



## DETERMINATION OF CLIMATIC CONDITIONS ON THE PLANTING AND ESTABLISHMENT OF WHITE YAM (*DISCOREA RATUNDATA*) IN SUGU GANYE LOCAL GOVERNMENT AREA ADAMAWA STATE, NIGERI.

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### INTRODUCTION

Yam plays an important role by providing cash and dietary carbon hydrate to peoples. It has a better keeping quality that most other tropical root and tuber crops because of the tubers have an extended period of dormancy during which psychological activity is at a minimum. Yam can therefore, serve as an important food security crop despite the large quantity production in West Africa. The availability of seed yam is critical because of the high cost. Hence the problem of limited supply of affordable good quality planting materials continues to be cited in literatures as responsible for low

### Abstract

*The studies observe the climatic condition on the planting and establishment of white yam (dicoria ratundata) in Sugu Ganye local government area Adamawa state Nigeria. The study used daily monitoring and observation of two hundreds (200) tubers of yam seed from planting to establishment. The observation shows that the establishments of yam in the study area are*

### Keywords:

*Determination,  
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*not the same, about 75% of the yam planted at the same time in the study area established within the period of 64 days, while 25% delayed with period of 18 days after. This is as a result of the climatic influences, selection of good quality seed and timing of planting date.*

*Base on observation temperature, moisture and wind were the most important climatic determinant for the establishment of yam. Base on the findings, it was recommended that farmers are advice to make use of timing in planting date, planting date should not exceed between ending January and February, avoid planting in the months of April and May, selection of good quality seed.*

productivity (Ironkwe et al, 200, Olanrewaju, 2009 and Obiokoro, 2005). Seed are a strategic input, and yam production cannot expand without propagation technologies to address issue of rapid multiplication of seed yam (Eze okoro et al, 2006).

Crop production in Nigeria as in other parts of the world is sensitive to environmental factors (Obiokoro, 2005) climatic factors appear to be more marked both in terms of its variation over space and time (Olasantan, 1999). The major climatic parameters involve in yam germination are rainfall, temperature and moisture (Orkwo et al, 1998 and Ekaputa et al, 2004). However moisture and temperature remains the most critical agro-meteorological factors for yam production in the tropics (Kramer, 1963). The occurrences of wet season-dry spells which may last for few days to

more than three weeks is another serious limiting factors to agricultural management in northern Nigeria. Influence of wet season dry spell particularly during the full vegetative stage when evaporative demand is high can lead to retardation of yield formation. The damage is more severe for field crops with shallow root system (Orkwo et al). However, for location with good soil moisture retention the yam crop may manage to utilize soil moisture reserve contain in the pores of the soil or open the very limited reserve contained in its own tissue before the onset during yam germination. Crop may also adopt physiologically or behaviorally to prevent temporary depletion of the store tissue moisture in other to prevent impairment of normal physiological function that may cause in reversible damage and crop death, more so that yam is highly susceptible to dry spell that occur during the onset of the rains has fully established. Therefore, since yam is planted between the period extending from after the cessation of the rains in a giving year to the time of onset in the succeeding year, it implies therefore that as soon germination starts, soil moisture become critical, hence the need for efficient soil moisture conservation strategy in other to optimize soil physical condition affecting the establishment of yam (Eruola et al, 2012)

Various techniques used by traditional farmers in modifying the on-farm micro-climate and efficiency of such techniques in West Africa has been studied that temperature and moisture are the most climatic determinant of yam establishment (Gbadebor, 2006). It is against this background that this study examines the climatic conditions on the planting and establishment yam (*Discorea ratundata*) white yam.

### **The Study Area**

Ganye local government area is located about 150 kilometers south west of Yola it has a total land area of about 2291.4 square kilometer. It shears international boundary with Cameroon republic to the east and to the south west by Sardauna and Bali local government area of Taraba Statheared. It also sheared the boundary to the north with Jada and Mayo-Belwa local government respectively. The areas is located between latitude  $8^{\circ} 15' N$  and  $8^{\circ} 30' N$  and longitude  $12^{\circ} 00' E$  and  $12^{\circ} 15' E$ . it has a total

population of about 164,087 people within a density of 150 per square kilometer concentrated in seven words (2006) population census. Land used pattern is dominated by agricultural activities, apart from these the rest of the land used are residential recreational, commercials, religions and few government reservation area. The vegetation of the area is savannah type; it is characterized by finer tall grasses during rainy season and has fairly thick vegetation cover. The climate, Ganye falls within the northern guinea climatic zone characterized by two main seasons annually. The dry season lasting from November to February and wet season falls from March to October and has a mean annual rainfall of about 1300-1400mm the maximum temperature varies between 29<sup>0</sup> C and 41<sup>0</sup> C while the minimum temperature is 14<sup>0</sup> C (Adeboye et al, 1999).

### **Methodology**

This study used daily observation of two hundred (200) tubers of yam seed from planting date to establishment

### **Experimental Farm Design and Field Management**

The experiment is carried out in Sugu area of Ganye local government. Two hundred by two hundred meter square of land which contain two hundred ridges were separated. The cultivar of interest was *Discorea rotundata* white yam. This is because is the only variety cultivated in the study area and is the most favored yam species in West Africa (Olanrewaju, 2009) and especially in Ganye Adamawa state Nigeria.

### **Land Preparation**

The land was plough on 28<sup>th</sup> October, 2018 and harrowed on 15<sup>th</sup> November, 2018. This is to allow the grasses and leaves of the harvested groundnut to decay in other to replenish the soil with nutrient which serves as fertilizer for yam establishment. Measurement and demarcation of plot followed after which two hundred heaps or ridges were prepared manually using big hoe and allow for some days before planting, this is to create moisture resulting from rise in temperature under the ridges for proper germination of yam seed.



(Fig. 1) Ridges Raised with Traditional Hoes

#### **Method of Obtaining the Seed**

The seed is obtaining from the second harvest of the yam in the neighboring farm. The first harvest is done between the eight month and nine month of growing season, when the tuber which is mostly used for food is carefully cut off bellow the coronal roots to avoid damage to the root system. The roots are then covered with soil and a second harvest of the same plant is done at the end of the season for used as seed yam (Nweke et al, 2011 and Otoo et al, 2001).





(Fig. 2) Seed Tubers From a Double Harvest Crop.

### **Planting**

The planting in the study area is done in the early morning and evening hours of the day, the yam is buried on the ridges of about 10 to 15cm deep and covered the head with dry grass or leaves to avoid direct heat from the sun. The seed yam was planted on 16<sup>th</sup> December, 2018 and established on 19 February, 2019. The remaining was established fully on 7<sup>th</sup> March.



(Fig. 3) Germination of yam seed



(Fig. 4) Establishment of Yam Seed



(Fig. 5) Fully Established

### **Results and Discussion**

Agriculture is a climatic dependent activity that places serious burden on the environment in the process of providing the teeming Nigeria population with food and fibers. The effect of climate on agriculture is related to variability in local times rather than in global climate pattern (Obiokoro, 2005). In the study area some of the climatic variables were observed during the processes of establishment of yam tuber. The climatic variables are as follows:

#### **Temperature**

Temperature is the most climatic factor to be considered in yam establishment, it determines when and where a certain crop can germinate (Eruola et al, 20113). In the study area during the month of planting temperature is low during the night hours but gradually increases during the day's hour which sets the moisture content under the ridges of the yam tubers, the rising in temperature sets up heat under the ridges thereby, fastening the germination of yam tuber and causes the ridges to crack which shows that germination has taken place under the ridges but establishment is yet to set up as shown in figure 3. The delayed establishment of some yam tubers is as a result of low temperature in the study area during the period of establishment.

#### **Humidity or Moisture**

Humidity, or air moisture content may also play an important role in yam establishment, high humidity tends to temper the effect of high temperature.



Crop such as yam require low moisture for germination. High humidity is more conducive to heavy dew at night, which can be beneficial in reducing moisture stress, but which can favor the development of certain diseases such as leaf rust and leaf spots, on some crops (Eruola et al, 2013). In the study area during the period of planting to establishment moisture content in the soil is low which do not have greater impact on the establishment of yam.

### **Rainfall**

Rainfall is one of the most important factors especially when crops are grown under dry land condition. Adequate soil moisture is necessary for good crop establishment, good yield and good quality. This moisture may be obtained from rainfall or irrigation. High rainfall episodes may cause flood damage, partial drowning on certain soil types will often favor disease development. (Eruola et al 2013). In the study area rain did not fall during the establishment of majority of the yam tuber, but some that experience early rainfall increases delayed of their establishment because the rain fall within short distance

### **Wind**

Wind can cause significant damage from mechanically injury to plants, increase transpiration of plants and desiccation of the soil on very sandy soil wind blow grift can cause severe damage to plants. Obviously, very windy areas should be avoided as far as possible, unless adequate provision is made for the establishment of wind breaks (Yohana L et al, 2018). In the study area the wind that blows during the period of planting to establishment penetrate in to the cracks of the ridges of yam tubers creating a mixture of warm and cool condition which aid positively in the establishment of yam as shown in figure 4.

### **Conclusion planting**

The result from the observation of this study area reveal that the establishments of yam are not the same 75% establish within the period of 65 days from planting while 25% delayed with 18 days, this is as a result of climatic conditions, timing of the planting date and selection of the good quality seed.

### **Recommendations**

1. In other to avoid the delaying in establishment and spoilage of yam seed farmers are advices to make use of timing in planting date.
2. Planting date should not exceed between January, February and early march in other to harvest early and good yield.
3. Planting should not be done at the month of April and early May. This is because of the effect of high temperature that can cause damage of yam seed and low yield during harvest.
4. Farmers are advice to select good quality of yam seed and mostly second harvest

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