

Effect of Palm Bunch Ash on Growth of Groundnut (*Arachis hypogaea*)

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Abstract: The study investigates the effect of palm bunch ash on growth of groundnut (*Arachis hypogaea*). The emergence of the plant was observed to be poorly enhanced by the application of palm bunch ash. The application of 500 g and the control gave the highest emergence percentage of 25.33 and 24.7. The application of palm bunch ash affected emergence and yield significantly. It is therefore recommended that for economic purpose palm bunch ash should be applied to groundnut for optimal yield.

Key words: Palm bunch ash, groundnut, *Arachis hypogaea*

INTRODUCTION

Groundnut (*Arachis hypogaea*) is a dicotyledonous plant which is widely distributed globally. The plant originated from Brazil and has spread however, to many other countries especially tropical and subtropical countries of the world (Onwueme and Sinha, 1991). It belongs to the leguminasea family, an annual branching herbaceous plant whose importance lies in the fact that it is a major crop for man and animal as well as its importance as raw materials for agroindustries. The seeds contain large amounts of fats (up to 60%) and protein (up to 45%). The nuts are eaten raw, boiled or roasted. A favourable dish is prepared from groundnut and both the leaves and nuts are used in soap preparation (Pureseglove, 1972). Groundnut cake is a high protein livestock feed and it is an excellent fodder and hay.

Organic fertilizers are usually wastes from industrial processing of parts of plants or animals. In the traditional agriculture of savanna area of Nigeria, bush fallow refuse, dung, etc., are important factors in the maintenance of soil fertility and the increasing total content and availability of plant nutrients, especially groundnut, is to maintain the level of organic matter in the soil (Jones, 1972).

The effect of palm bunch ash on crops is due to the fact that it constitutes some of vital mineral elements needed by plants for growth and increasing the yield of groundnut. Palm bunch ash constitutes varying amount of calcium, phosphorus, potassium and magnesium which affect the yield of crops (Aya and Lucas, 1979). The knowledge of how to improve the fertility of soil with that aid of various fertilizer materials has been accumulated by generation of farmers in fields.

Calcium enhances plant growth and improves the soil by reducing its acidic content, calcium is important both as a soil conditioner and as a plant nutrient which greatly

increases the symbiotic and non symbiotic bacteria which helps in adding more available nutrients to the soil thereby increasing groundnut yield and crops in general (Adeyemo, 1986).

Owing to the fact that the cost of commercial fertilizer is on the increase and that they have adverse effect on the environment, farmers are seeking for alternative sources of fertilizers that are user and environmental friendly. Palm bunch ash is one of such soil nutrients. The use of palm bunch ash has not been fully exploited by researchers.

MATERIALS AND METHODS

The experiment was cited at the Teaching and Research farm of the Federal College of Education (Technical), Omoku, Rivers State, Nigeria. The area is characterized by high rainfall in the rainy season and heavy sunshine in the dry season. The soil of the experimental plot is sandy loam. The experimental plot was properly cleared and stumps manually removed, while mapping out was done with the use of a measuring tape. The tilling and leveling of the plot was done with the aid of garden fork.

The design used was a Randomized Complete Block Design (RCBD) with three treatments replicated three times. The treatments used were: Control (0) application; 500 kg of palm bunch ash; 1000 kg of palm bunch ash. High yielding local groundnut variety was cultivated. Two seeds were sown per hole at a depth of 10 cm and the plant distance was 30×30 cm apart, with 27 stands per experimental unit and a total plant density of 243. The plot was weeded manually at 3 weeks and 6 weeks after, respectively with the use of hoe. The prevalent weeds in the experimental plot were carpet grass (*Axonopus compressus*) and guinea grass (*Panicum maximum*).

Data were collected on the following parameters:

Emergence: The number of plants that emerged were counted.

Height: Six plants were randomly tagged per experimental unit and their height measured from the ground level to the tip of the shoot using a centimeter rule at 30, 60 and 90 Days After Planting (DAP). The mean height of the plant for each treatment was determined.

Nodulation: Nodulation of 100% flowering was taken. Twenty seven plants were randomly uprooted in the experimental unit. Three stands in the middle of each row were uprooted. The number of nodules on each root was counted and recorded accordingly. Data obtained were computed and the mean number of nodules for each treatment was determined.

Yield: All the crops on each experimental unit were harvested manually and taken to the laboratory for yield determination. The weight of seeds harvested from each plot was noted and recorded. The number of pseudo-pods and matured seeds were counted.

RESULTS

Table 1 shows that emergence percentage was generally low in all treatment. However, significant differences were observed at 500 and 1000 g application of palm bunch ash.

From Table 2, height of groundnut plant increased from 23.89 to 27.05 and dropped to 25.10 at 1000 g application. There were no significant differences in height of the plant generally. Though the overall analysis reveals that application of palm bunch ash had positive effect on height and the application helped to improve the soil properties thereby supporting the growth of groundnut.

Table 3 shows that nodes decreased from 85.53 at control to 68.90 at 500 g application and then increased slightly to 69.1 at 1000 g application. The implication of this finding is that application of palm bunch ash had no significant effect on groundnut nodulation because the control gave the highest number of nodules.

Table 4 shows that there was no significant difference in yield at 500 g but significant difference existed 1000 g application though negatively. The implication of this finding is that 500 g application is the best for optimum yield.

Table 1: Effect of ash on emergence percentage

Treatment	Mean
Control	24.7±0.5779
500 g	25.33±1.527b
1000 g	21.0±2.00b

Means in the same column followed by the same letter(s) are not significantly different

Table 2: Effect of ash on height of plant

Treatment	Mean
Control	23.89±3.02a
500 g	27.05±6.09a
1000 g	25.10±1.30a

Means in the same column followed by the same letter(s) are not significantly different

Table 3: Effect of ash on nodulation

Treatment	Mean
Control	85.53±69.75a
500 g	68.90±19.90a
1000 g	69.1±40.47a

Means in the same column followed by the same letter(s) are not significantly different

Table 4: Effect of ash on yield

Treatment	Mean
Control	1.04±0.16b
500 g	0.95±0.086b
1000 g	0.53±0.0577a

Means in the same column followed by the same letter(s) are not significantly different

DISCUSSION

Palm bunch ash application had pronounced effect on height of groundnut. Analysis of variance showed that differences exist between control and fertilized plots (500 and 1000 g) application. The differences were significant at 5% level suggesting that palm bunch ash improved bit physical and chemical properties of the soil. There was no pronounced effect on nodulation. The number of nodules decreased with the quantity of palm bunch ash applied. It was observed that groundnut yield increased in the control and application of 500 g of palm bunch ash to groundnut. The study found significant effect of palm bunch ash on yield of groundnut. Oguzor and Ezekiel (2006) reported significant effect of palm bunch ash on maize yield.

CONCLUSION

The emergence of the plant was observed to be poorly enhanced by the application of palm bunch ash. The application of 500 g and the control gave the highest emergence percentage of 25.33 and 24.7. The application of palm bunch ash affected emergence and yield significantly. It is therefore recommended that for economic purpose palm bunch ash should be applied to groundnut for optimal yield.

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