

Growth Indices and Yield of Semi-Irrigated Celery (*Apium Graveolens*) as Influenced by Poultry Manure Application in Katsina, Nigeria.

ABDU BABANGIDA UMAR

Department of Agricultural Technology, Hassan Usman Katsina Polytechnic Katsina State Nigeria.

E-mail: abdubau@gmail.com

ABSTRACT

The study was carried out in 2008 at Hassan Usman Katsina Polytechnic farm to study the effects of rate of poultry manure application on the growth and yield of irrigated celery (*Apium Graveolens*). The experimental design used in this research was a randomized complete block design. The treatments consisted of 5 level of poultry manure applied at rate 0 (control), 10, 20, 30, 40 kg/ha⁻¹. Observations were made on plant height, number of leaves, stem diameter and fresh weight of leaves. Data collected were subjected to analysis of variance. Based on the analysis of variance carried out the result showed that 20kg/ha⁻¹ of poultry manure application gave statistically taller plants, higher number of leaves and stem diameter than other treatments but are not significantly different on fresh weight of leaves if compared to 40 kg/ha⁻¹ of poultry manure application.

Keywords: Poultry Manure, Celery, Growth Indices, Yield.

Introduction

Celery (*Apium Graveolens*) is an herbal plant belonging to the family Apiacea. Its common name is garden celery or smallage. Its Arabic name is *karaf* and Hausa name is called "*lansir*", John (1991). Celery is a biennial plant indigenous to Southern Europe, Asia and Africa. It is also found in North and South America, Robert (1998). Celery as the ancient called it smallage has been used as a medicine and Italian farmers began to cultivate celery and discovered that cultivation produced a much superior plant. At that time people began to use it more widely as a vegetable. The parts of celery used as a herb are seeds and roots, but also leaves and root both are used as a vegetable. Celery seeds are strongly aromatic and are tiny and brown in colour. In Europe celery is usually eaten cooked as a vegetable or as a delicate flavoring in a variety of stocks and soup. In African raw celery is served with spreads or dips as an appetizer and in

salad. The essential oil of celery seed are used as flavoring or fragrance in perfumes and cosmetics such as soap, creams and lotion Bradiley (1992). Celery is one of the very common and effective plants which help in curing various health disorders which are not easily curable, example such as kidney disorder, cancer, anti-inflametry, lowering of blood pressure, etc., www.care2.com/greenliving (2014), Batram (2005). There are limited numbers of varieties of celery on the market. The main varieties of celery seed are tender crisp and Americans Tingless. Celery is one of the highest yielding vegetable crops because it can produce 90 tons per hectare under good management, John (1991). It likes fertile soil, cool temperatures and constant moisture. This ecological requirement favors its cultivation in northern Nigeria during the cool hamatan season under irrigation when adequate amount of water can be ensured. There are some varieties like Conquistador that is tolerant to high temperatures and watering shortage. This paper aimed at determining the effect of different levels of poultry manure application on the growth and yield of semi- irrigated celery plant and thus be able to recommend appropriate level of poultry manure to be used in celery production.

Materials and Methods

The study was conducted in 2008 in Katsina State, Nigeria at Hassan UsmanKatsina Polytechnic farm in Batagarawa Local Government Area located between latitude $12^{\circ}59'N$ and longitude $7^{\circ}45' E$ between May to June 2008 . It was aimed at evaluating the effect of different rates of poultry manure application on the growth and yield of celery plant. The experimental design used in this research was a Randomized Complete Block Design (RCBD) together with Five (5) treatments and four (4) replications. The treatments used in this experiment consisted of five levels of poultry manure applied in different rates 0, 10, 20, 30, and 40kg/ha^{-1} . The gross plot size was $1.5 \times 1.5\text{m}$ with 1.0×1.0 as net plot size. Observations were made on plant growth parameters (height, number of leave, number of branches, number of flowers, stem diameter and fresh weight of leaves (yield). Plant height was measured with a meter rule at the distance from the soil level to the terminal bud. The number of leaves was obtained through visual counting of the leaves. Stem diameter was measured with venire caliper at 3cm above the soil level, while the yield was measured as fresh leaves weight of the tallest plant. All data collected were subjected to analysis of variance by using Duncan's multiple range tests (Duncan, 1958).

Results and Discussion

In Table 1, the result showed the effect of rate of poultry manure application on plant height. At two weeks after sowing. Application of 20kg/ha^{-1} of poultry

manure resulted in taller plant than 40kg/ha⁻¹ of poultry manure application but was statistically the same with 10kg/ha⁻¹ 30kg/ha⁻¹ of poultry manure application and the control which received no poultry manure at all. Similarly at four weeks after sowing 20kg/ha⁻¹ of poultry manure application resulted in taller plant than all other treatment but was statistically similar with 10kg/ha⁻¹ of poultry manure application. Among all the treatment tested it was the control that gave shortest plant than all other treatments. Similarly, at six weeks after sowing the control 0kg/ha⁻¹ plants are shortest compared to all other treatments.

Table1: Effects of Rates of Poultry Manure Application on plant Height of Celery at Hassan UsmanKatsina Polytechnic Farm in 2008.

Treatment poultry manure kg/ha ⁻¹	Plant Height (cm)		
	2WAS	4WAS	6 WAS
10	3.03ab	18.7ab	26.8a
20	3.47a	21.9a	31.9a
30	2.9ab	18.3b	30.6a
40	2.7b	17.8b	31.1a
0	2.9ab	13.9c	16.7b
SE ₊	0.039	1.26	3.8

1. WAS = weeks after sowing
2. Mean in a column of any set of treatment followed by unlike letter(s) are significantly different at $p \leq 0.05$ by using Duncan's multiple range test.

The result in Table 2 showed the effect of rate of poultry manure application on number of leaves of celery plant. At 2WAS 10 and 20kg/ha⁻¹ of poultry manure are statistically the same. Likewise 30 and 40kg/ha⁻¹ of poultry manure application is statistically the same. Similarly at 4 WAS, 20 kg/ha⁻¹ of poultry manure application are significantly different from other treatment. But 10kg/ha⁻¹ and 30kg/ha⁻¹ of poultry manure application are statistically the same based on number of leave. Similarly at 6 weeks after sowing all the treatments except (control) are statistically the same.

Table 2: Effects of Rate of Poultry Manure Application on Number of Leaves of Celery at Hassan UsmanKatsina polytechnic Farm, 2008

Treatment poultry manure (kg/ha ⁻¹)	Number of Leaves		
	2WAS	4WAS	6 WAS
10	6.6ab	3.0b	7.6a
20	7.1ab	5.0a	9.5a
30	6.3b	3.8b	8.6a
40	6.0b	4.0ab	9.0a
0	6.3ab	1.3c	5.9b
SE _±	0.034	1.121	3.87

1 WAS = week after sowing

2. Mean in a column of any set of treatment followed by unlike letter (s) are significantly different at $p \leq 0.05$ by using Duncan's multiple range test.

In Table 3, the result showed that the effect of rate of poultry manure application on stem diameter. At 6 weeks after sowing, 20kg/ha⁻¹ and 40kg/ha⁻¹ of poultry manure application are statistically the same.

Table3: Effects of Rate of Rate of Poultry manure Application on Stem Diameter of Celery at Hassan Usman Katsina Polytechnic Farm, 2008.

Treatment poultry manure (kg/ha ⁻¹)	Stem diameter (mm)
	6 WAS
10	1.2bc
20	1.8a
30	1.6ab
40	1.9a
0	0.9c
SE _±	0.02

1. WAS = week after sowing

2. Mean in a column of any set of treatment followed by unlike letter (s) is significantly different at $p < 0.05$ by using Duncan's multiple range tests.

In Table 4, the result showed effect of rate of poultry manure application on fresh weight of leaves (yield). Based on fresh weight of leaves (yield), 40kg/ha⁻¹ of poultry manure application are highly significant compared to other

treatment. 20kg/ha⁻¹ and 30kg/ha⁻¹ of poultry manure application are statistically the same based on weight of fresh leaves of celery.

Table 4: Effects of Rate of Poultry manure application on fresh weight of leaves (yield) of Celery at Hassan UsmanKatsina Polytechnic farm, 2008.

Treatment poultry manure(kg/ha ⁻¹)	Fresh Weight Celery (gm)
	6 WAS
10	16.0ab
20	36.0ab
30	27.5ab
40	45.0a
0	4.5c
SE ₊	42.4

1. WAS = week after sowing
2. Mean in a column of any set of treatment followed by unlike letter (s) are significantly different at $p < 0.05$ by using Duncan's multiple range test.

Conclusion

Based on the result obtained in this study it could be suggested that good growth and yield of celery could be obtained by applying 20kg/ha⁻¹ of poultry manure in the Sudan Savannah ecological zone.

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