KOLA: THE TREE OF LIFE

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Deputy Vice Chancellor,

The Ag. Registrar and other Principal Officers,

Deans of Colleges and Directors of Centres,

Ag. Head of Department of Horticulture and other Heads of Departments,

Fellow Colleagues (Both Academic and Non-Academic),

My Lords Spiritual and Temporal,

Friends of the University and Special Guest,

Gentlement of the Press,

Distinguished Ladies and Gentlemen,

Great UNAABITES .

INTRODUCTION

"God moves in a mysterious way
His wonders to perform
He plants his footsteps in the Sea
And rides upon the storm"

Mr. Vice Chancellor, Sir, Permit me to start today's inaugural lecture with the first stanza of No. 516 of the Sacred Songs and Solos (SSS). To me and to those who are familiar with my life right from birth till now, this hymn represents a remarkable summary of today's lecture and the presenter as a creature – a mystery of creation.

From the beginning of life and indeed to the end of creation;

"Blind unbelief is sure to err
And scan His work in vain
God is His own interpreter

And He will make it plain"
So be it forever and ever, Amen.

Today's lecture is titled "Kola: The Tree of Life" for a number of reasons some of which cannot be exhausted in a lecture of this nature. In the third day of creation, God said;

"Let the earth bringh forth grass, the herb yielding seed and
the fruit tree yielding fruit after his kind whose seed is in
itself, upon the earth and it was so."

Gen. 1 v. 11 in the KJV of the Holy Bible. Later on after Adam and Eve were created, God put them in charge of the Garden of Eden with instructions to live and eat of all plants except the fruit of the tree of life for on the day that thou eatest of the fruit of life thou shall die.

In the Holy Quoran, 2nd Sura verse 35 says:

"And we said: O Adam dwell thou and thy wife in the Garden
And eat ye freely (of the fruits) thereof where ye will;
But come not nigh this tree lest ye become wrongdoers".

Islam belief is that the "Garden" mentioned here is not on earth as the Quoran further says;

"Then did satan make from the Garden and get them out

On earth will be your dwelling place,
And your means of livelihood for a time"

Which means that earth is the place of banishment for Adam and Eve. One thing is however clear in the two accounts (Bible and Quoran). There was indeed a garden full of many beautiful things with particular reference to fruit trees among which was a particular one they were not supposed to eat.

InYoruba mythology as recorded is IFISM by Ibie (1986) when Orunmila was coming to the earth, he brough with him “four different plants which ifa priests use for all their preparations to this day”.

In the three accounts none was specific as to which tree is the tree of life. In a comtemporary literature a book was written on coconut and the author titled it “Coconut: the tree of life” This he did because of coconut importance and its uses. For kola, there are more uses and importance bothering on mysticism that make kola to be more qualified and be regarded as the tree of life.

MYSTICISM AND SYMBOLISM OF KOLA.

In Yoruba land, people say “Obi ni bi iku, obi ni bi arun” that means, it is kola nut that wards off death, it is kola nut that wards off sickness or diseases. This saying arose from the fact that people believe in the efficacy of the ability of kola nut to ward off evil things when used either in divination for a sick person or as part of concoction for a sick person.

Sanusi Agbabiaka, popularly known as S. Aka in one of his composition in Sakara Music while alive said;

> *“Mo ti ja ewe ogbo, ki eyin elegbe gbo temi.*
> *Mo ti ja ewe imo ki eyin elegbe o le mo ohun ti mo nwi.*
> *Mo ni obi abata meta, oro ti a ba bi obi ni obi nso*
> *Mo fi pelu atare, omo atare ki i ku m’ata loju*

Which means:

> I have taken ogbo leaf so that you my followers will hear me. I have taken palm front so that you my followers will know what I am saying. I have taken three *Cola acuminata* nuts because the kola nut is bound to provide answer to whatever question is posed to it. I combine it with alligator pepper, lligator pepper seed does not die inside its mother.

Mr. Vice Chancellor, Sir, this is part of an incantation which S. Aka was rendering in Sakara music. However, the salient point in this incantation is that it underscores the use of kola in divination. People who belive in the efficacy of diviantion will testify to this fact especially if what happened to Akaraogun in Ogboju Ode ninu Igbo Irumole by D.O. Fagunwa is anything to go by.

It so happened that Akaraogun was in the forest of four hundred deities when sighted two *C. acuminata* trees. He harvested some pods from one them. Since it was the right type of kola for diviantion and for worshiping the gun, he took a four cotyledon nut and split it into four and started to toss them up as it should be done in divination. For a yes answer which means that the sacrifice has been accepted, two of the four cotyledons must face downwards while the other two cotyledons must face up. Contrary to this, as he tossed them up, he did not get a yes anwers. At times three would face downward while one would face upward or three would face upward while one would face downward. At some other time four of them would face doward or upward. He tried several times; he could not get a yes answer. At last he decided to force a yes answer by using his hand to cause two to face upward and two to face downward saying it is by oneself that one should rectify one's fortune. He later went on his expedition but what he met on that day was very detestable, a situation that confirmed the negative answer he was getting. The Negative answer should have hinted him of possible danger ahead and he should have investigated further whether or not he should go on the expedition.

The third example under this section is how kola nut is used for appeasement. The tranditional worshippers offer kola nuts to their gods. Human beings also use kola nuts to appease fellow human beings especially their enemies and those that they believe have supernatural powers or those that they believe can harm them.

> Odalaye Aremu in his Dadakuada music said"
> Mo nbo wa'ye, mo ko'bi egbeje
> Mo nbo wa'ye, mo ko'bi egbefa
> Nitori iku ko, eyin janmo mi
> Nitori arun ko, eyin janmo mi
> Nitori Orogun elenini mo ni

Which is English translates
As I was coming into the world I bough 3.5 kobo worth of kola nuts

As I was coming into the would I bought 3.0 kobo worth of kolanuts
It was not for fear of death, my comrades.
It was not because of diseases or sickness, my comrades
It was because of my arch rival, the assailant.

The amount spent to buy kolanuts may appear terribly small nowadays. Against the background of those days, it is indeed a lot of money and indeed a lot of kolanuts!

Apart from using kola nuts to appease gods and fellow human beings, kolanuts were used as instruments of evangelisation by both Christianity and Islam. History has is on record that kola not palyed a major role in the spread of Islam in Africa and in Nigeria in particular. Kola nuts trade had three great effects on Islam as a religion. First, it was used as a medium of getting to non Muslim Hausas who were there and then converted to Islam. Secondly, kola trade brought a lot of wealth and as such financial success enable the merchants to devote more leisure time to the pursuit of Islam learning and piety. Thirdly kolanuts enabled converts to give alms, visit Mecca and establish private Islamic schools in fulfilment of Islamic injuctions. On the other handd, the spread of Islam encouraged demand on kola as the nuts were the only radily available stimulant which Islam did not condemn and thus its trade increased as more people in the Savanna region of West Africa became Muslims.

In the Southern part of Nigeia, Christinity used kola to win converts. History has it on record that many people in Lagos and Ogun States particularly Agege, Ota, Shagamu and other areas became converted to Christianity through the use of kola. This account will not be completed without mentioning the efforts made by Pa J. K. Coker the founder of african Church who would travel into the interior visiting some of his ex-labourers with the intention of establishing his church in their villages by advising them on how to plant kola. He was said to have carried out these functions in such places as Oyan, Ile-Igbo and Ikirun. Also, in Agege, Rev. Shingle had his “Gambia Plantation” which he named after his country of origin and many people got converted to Christianity through him as he used to visit many of his people and non-Christians advising them on how to plant kola.

Those who are still doubting the appropriateness of calling kola the tree of life should go to the eastern part of Nigeria and visit an Igbo family. They will welcome you with a plate of kola nut, cooked oil and a knife and you will listen to the prayers that will be said. According to Igbo belief “He who brings kola, brings life”. Thus the one piece of kola nut will be cut into little bits to be shared by you and other people around.

If the first ever recorded wedding took place in the Garden of Eden where fruits tree existed and several evidences tend to support the fact that kola tree was probably one of the fruit trees, then the Yorubas, Igbos and Hausas are only underscoring the fact that kola is the tree of life whenever kolanuts are used as an important item of mutual bond ceremony. The beginning of another life, a new generation or creation.

Biologically, in the plant kingdom, kola stands out as being unique as a plant whose seeds possess different colours of red, pink, white and their varying degrees.

KOLA PLANT

Different Species of kola

Kola belongs to the genus *Cola* under the family *Sterculiaceae.* The genus Cola contains many species numbering up to 50 in West Africa. Of these, only a few are fruit bearing while majority are woody species of economic importance. Of the few fruit bearing notaby *C. nitida* otherwise known as gbanja or goro, *C. acuminata* known in Yoruba as Obi gidi or Obi abata, *C. verticillata* Obi Olooyo or the slimy kola, *C. millenii* also known as Obi edun, only *C. nitida* and *C. acuminata* are of economic importance. *C. nitida* is however much more popular as kola of commerce than *C. acuminata.*

According to Russel (1955) the Gbanja kola tree is a robust tree, usually from 9 to 12m high although sometimes attaining a height of 24m. The tree may have narrow buttresses extending up the trunk for less than 1m. It has dense foliage which are not confined to the tips of branches. Its nuts have 2 cotyledons which may be red or white. Its fruits mature in the months of November and December. *C. acuminata* is a slender tree, up to 12m high but usually 6 to 9m. The branches are slender, crooked and markedly ascending; the foliage is often sparse and confined to the tips of branches. The embryo of *C. acuminata*, the abata kolanut, may have three to five or even six cotyledons which may be red, pink or white in colour. The fruits mature in the months of April to June, which is the peak of rainy season. The name "abata kola" is derived from the fact that its fruits mature during the wet season when they drop into the wet soil down below.

Distribution of kola

The earliest record on kola was that of Johannus Leo Africanus who was the first person to refer to kolanut in 1556 as reported by Russel in 1995. The Portuguese Odoardo Lopez recorded the occurrence of kola trees in Congo in 1591; followed by the record of Andre Alvares, who saw kola trees in Gambia and Guinea in 1594 (Nzekwu, 1961). van Eijnatten, (1969a) stated that kola tree was recorded all along the West Coast of Africa from Gambia to Angola. West Africa is generally known to be the origin of kola particularly in the rain forest area of Code d' Ivoire and Ghana. This area was for a long time the traditional source of gbanja kola nuts (*C. nitida*) which was mainly obtained from spontaneously occurring trees. Because of her preference for cocoa, Ghana has since ceased to be a major producer of kola. From West, cultivation and trade in kola have been established in countries like the Caribean Islands, Mauritius, Sri Lanka and Malaysia (Russell, 1955). During the slave trade, it's cultivation extended to tropical South an central America and to the West Indies.

With respect to C. acuminata, the original distribution stretches from Nigeria to Gabon. This specie was reported to occur spontaneously in Angola by Conde de Ficallo; it was also cultivated in this area as well as islands of Principe and Sao Thome. C. acuminata was reported to be widely cultivated around villages in southwestern Nigeria as far back as 1911 and even now some hectarages of its cultivation are still available. The species is of importance in the eastern part of Nigeria.

Kola Trade

Though kola originated in West Africa, its trade extends to several places worldwide. It extends from the Americas to the far east especially Malaysia. However, historically, the most pronounced areas of trade are West Africa, North Africa and the Middle East. While the trade in kola nuts to the Americas and other overseas countries are in form of dried nuts, kola trade in West Africa and between West Africa and North Africa and Middle East is with fresh nuts. Thus in the past, caravans of West Africa were known to be transportation of fresh kolanuts. Transportation these day has largely changed to air frieghting or by ships.

Kola trade, had by the 18^{th} and 19^{th} centuries boomed between Asante in the kola forests of South West and the central Sudan in the Savannah towards the desert and beyond. Kola trade had significant influence on the politics and life of people of West Africa (Lovejoy, 1980). Thus:

1. It led to series of policy and restrictions to the movements and interactions of certain categories of people and traders by the Asante people.
2. It led to dichotomy of the rich (the Agalawa, Torakawa and Kambarin Beriberi) kola traders and the poor Talakawas majority of whom were forced to join kola trade and subsequently became rich.
3. The rich kola trade led to the emergence of Sokoto Caliphate which apart from wielding politial clout emphasised Islam and education within its fold. This marked the beginning of the fusion of state and religion as is known with the Sokoto Caliphate today.
4. Successful kola trade and mass movement of traders to Kano and subsequent attraction of foreigners to Kano led to its emergence as the most organised and popular market in the African sub-region.
5. Kola trade brought a lot of money to government and thus further strenghtened the influence of the Sokoto Caliphate on their subject and other groups.

Uses of Kola

Kolanut has many uses. It contains in substantial amount active ingredients of Caffeine, Theobromine, Kolatin and Thophylline. Because of these properties, eating kola induces strength, alertness and concentration. To those heavy duty type of jobs as toilling, digging, etc it is a source of strength and vigour while students are known to eat kolanuts in order to able to study at late hours. In general, eating kola reduces fatigue and hunger and confers clear mindedness at work. Eating kola is like smoking cigarettes and compare favourably with taking a cup of coffee.

In addition to its everyday use, kola has many special usages and attributes. In Yoruba land, offering kola is an important show of hospitality and indicates that the visitor is welcome. On occasion like this, the person being visited will prefer he has white or pale pink nuts as these are preferred to red ones. It is just as if an English man is offering cigarettes to a friend.

The gift of kola, and especially white kola, means peace, friendship and sympathy among those partaking. In the recent past, it was common place practice to split and share kola when signing a contract or forming alliance between two parties.

Kola is offered as gifts in several ceremonies such as betrothal ceremony, wedding ceremony, naming ceremony, burial ceremony, house warming ceremony, and taking of a new cheiftaincy title. At a betrothal ceremony, and again at a wedding ceremony, amongst the Yoruba people, the distribution of kola is an important part of the proceedings and the sharing of the nuts amongst the people present signifies their approval of the union and their good wishes for its success. Kola is also used in oath taking whereby two or more people or groups bind themselves over for loyalty and secrecy by splitting kola and sharing it.

Kola also plays important roles in religious affairs as already atrticulated earlier on. According to Russel (1955) nothing could win the favour of the pagan god more readily that a gift of large kolanuts. It is also employed to interpret the mind of the god in divination. It is a source of income to the individual farmers and a source of foreign exchange to the nation. Through its trade, several kingdoms have risen and fallen. Typical examples are the Asante and Sokoto Caliphate of West Africa.

Kolanuts are used in making beverages, chocolate and wine. Perhaps some of you might have bought and tasted a wine called Dee Bee Wine. This is a wine made from kola by one Dr. D.B. Ogutuga who was once a Scientist at the Cocoa Research Institute of Nigeria, Ibadan. Unlike the chocolate imported from abroad which melts easily, the chocolate made from kola does not melt easily as it is thermoresistant and suitable for the tropics.

Kola is useful medically, it is used in some pharmaceutical preparations. Records have it that it was used medicinally by the Arabs and North African muslims to cure headache and sexual impotence. The strong bitter taste also act as sweetner for bad water or any bad taste. The nuts have colouring properties that make them useful for making dye.

BIOLOGY OF KOLA

Pod Characteristics

In both *C. nitida* and *C. acuminata* three major parts are recognised; the pod husk, the testa and the nut. The three together sum up to make up the size of the pod and the pod weight of an average pod. An account of the gross morphogenesis of the three parts in *C.nitida* has been given by Dubbin (1965) and Oyebade (1973). It takes about 133 days after pollination for *C. nitida* to attain maturity.

Dubbin (1965) found an average of 7.2 nuts per pod in *C. nitida* with a range of 1-15 nuts. However, Keat *et al.* (1960) found the range to be 4-10 nuts per pod. Similarly, *C. acuminata* nuts were reported to have 14 nuts per carpel (Keay *et al.*, 1960); 1-9 per carpel (Hutchinson and Dalziel, 1954); and up to 14 nuts per carpel (Russel, 1955). Oladokun (1982a) worked on the relationship between nut number per pod as well as total nut weight per pod as the pod weight of *C. acuminata* increases. He found that majority of pods fell within 101-200g pod weight class and 6-10 nut number per pod while the average nut number per pod was 7.9 nuts. The nut number per pod range was 1-13nuts.

It is significant to note that increase in pod weight was much more due to increase in nut weight than to increase in nut number. The regression curves of nut number and total nut weight per pod and percent nut weight with pod weight showed that there is a minimum size the pod must have to contain minimum sizeable nuts. The curves also showed that although a given pod must have to contain nuts in good condition, and may have reasonable size, the nuts may be entirely testa or too small to be economically useful.

Pod weight correlated positively with its three components viz; nut weight, testa weight and pod husk weight and the correlations were highly significant though nut weight were equally but much more significant than testa weight. Pod weight was also significantly correlated with pod length and pod girth but slightly with number. This is not surprising as the size of the pod dictates the pod husk weight, the latter being strongly correlated with pod weight. It is significant to note that pod weight is significantly negatively correlated with percent pod husk. This is a welcome situation in that the fraction of the husk decreases while that of the nut weight increases with increase in pod weight. It is not surprising that pod length correlated strongly with nut number since the more the number of the nuts within a pod, the longer it should be, if not wider.

Nut Characteristics

The nuts in each pod of *C. nitida* are known to vary in size (weight) and shape (Russell, 1955; Dublin, 1965; van Eijintten, 1969a) depending on factors such as age of the tree, climate and cultural conditions and fertility of the soil. The most striking and vairable feature in *C. nitida* nut is perhaps the colouration of the cotyledons. Voelcker (1935) recognised the existence of three coloures (Red, Pink and White) in *C. nitida*. He found the dark red to be most common and the white comparatively rare. His most striking conlusion was that colour of the nuts may vary from follicle to follicle, from tree to tree and on the same tree, from year to year; and that colour of the nuts is polygenically determined. These observations were in argreement with those of Chamney (1927) who had earlier shown variation in nut colour of *C. nitida* from year to year. However, Chamney (1927) concluded that colour is a function of age and not a Mendelian character. Dublin (1965) and van Eijinatten (1969a) also confirmed the existence of these three colours. But according to Dublin (1965) this division into three colours is quite arbitrary and unrealistic since observation on large number of *C. nitida* nuts revealed that one can pass progressively from a deep red coloured nut to a white or creamish nut, through a range of intermediate colorations. Russell (1955) also recognised the three colours in *C. acuminata* in Nigeria. Dublin (1965), expressing the curiosity of several authors at this phenonmenon of multiple coloration, stated there is no known precedence of this coloration in the plant kingdom. He believed that only *C. nitida* showed the three colours, while other species such as *C. ballayi, C. acuminata* and *C. verticillata* have pink nuts. Russell (1955), however, recognised the three colours in *C. acuminata.*

Russell (1955) recognised *Cola acuminata* to have three to five cotyledons while Kray *et al.* (1960) classified *C. acuminata* as that species of Cola with nuts of 3 to 5 cotlydons but rarely 2 or 6. Ibikunle (1975), while recognising the pleiocotyl nature of *C. acuminata*, found that germination velocity of *C. acuminata* varies with cotyledon numbers; four and five cotyledons giving the best germination rate. In the same report, he found that nuts of 11 - 15g size had the best germinations velocity. In classifying the nuts he used in the experiment into sizes, he found 11.15g class size to have 28.2% frequency, followed by 6 - 10 and 16 - 20g class sizes with 26.3% and 22.4% frequency respectively. The least frequency of 4.5% was recorded for greater than 25g size. However, the number of the nuts considered was rather small (only 1,433 nuts) and the classification was limited to only the nut size, leaving information on cotyledon number and colour distribution blank.

Oladokum (1982b) later worked on the relationships among nut size, cotyledon number and colour of *Cola acuminata* distribution in Southwestern Nigeria. The higlights of findings are hereby presented.

Nut size class 6 - 10g had higest frequency (34.8%) of the whole population of 29,428 nuts investigated. This followed by 11 - 15g size class. In all, about 90% of the whole population fell between 1 and 20g nut wieght, while the average nut weight was 15.3g. On the nut cotyledon number basis, four cotyledon nuts accounted for 59.3% followed by five-cotyledon nuts. More than 95% of the enitre nuts stored out had 3,4 and 5 cotyledons, while the least frequency of 0.5% recorded for only one-cotyledon ("akiriboto" variant). Two Nuts with 7 cotyledons were observed. Pink nuts outstripped the red nuts, while the white nuts had the least frequency.

When the percentage distribution of the nut size with respect to location was considered, it was observed that in all locations, the majority of nuts fell between 1 and 20g size. However, there is a conspicuous difference in size distribution in the nuts procured from Oke Agbe. Here, 11 - 15g size class had the highest frequency followed by 6 - 10 and 16 - 20g size class had the highest frquency followed by 6 - 10 and 16 - 20g size classes respectively.

Except for Ijan Ekiti where three cotyledon nuts ranked second to the four cotyledon nuts, the trend in all the locations is four, five and three cotyledon nuts in decreasing order of abundance. Four-cotyledon nuts accounted for about 60% of the population in all the locations except at Ijan ekiti where 56% was recoded.

Variation in nut colour with location seemed to be much pronouced than experienced with nut size and nut cotyledon number. A similar trend of pink, red and white nuts, in decreasing order of abundance, was displayed by nuts from Ifewara, Oke Agbe, Ondo and Ijebu Imushin. However, red nuts were in the majority at Ijan Ekiti.

The frequency values for the various weight classification indicate that the average nut weight of *C. acuminata* is rather low only very few weighed more than 20g while the average was 15g. Though this value is said to be low, it is similar to 16g reported for *C. nitida* by Russell (1955) and agress with van Eijnatten (1969b) who stated that weight of the *C. nitida* nuts may be up to 100g, but usually varies from 10 – 25g. the percentage distribution with respect to size class was simlar to that reported by Ibikule (1975) although 6 – 10g size recorded the highest frequency as against 11 - 15g size reported by him. The frequency distribution showed a significant variation with locations, and nuts from Oke Agbe tended to be heavier than in other locations.

For the first time, a report is made of one-cotyledon and seven cotyledon nuts. The occurrence of one cotyledon variant (“Akiriboto” variant) is not uncommon in *C. nitida* in the southern part of Nigeria, but it is surprising that such a record did not exist for both *C. nitida* and *C. acuminata* in all the sources of kola taxonomy consulted so far. However, the seven-cotyledon variant is both uncommon and unrecorded in any available literature on kola.

The fact that 3,4 and 5 cotyledon nuts accounted for more than 95% of the entire nuts in this study could be viewed against the germination velocity of the various cotyledon classes as reported by Ibikunle (1975) and confirmed by Oladokun (1985). One can relate the natural selection influence to the frequency distribution, since the most common cotyledon types recorded the fastest germination velocity and percentage.

Colour distribution in *C. acuminata* seems to be the most variable character, with respect to nut size cotyledon number and location. This agrees with van Eijnatten (1969b) who stated that the most obvious variation in the nuts lies in their colour. Colour categorization may appear as simple as to say Red, Pink and White but the graduation of colour intensity from white to dark red shows a streamlined pattern that makes the creation of colour demarcation a difficult task. Thus, the wide range and graduality of colour intensity variation makes classification somewhat difficult and subjective. It tends to make such a classification favour pink as reported by van Eijnatten (1969a).

Its variability suggests that colour variation in *C. acuminata* may not after all be a Mendelian character in agreement with Chamney (1927) working with *C. nitida* in Ghana. If, however, it is a Mendelian character, Voelcker's (1935) conclusion that colour in *C. nitida* is determined by a number of genes, which is itself no doubt complex, may be considered appropriate.

The existence of the three colours, red, pink and white, in *C. acuminata*, while disagreeing with Dublin (1965) that only *C. nitida* shows the three colours, agrees with Russell (1955) who reported the same phenomenon in *C. acuminata* in Nigeria. It is noteworthly to discover that pink nuts were in the majority followed by the red. White nuts conveniently were in the minority. van Eijnatten (1969a) writing on *C. nitida* stated that white nut is recessive to red while the latter is recessive to pink nut. On the basis of the results produced above, it is probable the same thing applies to *C. acuminata*. Oladokun (1985) found that pink nuts recorded the best germination performance in terms of percentage emergence and velocity. Red nuts came second while the white nuts came last. Thus, the influence of genetic colour dominance is manifested in germination ability and is thus understandably manifested in natural selection processes. However, in a later study on *C. nitida* (Oladokun, 1988) it was found that white nuts germinated faster than both red and pink nuts.

KOLA PROPAGATION

The ever increasing demand of kolanuts has led to sustained interest in cultivation of kola as efforts are made to increase both its hectarage as well as production per unit area. This simply means that abundant kola planting materials must be provided as to open up new farms. However, no sooner was such interest generated than it was realized that kola propagation is beset with a nimer of problems which need to be tackled to maximally obtain propagules of the right quantities and qualities at the right time. These problems are both inherent within the plant material itself as well as environmental (Oladokun, 1982c).

Kola is propagated both sexually and asexually. The sexual propagation is through the use of nuts which are sown to raise the seedlings which are eventually transplanted on the field while the asexual or vegetative propagation is through the use of ramets as planting materials. The age long practice by the local farmers is to plant the nuts at stake (directly) in the field where they are subjected to vagaries of weather and other environmental conditions. With the advent of modern methods of farming, seedlings are first raised under intensive care of the nursery conditions till they attain the age of about six to twelve months before transplanting into the field during the early rains (April – June). Also, few farms, especially government or institution owned ones, are established through ramets obtained from rooted cuttings, budding, grafting or marcotting which are also provided with intensive nursery care preparatory to their being transplanted on to the field. In any of these two basic approaches, several factors come into play to determine the degree of success attainable; a good deal of which have prevented timely provision of adequate propagates with desirable characteristics for successful field establishment. Thus the objectives of kola propagation research have been to:

(i) Study and understand the factors that influence kola propagation (sexual and asexual).
(ii) Manipulate such factors to maximize percentage success attainable.
(iii) Enhance the quality, timeliness and quantity of propagules attainable and
(iv) Aid breeding and selection programme for eventual crop improvement.

Sexual Method of Propagation (Germination Studies)

Inherent Factors

Germination of *C. nitida* takes a rather long time, sometimes up to one year to obtain reasonable percentage. Thus non-uniformity and post-harvest dormancy are common features of germination responses in the species. Studies have shown that this post-harvest dormancy is related to the physiological status of the embryo. For example, stored nuts germinate faster and better than the rush nuts a phenomenon, which was explained by the fact that the embryos of stored nuts were much more developed morpho-genetically than the fresh nuts (van Eijnatten, 1966). An investigation carried out by van Eijnatten (1968) further buttresses this finding as immature nuts germinated poorer than the mature ones.

Nut size has been found not to be significant on germination of *C. nitida* nuts though heavier nuts gave rise to faster growing seedling than ligher one (van Eijnatten, 1968). In a much later study, Oladokun (1988) found that nut size and nut colour interacted significantly to influence germination of *C. nitida.*

Biochemical analyses hve shown that total contents (organic and inorganic) within the nuts correlated positively and significantly with nut size, the latter having correlated with percentage germination (Oladokun, 1989). Similarly, mechanical hindrance or “nitida effect” has been implicated for delay in germination of *C. nitida* nuts (Ibikunle and Mackenzie, 1975). This is supported by the fact that parting of the cotyledons before sowing enhanced both the percentage and rate of germination. This was as a result of breaking the adhesive force that held the two cotyledons together thereby removing the mechanical barrier in the way of the embryo as well a allowing better respiration with concomitant physiological activities. Split nuts also germinate easily because part of the embryo usually accompanies each cotyledon though usually not in equal proportions (van Eijnatten, 1968). This also implies that the embryo needs not remain intact for it to grow. Removal of testa and cutting off of part of the cotyledon before sowing also enhanced germination (Ibikunle and Mckenzaie, 1974).

Colour inheritance in kola is rather complex. It is suspected to be under the control of several genes which interplay to produce red or pink or white nutted fruits. Though red colour is dominant to others, white nuts germinate faster than either the red or pink nuts (Oladokun, 1988). The interactions between nut size and colour on germination were significant such that big white nuts germinated better and faster than small red or pink nuts. Ironically, the frequency of white nuts in a given population of *C. nitida* nuts is, in most cases, rather low (7 - 9%) (Oladokun, unpublished). In *C. acuminata*, white nuts are even rare (3 – 4%) (Oladokun 1982b). But on commercial and ceremonial bases, white nuts are preferred to any other colour. Thus a breading or selection programme in favour of white nuts will satisfy both the aesthetic and the propagation requirements of the crop.

Unlike what obtains in *C. nitida*, germination in *C. acuminata* takes relatively shorter period. For example, it takes averagely about six weeks to obtain about seventy percent emergence. Post-harvest dormancy is not particularly charactaristic of this species though pre-sowing storage enhanced germination (Oladokun, 1985). In fact, a substantial amount of germination at times more than 30% is known to take place in the spacies while in storage, even in the absence of water. Nut size effect on gemination was significant (Oladokun, 1985). Nuts in the 11 - 25g size range, which accounts for about 60% of a given population of *C. acuminata* nuts, germinated better and faster than either heavier or lighter nuts. Similarly, the number of cotyledon a particular nut has determines when it will germinate when sown. Three to five cotyledon nuts accounting for over 90% of any give population of *C. acuminata* nuts germinated best and fastest. There was a highly significant interaction between nut size and nut cotyledon number on germination of the nuts such that medium sized nuts (11 - 25g) having four and five cotyledons germinated best and fastest. Two-cotyledon nuts germinated poorest irrespective of size, a phenomenon tagged “nitida effect” (Oladokun, 1985).

In related trials , nutrient content correlated positively and significantly with both nut size and germination percentage but correlation between nutrient content and cotyledon number was not significant (Oladokun, 1989). Since multiple cotyledon enhanced germination of the nuts, it thus means that cotyledon number effect on germination was more physico-chemical than biochemical. The relaxation of the adhesive force, binding one cotyledon to the other, as the cotyledon number increases, readily comes into focus. This Ibikunle (1975) observed that parting of cotyledons was not significant on the germination of *C. acuminata* nuts. The genetical implication of the link between germination performance of nuts with specific weights and cotyledon numbers and their frequency withing any given population of *C. acuminata* nuts cannot be over emphasized.

Nut colour effect was also influential on gemination of the nuts. Pink nuts which account for over 60% of a given population of *C. acuminata* nut germinated best and fastest. White nuts geminated poorest. This is unlike what obtains in *C. nitida* where white nuts germinated best and fastest. White nuts account for less than 4% of a given population of *C. acuminata* nuts. It is pertinent to note here that because of very low frequency of white nuts, it has not been possible to run a three factor experiment testing the interactions effects of nut size, cotyledon number and colour on germination of the nuts. Judging form the linkage between frequency of various categories of nuts and there germination performance, one may end up finding out that pink nuts with four cotyledons weighing between 11 - 25g geminate best and fastest. As in the case of *C. nitida*, white *C. acuminata* nuts enjoy higher preference and thus cost more that the red or pink nuts. Thus there is a need to select and bread for higher proportion of white nuts to satisfy the preferential taste while the physiologists tackle the problem of elevating their germination potential.

Nut orientation influenced germination of the nuts. Inverted nuts geminated best followed by the laterally placed nuts. These with basal placement geminated poorest. However, seedlings from the inverted nuts are mostly deformed while the ones from laterally placed nuts are normal. Cutting off the tip of the nuts as practiced by the farmers enhanced the germination of the nuts while parting the cotyledons did not significantly enhance germination performance. This is not surprising as pleiocotyly nature of the nuts has remove the mechanical barrier created by the force which parting of the cotyledons tends to remove. In an experiment testing the effect of nut size on storability of the nuts, it was observed that the proportion of the nuts that germinated under storage in nut weight ($r \pm 0.98$). As reported for *C. nitida* Oladokun (1982c) successfully germinated split nuts of *C. acuminata*.

Futher studies on morpho physical features of *Cola spp.* and their germination performance by Oladokun and Adedipe (1988) showed that the significant positive correlation recorded for increase in nut dry weight, nut lenght and width, embryo and embryo groove lengths with increase in nut size in both *C. acuminata* and *C. nitida* not only agree with but supplement the findings of van Eijnatten (1966) that embryo and embryo groove lengths increased with nut size in *C. nitida*. It is noteworthy that moisture content decreased with increase in nut size of both species. Mean moisture content for *C. acuminata* was 60.29% while that of *C. nitida* was 55.06%. These values compare favourable with those of *C. nitida* by Ogutuga (1975).

The fact that embryos were longer in *C. acuminata* than in *C. nitida* (0.6cm for *C. acuminata* as against 0.4cm in *C. nitida*) while the values of the ratio of embryo length to embryo-groove length were much higher in *C. acuminata* than in *C. nitida* may account for the differential rate of germination of the nuts of the two species. van Eijnatten (1967) observed that the embryos of stored *C. nitida* nuts were much more developed that those of freshly harvested nuts and that this accounted for stored nuts germination faster than freshly harvested nuts.

Correlating the germination rates with these morpho-physical factors in both species, it was observed that whereas nut size related morpho-physical factors positively influenced germination more in *C. nitida* than in *C. acuminata*, it was the embryo and embryo-groove lengths which apparently influenced germination in the latter. This is because both the embryo length and embryo-groove length are much more dependent on nut size in *C. nitida* than in *C. acuminata*. The size of the embryo is much more critical to germination in *C. nitida* than in *C. acuminata* because it is much smaller in the former than in the latter and will need to develop to the required size before germination can take place hence this condition is apparently satisfied under storage as observed by van Eijnatten (1967). For *C. acuminata* most of the embryos are fully developed and hence commence germination immediately even under storage. Embryo-groove length was much more size dependent in *C. nitida* than in *C. acuminata* and since it provides room for further growth and development of the embryo, it is no surprise, therefore that is was highly significantly and positively correlated with germination rate.

Increase in nut moisture content was much more detrimental to germination in *C. acuminata* than in *C. nitida* as this factor was much more negatively correlated with those factors that critically lead to increase in germination such as embryo length in *C. acuminata* than in *C. nitida.* Also *C. acuminata* nuts contained more moisture than *C. nitida* to the extent that it became detrimental to germination. Oladokun (1986) found that percentage germination in *C. acuminata* increased with nut size under storage conditions in keeping with negative correlation between nut moisture content and nut size.

The fact that on nut cotyledon basis, germination increased with increase in cotyledon number and embroyo length but decreased with embryo-groove length shows that increase in both nut size and cotyledon number jointly influence germination of *C. acuminata* nuts as heavier nuts have bigger embryos, less moisture content and, when combined with higher number of cotyledon, the cotyledons are held together by lower adhesive force leading to easier splitting of the cotyledons and emergence of the radicle. At this point in time, increase in the embryo-groove length is not particularly necessary to influence germination as the embryos have apparently attained the peak of pre-germination growth and development; this is where the importance of the ratio of the embryo length to that of embryo-groove length becomes significant. Where there is difficulty in splitting the possible ameliorative role of hormones and plant growth substances needs to be instigated (Adedipe, 1975; Ashiru, 1969).

Apparently, it is not necessarily the nut length of the embryo-groove length per se which determines germination differences between the two species. The length of the embryo relative to that of the nut, as well as embryo length relative to that of the nut width appear to be important factors in nut germination, as they are indicators of their developmental status. These values were 100% and 60% (respectively) higher in *C. acuminata* than in *C. nitida*, hence the widely observed faster germination in *C. acuminata* than in *C. nitida*. More comparative studies will, however be needed along these lines for better understanding of the basis (es) of differential germination in kola.

Environmental Factors

The first environmental factor tested on germination of *C. nitida* nuts is the medium of sowing. Five different media (sand, sawdust, topsoil and charcoal) have been tested for sowing kolanuts (Clay, 1964a; and van Eijnatten, 1968). There was no significant difference among the various media although topsoil had the highest percentage germination of 84.2% at 156 days after sowing followed by sand. Studies so far have shown that nuts sown at a depth of 2.5 to 5.0cm germinated as well as those sown on the surface but just covered with soil while germination percentage decreased with further increase in depth of sowing (van Eijnatten, 1968). For subsequent seedling growth, a depth shallower than 2.5cm is not advisable. Covering germination trays with 0.06mm thick polythene sheeting and a layer of sack markedly increased germination rate. Use of polythene alone under 60% shade was beneficial but in full sunlight, sacking was a necessary additional covering to prevent lethal temperatures developing in trays (Clays, 1964a). Nuts sown in nursery beds germinated slower than when pre-germinated in trays (van Eijnatten, 1968).

High temperature i.e. above 35^{o}C, was detrimental to germination of the nuts as all the nuts were killed while continuous temperature of 30^{o}C gave the best results (Clay, 1964a; van Eijnatten, 1968; Ibikunle and Mackenzie, 1975). However, increase in temperature, led to retardation in development of the resulting seedlings. Exposure of the nuts for very short periods to a temperature of 60^{o}C. retarded their germination while exposure for longer periods (more than 1 hour) killed the nuts. Reports of the effects of light on germination of *C. nitida* nuts are conflicting. An investigation carried out as early as 1964 showed that illuminated nuts germinated faster and the resulting seedlings grew more rapidly than the ones in the dark (Clay, 1964a). However , five years later, 1969, further investigations showed that high temperature and light did not have direct effect on germination (Ashiru, 1969). Further investigations are needed to resolve these seemingly conflicting results.

Little work has been done on the effects of chemicals, inorganic or organic endogenous or exogenous, on germination of *C. nitida* nuts. Kinetin and Thioureadioxide have been found to enhance germination of the nuts while no significant effect on germination has been recorded for Thiourea (Ashiru, 1969). Ibikunle and Mackenzie (1974) also observed no significant effect of Thiourea on germination of *C. nitida* nuts. Uniformity of germination was enhanced when the nuts were fumigated with phosphine for a period of 18 hours. Pre-sowing soaking of the nuts in water led to higher percentage and faster rate of germination than the control. Synergism occurred between parting of the cotyledons and soaking in water before sowing (Ibikunle and Mackenzie 1974).

Unlike *C. nitida*, not much has been done on the effects of external factors on germination of *C. acuminata* nuts. This has been due to a number of reasons prominent among which is the fact that research on *C. acuminata* as a species is in its infancy compared with *C. nitida* which has been preferentially worked upon. The best temperature range for germination of the nuts is between 25^{o}C and 35^{o}C. with 30^{o}C being better than either 25^{o}C or 35^{o}C. Nuts sown under 10^{o}C and 15^{o}C failed to germinate until their temperatures were raised. Those sown under 40^{o}C were virtually killed (Oladokun, 1985).

Vegetative Propagation

Through kola can be effectively raised through seedlings, the use of vegetative means has been compelled by a number of reason. Kola possesses high level of variability in growth and yield. Vegetative techniques come in handy as a tool for using superior clonal selections for crop production. Secondly, many tropical, tree crops propagated vegetatively, mature early and bear fruits within a few years of establishment (Ashiru, 1974). Kola is cross pollinated and mostly self incompatible. Thus seeds produced are made up of several genetic combinations, some of which may be undesirable. Thus, to maintain the genetic constitution of the parent plants, vegetative propagation is inevitable. Finally, vegetatively propagated trees grow more horizontally than tees raised from seedlings. These architectural qualities lend the trees to easy management, harvesting and maintenance practices.

Under sexual propagation, the two species, *C. nitida* and *C. acuminata* were separately considered. Owing to the fact that *C. acuminata* trees have not been selected, not to talk of breading on the species, very scanty work has been done to vegetatively propagate the species. When this occurred, materials used were usually those fom vigorously growing trees which may not necessarily be high yielders. In fact, the species was always tested along with known clones of *C. nitida* for comparison sake. Thus the approach in this section is to report on the use of several vegetative, propagation techniques on *C. nitida* and, where possible, *C. acuminata*.

Vegatative Propagation by cuttings

Inherent Factors

Early studies on rooting kola by cuttings showed that "rooting took longer than in the case of cacao but occurred eventually in a good proportion of the cutting". Different clones worked upon have been classified into easy and hard rooters based upon their rootability. Cuttings of all ages from one month (unhardened top flush) to nine months (second mature flush from the tip) gave more than 50% rooting while cuttings of three months old wood gave the highest rooting percentage. Cuttings from both *C. nitida* and *C. acuminata* seedlings rooted better than those from adult trees while vigorously growing trees produce cuttings that rooted better than the one from less vigorous trees (Oladokun, 1982c) The number of leaves left on the cuttings determnined rootability of the cuttings while cutting off the apical half of each leaf enhanced rooting in the two spacies. Leaf bud cuttings, which technically, are stem cuttings with considerably reduced stem internodes, were successfully used to root *C. nitida* (Ibikunle and Mckenzie, 1975). Though leaves of both species were used to root kola, only *C. acuminata* leaves developed roots but no shoots. Half leaf cuttings rooted better than whole leaves with upper half performing better than the lower half (Oladokun, 1982c).

Environmental factors

Series of studies revealed that rooting kola through cuttings require high relative humidity, heavy shading and copious watering though free draining. Different rooting media have been tested before fresh sawdust from seasoned hardwork was selected as the ideal rooting medium. Use of mist for rooting kola has been found to be beneficial for the two species pointing to the feasibility of large scale mist-propagation of the crop (Oladokn, 1982a). Hormonal treatment in general has been detrimental to rooting of *C. nitida*, according to Ashiru (1974) while *C. acuminata* cuttings response to hormonal treatments is yet to be known. However, post callus application of indol-butyric acid (IBA) was found to enhance rooting of *C. nitida* (Ibikunle and Mackenzie, 1975).

In the few experiments where *C. acuminata* cuttings were tested along with *C. nitida* clones, the former tended to callus and root better than the latter pointing to the possibility of *C. acuminata* being a better species than *C. nitida* as far as rootability is concerned. This nevertheless requires further investigation.

Vegetative Propagation by Budding

The first attempt at propagation kola through budding was made at Kabba in 1964 (Clay 1964b). A few year later, fresh attempt was made to bud kola using inverted- T and patch budding method. Success recorded in these two attempts was rather low. In the early 70's another attempt was made this time using four methods of budding, namely, patch, flute, ring and "T". The average percentage bud take this time was 49.1% while the effects of the period of budding and methods were not significant (Ashiru and Quarcoo 1971). Hitherto, only one species, *C. nitida*, was being used. In an attempt to obtain dwarf kola, interspecific budding was carried out using *C. acuminata, C. gigantea, C. lepidota, C. millenii* and *C. nitida* (AA231, AA86, L47 and L54) as scions. Rootstocks/Scion interaction occurred as there was bud incompatibility between *C. acuminata* and *C. nitida* as scions on one hand and *C. millenii* as rootstock on the other (Oladokun, 1986). With further studies on its usage, budding may emerge as a useful horticultural technique for rapid multiplication of kola.

Vegetative Propagatin By Marcotting

Though marcotting (aerial layering) is reputed to be rather slow method of vegetative propagation of kola, its use has been treid with success. Application indolbutryic acid (IBA) at various concentrations enhanced root formation (Ashiru and Quarcoo, 1971). To circumbent the drudgery involved in applying aerial layering technique, Oladokun (1986) tried soil layering, a modified form of aerial layering, on two clones of *C. nitida* (AA86 and AA231). Results showed as high as 40% rooting success with AA231 performing better than AA86. Limitations of this method include scarcity of suitable braches that are close to the ground and the seasonal nature of the operation; the technique cannot be used during dry season.

Vegetative Propagation by Grafting

The use of grafting to propagate kola was first tried in Gambia in 1940 only to be followed by another trial at Kabba, Nigeria , in 1964 (Clay, 1964b). Trials did not start on the use of this technique for rooting kola at the Cocoa Research institute of Nigeria until in the late 60's when *C. nitida* seedlings were grafted on to vegetatively propagated flowering AA231 root stocks, using approach grafting. Though the seedlings (scions) grew vigorously, the maturity status of the rootstock did not change their juvenility habit as they continued growing monopodially without producing flowers (Eijnatten, 1969a).

KOLA GROWTH AND YIELD

Germination of kola nuts has been treated above under kola propagation. After germination, kola seedlings continue to grow until maturity when they start to fruit. Just as the nut weight plays some roles in the germination of kola nuts, it also plays a significant role in the growth and development of the seedlings. The relationship between nut weight and the growth performance of *C. acuminata* seedlings was studied by Oladokun (1993). His findings showed that there is a significant correlation between nut weight and all the growth parameter of. *C. acuminata* seedlings. This relationship is therefore indicative of the importance of stored food in seeds of plant whether in the cotyledons or the endosperm. Generally, the amount of these food reserves are usually in direct proportion of seed weight, which, in the study, positively varied with the seedling growth and development. The respective correlation coefficient factors between their nut weight and growth parameters at the end of 32 weeks of observation were: plant height +0.98, stem girth + 0.96 and total dry weight + 099.

The better performance of the seedlings with increase in nut weight in terms of plant height, stem girth, number of leaves, total plant dry weight and growth rates agrees well with the findings of van Eijnatten (1968) who recorded significant positive influence of increasing nut weight on *C. nitida* seedling growth. Calculating correlation coefficients for relationship between nut weigh and seedling height, leaf number and length from the result presented by van Eijnatten (1968), it was discovered that the respective correlation coefficients were + 0.95, + 0.90 and + 0.98. These results compare favourably with the findings on *C. acuminata*.

Germinating nuts are usually planted in baskets or polypots, with a depth of approximately 45cm to allow for proper root development (van Eijnatten, 1969a). While transplanting the seedlings, cotyledons are usually inadvertently dropped off. Studies have shown that the presence of these is essential for the early growth and development of *C. nitida* (Oladokun, 1986) and *C. acuminata* (Oladokun, 1993)

seedlings. This is because they provide reserve food and nutrients for the growing seedlings.
The first obvious difference between a kola seedling and mature tree is in the pattern of growth and canopy. Kola seedling exhibits monopodial growth marked with several flushing periods in a year while the adult tree assumes dome shaped sympodial growth characterized by two main flushing periods in a year. Though in the adult tree, shade is no longer required there is no known quantitative study on the physiological impact of varying light intensities on the adult tree. Kola tree are traditionally grown in the rain forest areas where they form understorey layer. There is a need to carry out studies on water balance or water use efficiency of the crop. Available literature has failed to mention any possibility of the use of irrigation in raising kola in areas of suboptimal water supply. The only indirect evidence of the critical use of the available water by the adult kola is its pattern of leaf flushing and flowering which follow onset of rain (Russel, 1955; Bodard, 1962). Both the intensity and rate of flushing are closely linked to the rate of flowering and fruit yield in kola (Bodard, 1962). In general, there is little or no information on the environmental impact on field growth of kola.

There are three types of flowers produced by kola plant. These are male, female and hermaphroditic flowers. The study of the flowering nature and pattern, inflorescence distribution and type as well as fructification has revealed kola to be a rather variable and complex plant. This area of study is also a very crucial one for any possible kola productivity improvement. For example, buds on mature kola tree may develop into a vegetative shoot or an inflorescence; and it is difficult to determine from appearance of the bud which will be produced (Dublin, 1965).

Inflorescence and flower production in kola vary in terms of sex and sex ratio, spatial and chronological distribution vis-à-vis the overall number of the inflorescence produced and the sex ration complexity (Russel, 1955; Bodard, 1962; Dublin, 1965) as well as species difference. Bodard (1955) pointed out the existence of three types of inflorescence and how they vary with age of plant and location on the plant part.

With respect to time of flowering, both the beginning and end of flowring season are dominated by male flowers while the period in between is either dominated by hermaphroditic flowers or mixed inflorescence (van Eijnatten: 1969a). Main flower production lasts about three months during which time 80.90% of the total number of flower produced emerges. In Nigeria, this is period of August to October for *C. nitida* and January to March for *C. acuminata*. In Zaire, Eijnatten (1977) reported that flowering of *C. acuminata* occurs around November to January of the following year.

The relative advantages and disadvantages of the production of the different flower types, their rations and distributions are not very clear. While younger trees have higher male to hermaphrodite flower ratio, the converse obtains in the older trees.

While some kola trees may have only male flowers, others may have up to 50% of hermaphroditic flowers. The numbers of hermaphroditic flowers per tree is positively correlated with yield (Dublin, 1965). In contrast, Russell (1955) reported that trees with many hermaphroditic flowers had few fruits. These are mere observations whose cause and effects are not known yet; leaving one to wonder what physiological factors govern these peculiar floral characteristics displayed by kola.

The yield of kola nut amounts to less than 0.1% of the potential because of flower bud drop, flower drop, low pollination efficiency, self incompatibility, fruit abortion due to insect attack or physiological abscission, nutrient deficiency and other environmental stresses.

Kola tree starts to lose its production potential first through a great loss in the number of flushes or newly formed branches. This is followed by bud drop which has been reported to be very high (Bodard, 1962). Compounded with these is the report of the same author, Bodard (1962), that only 1% of the opened flowers fruited naturally. The rest was either not pollinated or dropped off, the latter being enhanced by too much rainfall. The chances of fertilization occurring in a successfully pollinated flower are beset by the complexity of self incompatibility and environmental factors. There are no reports yet on the impact of environmental factors on fruit production but studies on pollen grain viability showed that the latter is dependent upon age, time and prevailing environmental conditions. While Russell (19565) reported that self-incompatibility is predominant in Nigerian kola, Bodard (1962) recorded the opposite in Cote d' Ivoire. Self incompatibility accounts for more than 50% of the low productivity in kola. It takes 135 to 150 days from pollination or 120 to 135 days from fertilization to maturity of kola fruit (Oyebade, 1973). Withing this period, quite a lot can and do happen to kola fruits. Considerable fruit abscission (drop) has been reported as early as two weeks after pollination and by the end of the tenth week, fruit drop stops (Russell, 1955; Dublin, 1965; van Eijnatten, 1969a).

There is a need for intensive but systematic physiological study of the reproductive phase of kola tree. Such study must, however, take into consideration some methods being practiced which have been found to improve productivity. These include artifical or controlled pollination, ring or spiral debarking, use of hormones to increase the number and the retention of flowers and modify the sex ratio, and the use of ramets. van Eijnatten (1969) believed that there are physiological limits to the development of the fruit but that they are determined by much more localized factors than the bulk of tree. Studies of the photosynthate translocation and hormonal balance effects on fructification of kola tree are desirable.

CONCLUSION

Above is the account of kola as a plant, its mysticism, its biology, propagation, growth and yield. All the findings point to the fact that more investigations on kola are require particularly the ones dealing with its propagation and yield. It is high time the Government took a bold step in funding research on all our commodity crops. Also, there is a need for the government to take a look at kola trade so as to regularise it. Such a step will yield a lot of foreign exchange for the country as the kolanuts are in high demand as raw material for various industries in foreign countries.

For now, it has not been possible to specifically pinpoint the evolution of kola as a plant. However, one thing is clear, if it is true that life started in Africa and that the legendary Garden of Eden was established by God in this continent, full of fruit trees, kola must have been one of the first trees created by God. Thus the saying by the Igbo that "he who brings kola brings life" has transcendental validity. More research is also needed on kola with respect to its involvement in religious activities as well as the creation of man.

MY LIFE

Mr. Vice Chancellor, Sir, I have come from a humble background. When I say "humble backround" I say it with all sense of responsibility, reflection and presentation. In narrating my life history, I like to begin by expressing my profound gratitude to the foresight of the one and only one Sage, Late Chief Obafemi Awolowo for introducing the Free Primary Education in the old Western Region in 1955. It was this singular act that led to the actualization of the fervent desire of my mother Late Mrs. Olayonu Abike Oladokun who despite the fact that she never had many form of formal or Western Education and poor state of finance, had been nursing the idea of sending me to school. Thus I started my primary school education in 1956.

I remember how I had to work as a butcher attendant, mason attendant, sand digger, firewood collector, etc on weekends and some week days to earn some money necessary to take care of my uniforms, books and other essential things during my school days. The tuition fee, of course, was free!

It was the prediction/recommendation of my primary school Headmaster, Pa. J. Jeboda, and I quote "If this boy is given the opportunity to continue his education through financial support, by 10 years time, he will become a graduate" unquote, which he made before Late Pa Chief T.L. Oyesina, the proprietor and founder of Ibadan Boys High School Group of Schools in December 1960 that earned me Oyesina Scholarship which I utilized for my secondary school education. Though I was unable to obtain my first degree at the dot of 10 years as predicted by Pa. Jeboda, I thank god that at 10 years and six months after, June 1971 to be precise, I was adorned with the hood as one of the graduating students of the University of Ibadan. I am eternally grateful to Pa Jeboda for his abiding interest in me and my career. My gratitude to the Oyesina family is limitless and I pray that Chief Oyesina's soul will continue to rest in eternal peace at the bosom of the Lord. For those of you who may not know, Late Pa Chief T. L. Oyesina's life and time was marked by magnanimity and philanthropy the type of which are rare to find.

I was privileged to rub shoulders and eat on the same table with sons and daughters of the rich, the elites and the expatriate foreigner through the grace of the Day Students Scholarship I won through the entrance examination. This was later converted to full Boarding Scholarship at the International School, Ibadan from 1966 to 1968. That was a time when boarding student fees at the International School, Ibadan, was five hundred pounds compared with about twenty pounds paid in other secondary grammar school. I remember with gratitude the kindness of one of the stewards at the International School, Ibadan, who accommodated me in his one bedroom apartment at Samonda, Ibadan, because of the distance I had to trek between my home at Oke Ado and the University of Ibadan before I finally secured full Boarding Scholarship. For my schooling at the International School, Ibadan, I am very grateful to all my teachers there and then particularly Late Mr. S.D. Snell, the then Principal, and Late Miss Hayward, my House Mistress.

With the admission to the University of Ibadan in 1968, it was by the Grace of Mr. Gillespie, the then Principal of the International School, Ibadan, after Late Mr. S.D. Snell who paid the first deposit of ten pounds to register as a student at the University of Ibadan. Having paid ten pounds deposit the question was how to pay the balance of the fees. As the Lord would have it, the then Commissioner for Education in the then Western State, Dr. V.O.S Olunloyo came out with an order that interview alone should not be used to select Government Scholars. Rather, a statewide examination should be conducted for all the applicants and that only those who did well should be invited for interview. I sat the examination and I was invite for interview. Thus I was able to win the Western Sate, Scholarship which I utilized at the University of Ibadan. It was the African American Institute's African Graduate Fellowship (AFGRAD) that gave me a berth to the University of California, Riverside (UCR) in the United State of America for my master's programme before I finally obtained my Ph.D. through a programme of in-service training at the Cocoa Research Institute of Nigerian (CRIN), Ibadan.

Mr. Vice Chancellor, Sir, I have gone to this extent to prove to all and sundry that I indeed came from a humble beginning. But there is a saying in Yoruba that it is because there is no forum where individuals will meet to compare their level of poverty that we are unable to know whose poverty is more grievous that the other. There were, and in fact, there still are thousands of people with perhaps more heart throbbing experience that mine but who have not been as lucky as I have been. This reminds me of a short poem of mine which says:

What will be will be
What will not will not
It is for man to try
God causes all to be

This is why I am indeed grateful to God for the miraculous ways He has taken to make me what I am today. For those whose cases are much more serious than mine, I pray God Almighty to meet them at the point of their need.

I like to formally thank everyone, dead or alive who made it possible for me to be counted worthy of delivering this inaugural lecture. I am eternally grateful to my mother Mrs. Olayonu Abike Oladokun who laboured and died to get me educated hers was the profound initiative, support, maternal love and care. I thank all my teachers right from primary school to the university notable among them are Pa. J. Jeboda, Late Pa S.O. Ojeniyi, late Mr. S.D. Snell, Mr. J.G. Gillespie, Late Miss Hayward, Pa Akintunde Laseinde, Mr. J.W.Shue, Prof. M.O. Adeniyi and Prof. N.O.A. Adedipe for not only training me but also attending to other necessities of my life. I also want to acknowledge with thanks the supportive and inspirational roles of Prof. and Dr. (Mrs.) S.O. Olarinmoye, Mrs. F.G. Alade, Mrs. Clara Osinulu, Late Pa. A.K. Jaiyesimi, Late Pa (Chief) J. A. Ayorinde, Prof. L. K. Opeke and a number of others too numerous to mention. It took the abiding spirit of philanthropy, benevolence and God's inspiration of all my benefactors to make me what I am today.

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I pray God's guidance and blessings in their lives and future aspirations.

Mr. Vice Chancellor, Sir, permit me to end today's inaugural lecture with a Yoruba poem of mine titled "Eran ni mu ni je idin Obi ni mu ni je kokoro" that is it is the meat that causes one to eat maggot, it is the kola that causes one to eat kola weevil.

ERAN NI MU NI JE IDIN, OBI NI MU NI JE KOKORO.

Ohun a ba fe l'aye ni so ni d'eru
Ohun to a yan l'ayo ni mu ni se ohun ti ko wu ni
Bi ka t'ori isu je epo, ka t'ori epo je isu
Eran ni mu ni je idin, obi ni nu ni je kokoro

Abi e o r'omo ekose ti nroju pe oga oun ran'un n'ise
Se bi e r'omode ti nso tori pe iyawo oga ran l'oja
Oye k'omode to ba fe d'oga l'ola mo wipe
Eran ni mu ni je idin, obi ni mu ni je kokoro

Omo ile iwe ti nroju pe nwon fun u ni ise lo'si ile ko maa roju
Eyi ti nbinu pe asiko faaji ko to ko ronu jinle
Omo ile iwe to ba fe d'oga ile ise, tabi to ba fe di Pofessor
Agaga eyi to fe di asiwaju to se mu yangan lehinwa ola ranti pe
Eran ni mu ni je idin, obi ni mu ni je kokoro

Ailobinrin ki i je ka duro lasan omo araye
Bi tokotaya ba fe ra won tan, a wa d'ogun pakaleke
B'oko s'aise, iyawo le ya boran
Ohun gbogbo a wa di b'oju ki nbenu
Idi eyi lo fi ye ki tpkotaya ranti pe
Eran ni mu ni je idin, obi ni mu ni je kokoro

Bi aye koro to ju jogbo lo
Bi sanmoni tile wu ko lo tinrin to l'oke epe
Ani bi laasigbo omo eda ko jeki o r'okan bale rara
Mo fe bi nyin na, ta lo je so wipe o ya ka lo s' alakeji
Eran ni mu ni je idin, obi ni mu ni je kokoro

Bi Naijiria ti wu ko buru to ka wa epo titi k'agara O da ni
Ki NEPA o pa' na airotele, k'omi o lo fe lai mo iye ojo
Ilu eni ko sai se ilu eni
Okan ile baba eni a si ma fa eniyan

Nitorina lo je ki nwi pe
Eran ni mu ni je idin, obi ni mu ni je kokoro

Bi igbo oro ba di gaga, ti odan oro si di gaga
To be ti alantakun ta'wu di isasun ologbon gbogbo
Nwon a ma wipe enyin agba to je ese 'bi
Esa arayin jo, obi l'eleri oro
Obi leleri oro t'oni omo araaye
Bi e ba de ile ki'e ri ohun mu s'orin ko
Eran ni mu ni je idin, obi ni mu ni je kokoro

Thank you all , for listening

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