogen and potassium is crucial for plant growth, yield, and overall composition.

Despite the widespread use of urea as a common source of nitrogen for plant growth, there is a lack of specific understanding regarding how different concentrations of urea impact the growth of scent leaf plants *(Ocimumbasilicum).* Investigating the effect of urea on the growth parameters of scent leaf plants is essential for optimizing their cultivation practices and enhancing their yield.

Overall, the significance of the study lies in its potential to improve agricultural practices, promote sustainable cultivation methods, enhance crop productivity, and advance scientific understanding of plant-fertilizer interactions, particularly concerning the growth of scent leaf plants.

II. MATERIALS AND METHODS

2.1 EXPERIMENTAL SITE

The sample of *Ocimum Basil* were sourced from Blissful Ventures Horticultural Garden, Port Harcourt. The plant were identified in the herbarium of the department of plant science and biotechnology, University of Port-Harcourt, Rivers State, Nigeria. It was then transported to Blissful Ventures Horticultural Garden for propagation.

2.2 MATERIALS USED
i. Total of 12 pots were used
ii. 20 grams of loam soil per pot
iii. 12 seeds of *Ocimumbacilicum*
iv. Urea fertilizer

2.3 SAMPLE PREPARATIONS AND EXTRACTION
The recent cut stems of Basil plant were chopped and sealed in a plastic bag to protect them from direct sunlight, while also creating a warm and moist environment. The stems were then divided into smaller samples and brought to the laboratory for measuring their physical weight.

2.4 EXPERIMENTAL DESIGN
The experiments were arranged in Randomized Complete Block Design (RCBD). A total of 12 pots were used, four treatment of urea fertilizer (0, 10g, 20g, and 30g) and three replications. The blocks were spaced 1m apart for easy movement during cultural operations.

2.5 STEM PLANTING
The basil plants were planted from stem cuttings in individual pots containing compost soil to prevent nutrients competition during germination and optimize the effectiveness of urea fertilizer application. Planting took place from September to November, with watering provided by rainfall and regular weeding conducted to support healthy plant growth.

2.6 FERTILIZER APPLICATION
The inorganic fertilizer were applied once at two weeks after plant sprouted. Method used were soil drenching, this were done to improve soil penetration, easy absorption, reduce soil P^H, prevent burning and allow even distribution.

Table2.1. Application of fertilizer

S/N	Treatment	Concentration per pot
1	T1(control)	No fertilizer
2	T2 Urea	10g
3	T3	20g
4	T4	30g

2.7 DATA COLLECTION
Germination count was taken and normal agronomic practices were observed such as weeding of the pot. The following observation were recorded during the course of study as vegetative and flowering stages using Standard Evaluation System (SES).
i. Plant height (cm) at maturity using a meter rule.
ii. Number of leaves (at vegetative stage by count).
iii. Leaf length.
iv. Fresh weight (after harvest).
v. Dry weight.
vi. Nitrogen content.

Measurement for plant height (taken from the soil to the tip of panicle), leaf length and number of leaves where all taken at weekly interval.

2.8 Statistical Analysis: To ascertain whether the results were significant or not, statistical analysis were performed on the values obtained from measuring the growth parameters

III. RESULTS

3.1 SOIL ANALYSIS
Soil samples were analyzed and the findings are summarized below.

Table 3.1 Soil Analysis

Soil properties	Values
Organic carbon	1.63
Organic matter %	3.45
Soil PH	4.76
Exchangeable base	
Ca (Cmsl/kg)	3.265
Cu (mg/kg)	2.603
Fe (mg/kg)	7.623
K (Cmol/kg)	0.053
Mg (Cmol/kg)	0.501
Na (Cmol/kg)	0.397
Mn (Cmol/kg)	8.2
P (mg/kg)	17.9
Zn (mg/kg)	7.8
Clay (%)	16.5
Sand (%)	69
Silt (%)	8
Textural class	Sandy Clay Loam

3.2 PLANT HEIGHT
The application of urea at varying concentrations (0, 10, 20, 30 g N/ha) had a significant impact on plant height at P=0.05. After nine weeks, the tallest plants were observed in treatment T4, which received the highest urea application rate (30 g N/ha), reaching a

height of 33.5cm. This was followed by T3 (27.6cm), T2 (22.7cm), and the control group T1 (15.3cm), which showed progressively shorter heights.

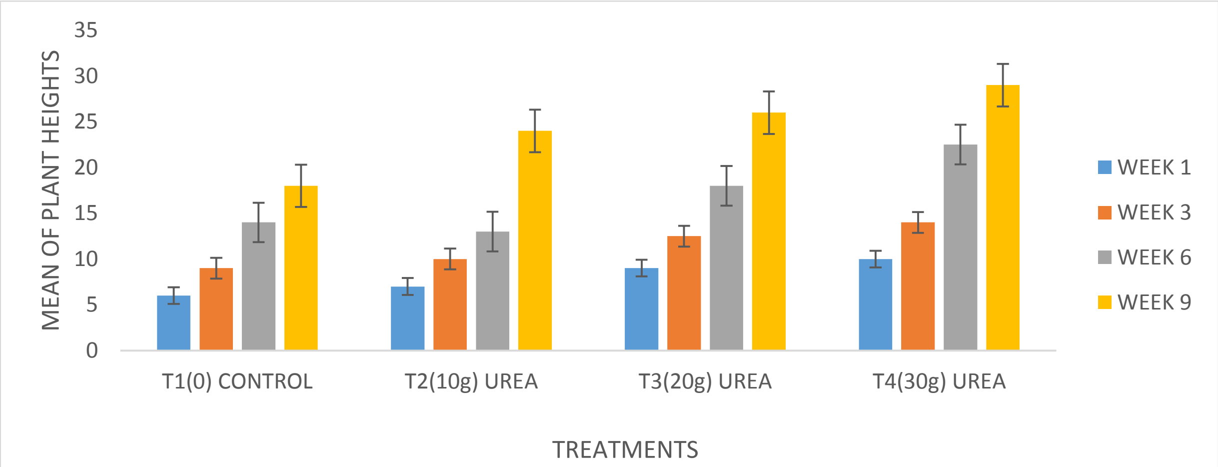

Fig. 3.1 Effect of Urea and Control on Mean Plant Height

3.3 NUMBER OF LEAVES

The number of leaves per plant showed significant variation at P=0.05 when urea was applied at different concentrations (0, 10, 20, 30 g N/ha). By the ninth week, the treatment with the highest urea concentration (T4, 30 g N/ha) produced the most leaves, with a count of 26. This was followed by T3 (20 g N/ha) with 22 leaves, T2 (10 g N/ha) with 17 leaves, and the control group (0 g N/ha) with the fewest leaves, at 12.

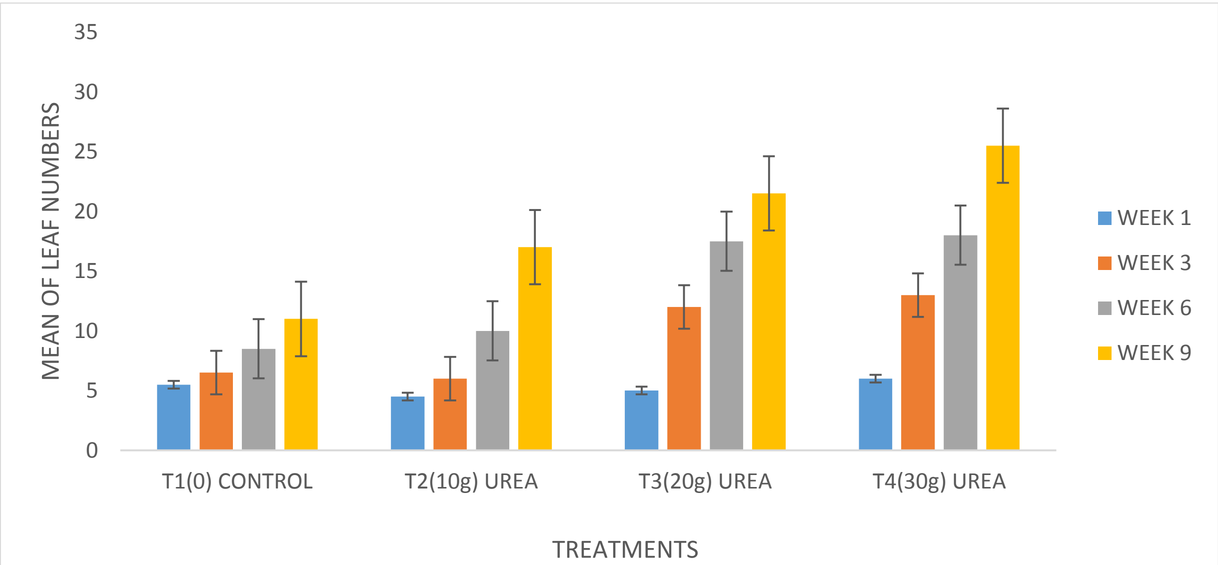

Fig. 3.2 Effect of Urea and Control on Mean Leaf Number

3.4 LEAF LENGTH

The length of plant leaves showed significant variation at P=0.05 when urea was applied at different concentrations (0, 10, 20, 30 g N/ha). By the ninth week, the leaves in treatment T4, which received the highest urea concentration (30 g N/ha), reached the longest length of 13.2 cm. This was followed by T3 (20 g N/ha) with a leaf length of 9.4 cm, T2 (10 g N/ha) with 7.8 cm, and the control group (0 g N/ha) with the shortest leaf length of 5.3 cm

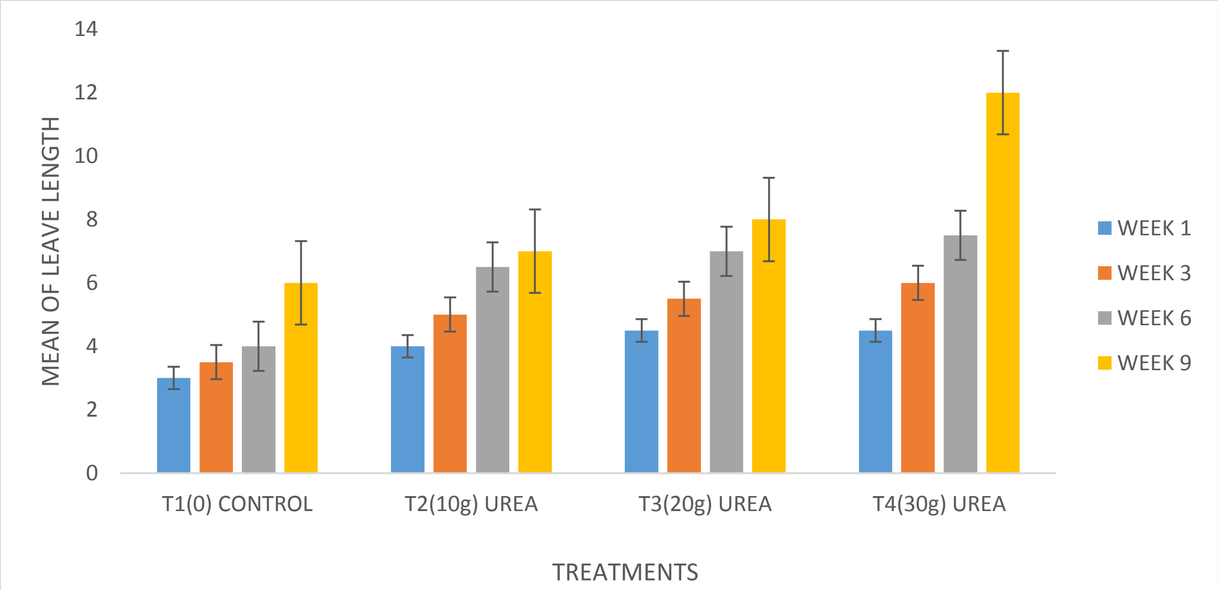

Fig.3.3 Effect of Urea and Control on Mean Leaf Length

3.5 FRESH WEIGHT

The results are presented in the table below.

Table 3.2 Effect of Urea and Control on Fresh Weight

TREATMENT	WEIGHT
T1(0) Control	28.76g
T2 (10g N/ha) Urea	65.52g
T3 (20g N/ha) Urea	49.21g
T4 (30g N/ha) Urea	88.35g

The data reveals that significant biomass production were observed in all treatments, with notable increases recorded in T1, T2, T3 and T4.

3.6 DRY WEIGHT

Table3.3 Effect of Urea and Control on Dry Weight

TREATMENT	WEIGHT
T1(0) Control	14.5g
T2 (10g N/ha) Urea	24.81g
T3 (20g N/ha) Urea	27.23g
T4 (30g N/ha) Urea	35.19g

The data reveals that significant biomass production were observed in all treatments, with notable increases recorded in T1, T2, T3 and T4.

IV. DISCUSSION

The growth stages of the *Ocimumbasilicum* plant improved greatly with the application of urea.

The results from the study showed that the parameters studied varied significantly at P = 0.05 with the application of urea at different concentrations (0, 10, 20 and 30 kg N/ha).

Growth parameters such as plant height, number of leaves and leaf length contributes immensely either direct or indirectly to the yield of crops.

Nitrogen is one of the basic nutrients used by plants to build many organic compounds, such as amino acids, peptides, proteins, enzymes, or nucleic acids. (Kaya and Higgs, 2003; Ma and Shi, 2011; Ma *et al.*, 2012).

The basil yield increases with the increased dose of nitrogen (Biesiada and Kus, 2010).Foliar application of nitrogen in the form of urea causes the increase of fresh basil herb weight and yield with simultaneously increased concentrations of N-NH_4, N-NO_3, K and Ca, compared to control (Narzynska-Wierdak*et al.*, 2011).Besides, foliar feeding with nitrogen contributed to the significant increase of plant height, as well as the length and width of the basil leaf blade.

Considering the few studies on the effect of nitrogen upon basil growth and yield, this study were undertaken to evaluate the response of this plant species to nitrogen applied in various concentrations, the interaction between these components in creating growth and development of the plants, as well as yield quantity (Ali *et al*., 2003; Rao *et al*., 2007; Megda and Monteiro, 2010).

From the results, it was observed thatas the Urea fertilizer increases, the nitrogen content in the plant increases.

Generally, it is clear from the data presented that the application of inorganic fertilizer (Urea) increased all studied parameters like plant height, number of leaves and leaf length. Similar results were found by Harish *et al.* (2010).

V. CONCLUSION

Inorganic fertilizer (Urea) enhances supply of adequate nutrient to the plant. It improves soil fertility and productivity, but on the other hand, it can cause burns of the plant when not used properly. From the result of the study, it can be concluded that Urea is effective in all parameters studied and this shows Urea is a better fertilizer in *Ocimumbasilicum* production. At the conclusion of the experiment, it was observed that the concentration of 30kg of urea yielded the most favorable outcomes in terms of basil plant growth, as evidenced by significant improvements in plant height, leaf length, and leaf count.

REFERENCES

[1]. Agarwal, C., Sharma, N.L., and Gaurav, S.S. (2013). An analysis of basil (Ocimum sp.) to study the morphological variability. *Indian Journal of Fundamental and Applied Life Sciences, 3, 521-525.*

[2]. Ali, M., A. Hossain, M.A. Mondal, M.F.andFarooque, A.M. (2003). Effect of nitrogen and potassium on yield and quality of carrot. *Pakistan Journal of Biological Sciences, 6 (18), 1574-1577.*

[3]. Biesiada, A. and Kus, A. (2010). The effect of nitrogen fertilization and irrigation on yielding and nutritional status of sweet basil (*Ocimumbasilicum L.*). *ACTA ScientiarumPolonorumHortorumCultus,* 9 (2), 3-12.

[4]. Harish, E. and P.E Simon (2010). Effect of Urea on the growth and development of basil *(Ocimum L.).International journal of Agronomy and Plant production 2, 5-9.*

[5]. Kaya, C. and Higgs, D. (2003). Supplementary potassium nitrate improves salt tolerance in bell pepper plants. *Journal of Plant Nutrition, 26(7), 1367-1382*.

[6]. Ma, L., Ren, G., and Shi, Y. (2012). Effects of potassium fertilizer on diurnal change of photosynthesis in *Stevia rebaudianaBerton*i. *Advanced Materials Research Volumes*, 343-344, 1087-1091.

[7]. Ma, L., and Shi, Y. (2011). Effects of potassium fertilizer on physiological and biochemical index of *Stevia rebaudianaBertoni*. *Energy Procedia*, 5, 581-586.

[8]. Megda, M. M., and Monteiro, F. A. (2010). Nitrogen and potassium supply and the morphogenic and productive characteristics of *Marandupalisadegrass*. *RevistaBrasileira de Zootecnia*, 39(8), 1666-1675.

[9]. Narzynska-Wierdak, R., Borowski, B., and Dzida, K. (2011). Yield and chemical composition of basil herb depending on cultivar and foliar feeding with nitrogen. *ACTA ScientiarumPolonorumHortorumCultus,* 10(1), 207-219.

[10]. Rao, E.V.S.P., Puttana, K., Ganesha, R.S., and Ramesh, S. (2007). Nitrogen and potassium nutrition of French basil *(Ocimumbasilicum L.). Journal of Spices Aromatic Crops, 16(2), 99-105.*