Original Research Article

COMPARATIVE EFFECTS OF COW DUNG AND POULTRY MANURE ON THE GERMINATION AND GROWTH OF *Zingiber officinale* (GINGER) William Roscoe

ABSTRACT

The study is based on determining the effects of organic manure (cow dung and poultry manure) on the growth & germination of *Zingiber officinale* using topsoil in the research as the medium of growth. The seeds were subjected to 7 treatments which include cow dung and poultry manures and topsoil only as control treatment. The seeds were sown directly into the polythene pots thoroughly mixed with the organic manures at different levels of application which includes 2.5g, 5.0g and 10.0g with 3 replicates making a total of 21 poly pots. The germination was thoroughly observed for 3 weeks after planting. The experiment was laid in a completely Randomized design with 3 replicates.

The parameters assessed were the plant height, the number of leaves and stem girth. The data collected were subjected to ANOVA.

The Results of the study showed that treatment T1 with cow dung at 2.5g had the highest plant height Of (49.65cm), stem diameter of (0.458m) and Number of leaves (12.27) followed by T5 (5.0g of poultry Manure) with plant height of (45.40cm) stem diameter (0.435cm) and number of leaves (12.73). Treatment 7 which is the control treatment had the Least Leaf Number of (24), height of (28.97) and stem diameter of (0.257).

Therefore from all the treatments used, cow dung at 2.5g and poultry manure at 5.0g are advisable for Raising *Zingiber officinale*.

***Keywords*:** Comparative, Effect, Cow dung, Manure, Growth, Ginger

INTRODUCTION

Spices constitute an important group of agricultural commodities which have been used for adding flavour to food. Ginger consists of fresh or dry root of *Zingiber officinale*. The English Botanist William Roscoe (1753-1831) gave the plant the name of *Zingiber officinale* in an 1807 publication. The ginger family is a tropical group especially abundant in Indo-Malaysia, consisting of more than 1,200 plant species in 53 genera. The genus *Zingiber* includes about 85 species of aromatic herbs from East Asia and tropical Australia.

The name of the genus *Zingiber* is derived from a Sanskrit word denoting "horn-shaped" in reference to the protrusions of the rhizome. Some species are also used in pharmaceutical, perfumery, cosmetics and other related industries. Indian is one of the most leading spice producing and exporting countries in the world. In addition, large quantities of spice are consumed within the country for seasoning food and for several purposes. Spices are often the currency of the developing countries such as Asia, India, the improvement in agro-technique and the release of many intensive researches [1].

The primary producers of spices are India (by far the largest producer and exporter), Egypt and Brazil. Since spices are always in demand in the industrial world, export of these basic agricultural commodities by developing countries can be relied upon to earn valuable foreign exchange. The major importers are United States of America, East-Asia, Japan, Europe and Middle Eastern countries. The current estimate of world import is 52,500 tons valued at US $ 1,500 million with an annual growth of 4%. This is against world production of 8.5 tons valued at US $25 billion [2].

Ginger plant is of two types which includes the fresh ginger and the dry ginger. Fresh ginger and dry ginger are considered two different commodities; in fact, one author of an early [3] (Chinese

herbal) felt that, they were so different that they must come from two different plants. The dry root is used to dispel pathogens via its ability to induce sweetening. It also expels cold, relieves nausea and clear away toxic matters [4] The dry root treats depleted yang, removes cold, useful for "cold" pain of the stomach and abdomen, it is also useful for diarrhoea due to cold deficiency, cough, rheumatism and so on. Experimental data developed by a Chinese scientist verifies in the ability of the dried root to strengthen the stomach while acting as mild stomach and intestinal stimulant, it has been shown to inhibit vomiting. Studies with fresh root showed that for the first few hours, ginger tea reduce gastric secretions followed by a longer period of stimulation. Animal experiments have also shown analgesic and anti-inflammatory activity.

Ginger is known as the best spice crop, it is a perennial herb differing in shape and size in different cultivate types. The herb develops several lateral shoot in clumps which begins to dry when the plant matures, the leaves are narrow distinctions linear lanceolate and greenish which flowers (pink in colour). Ginger is in different forms that includes raw ginger, bleached dried ginger, ginger Olerosin, ginger powder, ginger oil, dried ginger and ginger flakes. It is cultivated in almost every part of the world (I I S R experimental farm kerala).

Zingiber officinale thrives in any soil provided it is well drained. It is valued as the best spice because it is used in cooking and baking for its flavouring nature [5]. The characteristic odour and flavour of ginger is caused by a mixture of *Zingerone, Shogoals* and *gingerols,* volatile oil that compose of one to three percent of the weight of fresh ginger. Before eating, fresh ginger may be peeled and for storage, it can be substituted for ground ginger at a ratio of 6:1 although, the flavour for recipes such as ginger bread, cookies crackers, cake, ginger ale and ginger beer.

Ginger can be placed in plastic bag and refrigerated or frozen for longer-term storage. It can be used for preserving foods and it kills harmful bacteria. Indonesians frequently use spice paste based on the fresh chills and ginger to rub meat before grilling or baking commences which is

also applied in some of our homes whereby we use ginger for steaming our meat, fish etc, before cooking to enhance the great, accurate and adequate taste of our meal.

GENERAL OBJECTIVE OF STUDY

To determine the effects of organic manure on the germination and growth of *Zingiber officinale*.

SCOPE OF THE STUDY

This experiment is focused on the effects of poultry manure and cow dung on the growth of *Zingiber officinale*.

MATERIALS AND METHOD

AREA OF STUDY

The experiment was carried out in Federal College of Forestry, Ibadan, Jericho, Oyo State, Nigeria beside the Visual, and now, Agricultural Technology Department. The college is situated at Jericho quarters under Ibadan south-West Local Government area of Oyo state. The area lies between latitude 7°26 N and longitude 3°36 E. The climate of the area is tropically dominated by rain fall pattern which ranges from 1,400mm - 1,500mm; the average temperature is about 31.2 and relative humidity about 80%. The climatic condition of the area is rainfall with two distinct seasons which are dry season and rainy season.

MATERIALS

The following are the materials used for the experiment. Ginger rhizomes, top soil, polythene pots, cow dung, poultry manure, vernier caliper, wheel barrow, watering can, 30cm ruler, exercise book and sieving basket.

METHOD OF PREPARATION OF THE POULTRY MANURE AND COW DUNG MIXTURE.

The poultry manure was sun dried for one week; this is as a result of high nitrogen composition present in the manure which may be toxic to plants when added to it. This treatment was also applied to cow dung. The dried manure was later sieved and the fine dust was collected for the experiment. The level of application was 2.5g, 5.0g and 10.0g.

The top soil was gotten from the *Gmelina* plantation in Federal College of Forestry, Ibadan and it was properly sieved in order to separate all unwanted materials contained in it. Later on, the top soil was measured into the polythene pots that constitute 21 pots; the weight of the soil used was 2.5kg per pot and the size of the pots used were 25cm by 10cm.

PROCUREMENT OF RHIZOMES

The rhizomes of *Zingiber officinale* were procured from National Horticultural Research Institute (NIHORT). They were later bisected with a sterilized knife in order to avoid fungal attack on them.

EXPERIMENTAL DESIGN

The experimental design (CRD) completely randomized design comprised of seven treatments with three replicates.

Table 1: EXPERIMENTAL LAYOUT

T1	T3	T2	T5	T7	T6	T4
T2	T1	T4	T3	T5	T7	T6
T4	T2	T3	T1	T6	T7	T5

Ti = Cow dung 2.5g

T2 = Cow dung 5.0g

T3 = Cow dung 10.0g

T4 = Poultry manure 2.5g

T5 = Poultry manure 5.02

T6 = Poultry manure 10.0a

T7 = Control

PARAMETERS ASSESSED

a) Plant height (cm)

b) Stem girth (mm)

c) Leaf count

METHOD OF DATA COLLECTION

The method of data collection adopted was duly on a weekly basis. A 30cm ruler was used to measure the plant height and the stem girth was measured with a venier calliper and the leaves were counted on a weekly basis.

METHOD OF ANALYSIS

The experiment is subjected to mean and analysis of Variance (ANOVA).

RESULTS AND DISCUSSION

Effect of Cow dung and Poultry Manure on The Height of *Zingiber Officinale.*

Table 1 show that there is a significant difference among the treatments and the period of assessment (<.001) but, no significant difference in the interaction between treatments and the period of assessment at 5% level of probability (1.00 Ns).

Table 2 shows the mean height for all treatments at l0weeks seedlings with crow dung manure applied at 2.5g (T1) recorded the highest mean height of 49.65cm followed by T2 of 5.0g with the mean value of 48.76cm. T7 which is the control had the least performance with mean of 28.97cm which is in accordance with [5] who stated that natural fertilizers (Organic manures) are effective for the growth of plants and they can also be used in the place of artificial fertilizer. In the result of his experiment, cow dung at 2.5g was recorded as the treatment with the highest growth performance followed by 5.0g of poultry manure. However from my research findings this is proven to be correct and accurate in conclusion.

Table 2: Effect of organic manure on the Height of *Zingiber Officinale*.

	Weeks after planting										
TREATMENTS	1	2	3	4	5	6	7	8	9	10	Ave Mean
T1 (2.5g)	9.80	18.67	42.00	42.27	43.13	61.77	62.30	64.57	71.50	80.80	49. 65
T2 (5.og)	5.93	15.37	35.80	38.77	46.73	60.43	64.73	66.43	69.77	83.63	48.76
T3 (10.0g)	4.63	2033	36.10	36.80	45.07	61.40	62.69	65.27	69.53	81.77	48.36
T4 (2.5g)	2.13	17.43	33.47	33.70	43.70	61.83	65.13	65.53	74.77	84.47	48.22
T5 (5.0g)	2.87	18.87	31.17	34.00	41.37	56.93	57.10	61.40	70.80	79.50	45.40
T6 (10.0g)	3.40	8.07	30.93	39.50	43.67	61.07	61.08	64.13	68.13	78.20	45.82
T7	0.00	2.47	11.97	20.17	26.67	38.80	38.81	41.50	48.13	61.17	28.97

L.S.D	6.928
Grand mean	45.02
S.E	13.573 %
C.V	30.1

Effect of organic manure on the mean girth of Zingiber officinale Seedlings.

Table 2 shows that there is no significant difference among the treatments and period of assessment but there is interactions between treatment and period of assessment at 5% level of probability (<.001).

Table 3 below shows the means Girth for all the treatments at 10 weeks, Ti (Cow dung 2.5g) had the highest means of 0.458 cm at 10 week after planting; followed by T5 (Poultry manure 5.0g) having the mean value of 0.435cm. T7 which is the control was recorded to have the least mean value of 0.257cm. Therefore Cow dung and poultry manure are far better than ordinary topsoil, therefore the cow dung at 2.5g is quite effective in promoting the formation of stem girth and can be useful in raising the seedling.

Table 3: Effect of organic manure on the Height of *Zingiber Officinale*.

	Weeks after planting										
TRMTS	1	2	3	4	5	6	7	8	9	10	Avg/M
T1(2.5g)	1.333	1.600	0.170	0.167	0.173	0.183	0.200	0.223	0.240	0.290	0.458
T2(5.0g)	0.933	1.467	0.170	0.163	0.170	0.183	0.190	0.210	0.237	0.290	0.401
T3(10.0g)	0.4771	1.633	0.180	0.160	0.170	0.180	0.197	0.223	0.243	0.293	0.376
T4 (2.5g)	0.900	1.500	0.167	0.157	0.167	0.183	0.203	0.223	0.240	0.290	0.403
T5(5.0g)	1.267	1.500	0.160	0.160	0.170	0.180	0.187	0.210	0.230	0.230	0.395
T7	0.00	1.033	0.157	0.147	0.160	0.173	0.190	0.210	0.227	0.277	0.257
L.S.D	01120										
Grand mean	0.389										

S.E	0.2194
% C.V	56.3

Table 3 shows that there is no significant difference among the treatments and period of assessment but there is interactions between treatment and period of assessment at 5% level of probability (<.001).

Table 4: Effect of organic manure on the mean leaf production of *Zingiber Officinale* Seedlings.

TRMTS	1	2	3	4	5	6	7	8	9	10	Avg/M
	0.33	2.33	6.33	6.33	9.00	11.33	16.00	19.33	24.00	27.67	12.27
	0.00	1.67	5.00	6.69	10.00	11.33	14.33	18.00	22.00	26.00	11.50
	0.33	2.67	6.33	7.67	10.00	11.67	15.67	19.33	24.00	28.00	12.57
	0.00	3.67	6.67	6.67	9.00	11.00	16.33	20.00	24.33	28.33	12.60
	1.00	3.67	8.33	7.00	9.33	11.00	16.00	19.67	23.67	27.67	12.73
	0.67	2.00	6.33	6.33	8.67	10.33	14.67	18.33	22.67	26.67	11.67
	0.00	0.00	2.00	4.00	6.33	7.67	13.33	16.33	20.33	24.33	9.43
L.S.D	1.244										
Grand mean	11.82										
S.E	2.438										
% C.V	20.6										

Table 4 shows the means leaf production for all the treatments. Poultry manure applied at 5.0g (T_5) recorded the highest mean of 12.73 at 10 weeks after planting in the pots, followed by T_3

cow dung at 10.0g with the means of 12.57 or 12.6 while T_6 poultry manure applied at 10.0g and T_7 the control had the lowest mean of 11.7 and 9.43 respectively after 10weeks of planting. The poultry manure was quite effective followed by cow dung equally in promoting the leaf formation of the seedling and can be used for raising the seedling in line with [6].

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