

Research Article

Effect of poultry manure on the growth and development of oil palm (*elaeis guineensis* L) seedling in a screen house

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Abstract

This trial was conducted in the screen house of kabba college of Agriculture Teaching and Research farm. The objective of the experiment is to investigate the effect of different rate of poultry manure on the growth and development of oil palm seedlings at nursery stage. Rate of poultry manure considered for the experiment were 0, 50, 100 and 150g per seedling in a poly bag. Experimental design applied for this work was complete randomized design (C R D) with four replicate of the treatment. Data were collected on plant height and plant girth at weekly interval while number of leaves were on four weeks basis .The result obtained showed that at 16, 18, 20 and 22 weeks after planting there was no significant difference in plant height of oil palm seedling treated with 100g and 150g bags but they were significantly ($p<0.5$) higher than the control and 50g/bag. The same trend was observed for plant girth and number of leaves which was on weekly and four weeks interval respectively. Therefore, the use of poultry manure at 100g per seedling is beneficially in oil palm production than 150g per poly bag.

Keywords: poultry manure, oil palm seedling, sprouted nut ,Nursery and poly bag

INTRODUCTION

Oil palm (*Elaeis guineensis* L.) is families of flowering plants belonging to the monocotyledonous crop popularly grow along forest region of West African. The specific name guineensis is derived from the guinea coast where it is believed to have originated (Hartley, 1990).

Oil palm is one of the tree crops of this Nation which has contributed to the economic development of Nigeria before the advent of civil war in 1966 (NIFOR manual, 2003).

The climate of the southern area of this country favours the growth of the crop. Before the mid 20th century, the density of oil palm grove was very high in the rain forest area of Eastern Region of Nigeria. The oil palm producing states are, Abia, Imo, Rivers, Cross Rivers, Edo, Delta, Anambra and kogi state. Palm produce accounted for 52 percent of the total Nigeria's export between 1906 and 1913(Usoro, 1974, Omereji, 2005).

Global production data for oil palm indicated that in 1985 slightly in excess of 7.6 metric tones were produced and the major contributing countries are Malaysia, philipines and Nigeria .(FAO,2001). About 47% of the total oil palm are produced from wild grower 21% are from plantation or estate. While 25 % are the products from small scale oil palm growers (Nigeria National Agricultural research strategy plan 1996 – 2010 bukar *et al.*,1999).

It is most important source of edible oil and it produces more oil per acre than any other oil producing crops (Omereji, 2005). Palm oil has two types of which includes the oil extracted from the outer pulp of the fruit and the palm kernel oil

obtained from the kernel, palm oil is mainly used for the manufacture of soap and detergents, production of margarine, candle, and source of lubricant oil in mechanical engine and machine.

The leaves of oil palm are used for making brooms used to pack away dirt's from our environment, the front and back of fronds are peeled and use to woven into basket for domestic uses, the main stem known as truck are saw and used for building and fence. Red oil the major product is used for domestic cooking locally and internationally. It is exported as raw material to the oil paint factory to earn foreign exchange value to improve our economy. It earned the nation about 22% of the foreign exchange up to the beginning of civil war. Palm kernel cake which is a major ingredient in livestock feed manufacture is a by-product of palm kernel, the kernel oil is used in bakery trade and making of ice creams. (Annual reviews of oil seeds 1943 – 1964, F.A.O year book 2005 Edition)

Oil palm production is a trade commodity that cut across Nigeria geopolitical zones as well as source of income generating crop to farmers. In views of the important of oil palm, the production is in low scale due to inadequate seedlings production. This low in oil palm seedlings production has been attributed to inadequate knowledge of appropriate rate of poultry manure to be adopted that will enhance the growth of oil palm seedling at the nursery.

MATERIAL AND METHODS

The experiment was carried out at the Teaching and Research Farm screen house of Division of Agricultural college, kabba college of Agric. It was situated in the southern guinea savannah ecological zone of Nigeria ($07^{\circ} 56^{\text{N}} 06^{\circ} 45^{\text{E}}$ and 427m above sea level).

The poly bags were filled with top soil incorporated with poultry manure and was laid out in a complete randomized design (CRD). With four treatment which was replicated four times, the treatment were as follows; pmo(control; no poultry manure) pm 50g (poultry manure at rate of 50g /poly bag) pm100g(poultry manure at rate of 100g /poly bag) pm 150g(poultry manure at rate of 150/poly bag).

The planting materials Tenera (sprouted nut) for the experiment were gotten from Nigeria institute for oil palm research (NIFOR) Benin city Nigeria, while poultry manure was obtained from the college livestock farm.

500 black polybags of size 25cm x 12.5cm (250gauge) were filled with top soil (0-15cm) obtained in kabba oil palm grove. The soil used was near neutral P^{H} but slightly acidic, with high base saturation (<50%) and low total N. The soil was bulked, thoroughly mixed and sub-sample taken for physico-chemical analysis before filling into poly bags soil. Organic carbon and total N were determined by the method of walkey and black (1934) and Bremner(1960) respectively. Exchangeable bases were extracted by equilibration in neutral normal ammonium acetate solution followed by the determination of Ca, and Mg in the extract by EDTA titration technique and Na and K by flame photometry. Available P was extracted using the method of Bray and Kurtz (1945) and determined by colorimetry. Particle size analysis was determined by the hydrometer method of Bouyoucous (1951).

The poly bag were planted with sprouted nut of Teneral oil palm gotten from Nigeria Institute for oil palm Reseach (NI FOR) Benin while the poultry manure was obtained from the college livestock farm.

The poly bags were layout in complete randomized design (C R D). the treatment was poultry manure at different levels of 0, 50, 100 and 150g per bag. Three different growth characters were observed and measured on weekly interval and four weeks basis, parameters measured are plant height(cm) with the aid of meter rule, plant girth using venire caliper, Number of leaves by numerical counting.

RESULTS AND DISCUSSION

Table 2 shows the effect of different levels of poultry manure on plant height (cm) of oil palm seedlings at the nursery stage. It was indicated that there were significant effect for plant treated with poultry manure and control. This observation agreed with that of Agboola (1982c) who reported poor growth of cocoa and oil palm seedling in unamended soil, this trend was also noticed in other growth parameters as indicated in tables 3 and 4. Effect of treatment on plant girth in table (3 and 4) show that there were no significant difference for plant treated with 100g and 150g of poultry manure, but they were both significantly ($p < 0.5$) higher than control and 50g per bag, this result also followed the same sequence in same manner with plant height, this may be due to availability of plant nutrients brought about by the soil water holding capacity which in turn improve soil structure and texture as stated by roe and comfort (2002). It is pertinent to note that poultry manure activates many species of living organism which release phyto-hormones and might have stimulated the plant growth and nutrient absorption

Table 1. Results of Soil, and Manure Analysis use for the experiment

Properties	Soil	Poultry manure
	Type: Afisol (FAO)	
p ^H	6.60	7.90
Ca mol Kg ⁻¹	2.50	19.0
K Mol kg ⁻¹	0.12	1.33
Na mol kg ⁻¹	0.31	3.0
Mg mol kg ⁻¹	1.53	11.59
Ex. acidity	0.08	0.01
CEc	4.54	34.93
Base saturation %	98	100
Organic carbon %	1.68	5.88
Total N %	0.17	0.59
Available phosphors	19.74	58.80
Sand %	81.20	N/A
Silt %	12.20	N/A
Clay %	6.60	N/A

N/A—Not available

Table 2. Effect of different levels of poultry manure on plant height

Treatment	AT 14 WAP	AT 16 WAP	AT 18 WAP	AT 20 WAP	AT 22 WAP
Pm o g	7.80	8.20	10.00	13.00	15.60c
Pm 50 g	9.60	11.20	15.65	18.90	20.60b
Pm100 g	11.18	14.78	18.93	21.75	25.35a
Pm150 g	11.63	15.48	19.78	23.00	26.18a
L O S	N S	N S	N S	N S	
L S D	-	-	-	-	3.01

Table 3. effect of different levels of poultry manure on plant girth

Treatment	AT 14 WAP	AT 16 WAP	AT 18 WAP	AT 20 WAP	AT 22 WAP
Pm o	2.68	2.80	2.93	3.08b	3.28b
Pm 50 g	2.83	3.02	3.20	3.38ab	3.58ab
Pm100 g	2.88	3.07	3.28	3.53a	3.75a
Pm 150 g	2.98	3.15	3.38	3.65a	3.88a
L O S	N S	N S	N S	*	**
L S D	-	-	-	0.36	0.33

LOS- Level of significant

L S D-Least significant difference

Table 4. Effect of different levels of poultry manure on number of leaves

Treatment	AT 14 WAP	AT 16 WAP	AT 18 WAP	AT 20 WAP	AT 22 WAP
Pm o g	3.00	3.50	4.00	4.00a	4.50ab
Pm 50 g	3.55	3.75	4.25	4.50a	4.51b
Pm 100 g	3.75	3.95	4.75	4.85a	4.95a
Pm 150 g	3.75	4.00	4.95	5.00a	5.00a
L O S	N S	N S	N S		
L S D	-	-	-	0.70	0.66

CONCLUSION AND RECOMMENDATION

It could be recommended that 100g of poultry manure per bag is the best level for raising oil palm seedlings in the nursery on low fertile soil. This recommendation collaborates with the fact that inorganic fertilizers are scarce and expensive for low resource poor famers.

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