Research Journal of Biological Sciences 2 (5): 590-592, 2007

Effect of Planting Methods on Growth of Cassava

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Abstract: The experiment investigated the effect of planting methods on growth of cassava in Omoku climatic zone, Nigeria. Randomized complete block design was used in the experiment. The treatments were horizontal method (control), slanting method and vertical methods of planting. Comparison of treatments was done with use of percentages, mean and analysis of variance on parameters such as emergence (appearance of shoot), germinated nodes, height at 20, 40 and 60 days after planting. Analysis of the result showed that vertical method of planting cassava gave the best sprouting percentage of 88.8% while there was no significant difference on the number of germinated nodes. Based on the findings of the experiment, it is recommended that vertical method of planting cassava or slanting method should be employed because they sprouted more rapidly than horizontal method. During propagation the nodes should be placed upwards for proper and luxuriant growth of the plant.

Key words: Planting methods, growth, cassava, climate zone, proper and luxuriant growth

INTRODUCTION

Nigeria is a major cassava producing country in the world and the importance of cassava in contemporary Nigeria cannot be overemphasized. There is no doubt that the demand for cassava exceeds supply in Nigeria (Okeke, 1989), underscoring the importance attached to the crop. Cassava (*Manihot* sp.) which originated from Brazil, South America is one of the most important food crops in West Africa. It is a root tuber that produces latex and reaches a height of 1.8-3.6 m depending on the variety. Because it is easy to cultivate and grows on poor soils; it is grown throughout West Africa. The tuber is processed into garri, tapioca and cassava flour for human consumption, while the leaves are cooked and eaten especially in areas like Sierra Leone (Adegbola *et al*., 1978). According to IITA cassava is firmly established in the agricultural scene of Southern Nigeria. It has gained recognition as one of the staple food crops and an excellent "famine reserve" crop. Many technical factors have earned cassava this reputation, cassava is an extremely undemanding crop which is able to grow under a variety of climatic and soil conditions. It is tolerant to draught and once established, cassava unlike other crops has no critical period when lack of rain will cause crop failure. Cassava is adapted to low fertility soils. It can be partially harvested when the food is needed, it can also stay two and half years from the fact that its starchy, thickened, tuberous roots are a variable source of cheap calories especially in developing countries where calorie deficiency and malnutrition are widespread. In many parts of Africa, the leaves and tender shoots of cassava of cassava are also consumed as vegetables. It also used as a source of ethanol for fuel, energy in animal feed and starch for industries (IITA, 1990).

Cassava is grown through cultivation of stem cuttings and the method of planting has depended on the environmental conditions. According to Okeke (1989) cassava stem cuttings have been planted in angular or horizontal positions in freely draining soils without appreciable difference in yields. However, it was noted, angular (slanting) planting on mounds or ridges (raised seedbed) are imperatives in area with high water table. Stem cuttings are usually inserted to half their length into the soil either at an angle, vertical or horizontal (Gibbon and Pain, 1985). According to Adeniji *et al*. (1989) cassava cuttings can be planted by completely burying them horizontally as practiced by most traditional farmers in Southern Nigeria. another way of planting cassava is by exposing a part of cutting on the mound or ridge (slanting method). The angles of inclination of the planted cuttings depend on the locality, ranging from 30-90° with the buds facing upwards and two thirds of the cuttings buried. Planting at an angle of 90° has recently given the highest yields from an ongoing cutting positioning experiments. IITA (1990) noted that the depth of planting cassava must be regulated according to the prevailing environmental conditions. Too much exposure of the cuttings in areas where soil moisture is below optimum can result in poor stands and hence low yields. A good practical rule is that where there are dry soils, cassava cuttings should be planted fairly deep and the soil is

moist and heavy the planting depth should be fairly shallow. In later case, it should be remembered that deep planting will make harvesting difficult and increase production costs, however, deep planting is advisable in areas prone to termite attack. The depth of planting varies from 5-20 cm but is usually about 10cm. the depth of planting cassava as cited in Adeniji *et al.* (1989) cassava cuttings are planted 10-12cm deep as practiced by most traditional farmers in Southern Nigeria.

In Omoku area of Rivers State, Nigeria, cassava is planted by burying horizontally, the entire cutting beneath the soil surface. According to personal sources the yield of cassava planted by burying horizontally is low. There is however, absence of documented research work to verify the claim of local farmers. This research work is therefore aimed at verifying the above claim and also, compare the performance of the slanting and vertical methods with the horizontal one which is the prevalent method of planting in the study area (Omoku).

MATERIALS AND METHODS

The experiment was carried out in 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 cleared manually and stumped with cutlass and hoe. Cassava cuttings were planted on flat surface. The area was marked out into three blocks (replicates) with each block comprising of three treatments. Experimental units had three rows of plants spaced at 50 cm by 50 cm, with a 20 cm wide path in between the various plots. The total area of the whole experimental plots including the parts was 10 m^2 while the area of one experimental unit was 3.2 m^2.

The experimental design was randomized complete block design with three rows arrangement and three replicates. The treatment comprised of three different methods of planting cassava cuttings, that is, horizontal, slanting and vertical per block in that order which were randomized within each replicate. The cuttings were cut up to 20- 30cm long leaving only 5 nodes and thereafter planted. The cassava variety planted was TMS 30555.

Data were collected on the following parameters:

Emergence percentage: Based on the number of stands measured on the first days after sprouting. The number of stands that sprouted were counted and percentage calculated using the formular;

$$\text{Sprouting percentage} = \frac{\text{Number of stands sprouted}}{\text{Number of stands planted}} \times 100$$

Germinated nodes: Based on the number of nodes on each cuttings planted, the number of nodes on each germinated tagged plant was counted on each of the experimental plot respectively and the average number of nodes germinated was computed for each treatment.

Height: Tagged plants were also used for collecting the height data. The crop height were measured from ground level to tip of the shoots using meter rule at 20, 40 and 60 days respectively after plating. The data was collected and the mean height of plant per treatment was determined.

Data analysis: Data analysis was by the use of mean, percentage and analysis of variance.

RESULTS

Emergence percentage: Emergence is the ability of the planting material to develop plumule and radical. The plumule develops to form the shoot while the radical develops to form the root which later develops to the cassava tuber. The emergence of cassava cuttings and its growth is an indication of the viability of the planting materials, methods of planting adopted and the fertility of the soil. The result of the emergence of cassava is presented in Table 1.

Table 1: Emergence percentage at 14 days after planting

Treatment	Emergence percentage
Control	71.1
Slanting	79.9
Vertical	88.8

Table 2: Number of germinated nodes after 30 days after planting

Treatment	Number of germinated nodes
Control	1.70a
Slanting	1.80a
Vertical	1.60a

Means in the same column followed by the same alphabets are not significantly different at p = 0.05

Table 3: Effect of planting methods on the height of cassava (cm)

Treatment	20DAP	40DAP	60DAP
Control	48	125.3	201.6
Slanting	46.6	107.6	209.3
Vertical	41.1	91.3	170

Table 4: ANOVA showing effect of planting methods on the height of cassava (cm)

Treatment	
Control	124.97±76.80a
Slanting	121.17±82.19a
Vertical	100.80±64.97a

Means in the same column followed by the same alphabets are not significantly different at p = 0.05

As observed from Table 1, the highest emergence was observed when planting was done vertically (88.8%). The next higher emergence was observed with the slanting method (79.9%). The vertical method of planting cassava resulted in an emergence of 71.1% which is the lowest recorded in the experiment.

Number of germinated nodes: The number of germinated nodes signified healthy growth of cassava cuttings and the pattern of planting method adopted. The result of germinated nodes is presented in Table 2.

The results showed that at 30 Days After Planting (DAP) germination was relatively the same on all treatments. The control treatment recorded 1.70 nodes on the average, while the slanting and vertical methods recorded 1.80 and 1.60, respectively.

Mean height of cassava: The height of cassava gives an indication of availability of nutrients responsible for growth of plant tissue and the methods of planting adopted. The result is presented in Table 3.

The lowest height was recorded for vertical method of planting cassava. According to the analysis of the result, cassava height measured at 20, 40 and 60 Days After Planting (DAP) were 41.1, 91.3 and 170.0 respectively. This was followed by the slanting method of planting cassava at 20, 40 and 60 DAP were 46.6, 107.6, 209.3, respectively. Generally, it was observed that the plot where the control method (horizontal) was adopted gave the highest height of 48, 125.3 and 201.6 at 20, 40 and 60 DAP.

Table 4 shows that mean height of horizontal planting method (control) was highest, followed by slanting and the least was vertical. The analysis of variance however, showed that there were no significant differences in the heights of the three planting methods in the experiment. Okeke (1989) had reported that slanting planting method are better in areas of high water table like Omoku, the study area.

DISCUSSION

Differences in emergence percentage were observed between horizontal (control), slanting and vertical methods of planting cassava. It can be concluded that different planting methods influenced the emergence of cassava plant. This conforms with an earlier experiment by International Institute of Tropical Agriculture (IITA, 1990).

From the results of the study, there was no significant difference in number of germinated nodes among the three planting methods experimented with. The implication of this is that the planting method employed does not necessarily affect the number of germinated nodes. Also, it was observed that the height of cassava planted using the horizontal method (control) performed relatively better that the other methods. This could be attributed to a faster growth of sprouted nodes as a result of more nutrients being available for the sprouted nodes as against slanting and vertical methods.

CONCLUSION

The study was based on the effect of planting methods on cassava growth. Different planting methods of cassava were tested in the experiment. They were the horizontal (control), slanting and vertical methods. Data were obtained using the following parameters: Emergence percentage, number of germinated nodes and height.

The emergence of cassava was observed to be relatively enhanced by vertical method which gave an emergence percentage of 88.8%. It was observed that number of germinated nodes showed no significant difference on any of the methods tried. Based on the findings of the experiment it is recommended that vertical method of planting cassava or slanting method should be employed because they sprouted more rapidly than horizontal method. During propagation the nodes should be placed upwards for proper and luxuriant growth of the plant.

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