

Review

Kolanut production, processing and marketing in the South-eastern states of Nigeria

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Kolanut is an important economic crop in the South Eastern region of Nigeria. However, there were no contiguous kola plantations in the South East, rather each homestead has about 2 to 15 kola trees scattered around the backyard. The land tenure system was observed to be the major constraint to kola production in large scale in the South East. Other limiting factors were poor nutrient status of the South Eastern soils, which have been heavily leached; the long gestation period of kola tree; the characteristic low yield of the crop; various pests, diseases and weeds (epiphytes) ravaging the plant. The non-inclusion of kolanut in the list of graded items for exportation by the Federal Government of Nigeria also contributes to its low production and marketing. Traditional methods of production, processing, storage and marketing peculiar to the South East are discussed.

Key words: Kolanut, production, processing, management, marketing.

INTRODUCTION

Kola (a member of the family Sterculiaceae) is mostly produced in Africa and is cultivated to a large degree in Nigeria, but also in Ghana, Ivory Coast, Brazil and the West Indian Islands (Eijnatten, 1973; Opeke, 1987; Oludemokun, 1983). Annual production from these countries alone is in excess of 250,000 tons, while the world production is about 300,000 tons (Brickell et al., 2002). Two species *Cola nitida* (vent) schott and Endl and *Cola acuminata* (P. Beav) Schott and Endl., are of major economic importance (Oladokun, 1982). *C. nitida*, which is referred to as "the true kola of commerce" has featured in the internal trade of West Africa for a number of centuries (Nzekwu, 1961; Eijnatten, 1969). Kola nuts are a common sight in Nigerian markets, cities and villages. They are often sold by street vendors at bus and train depots. Many Nigerians consume kola nuts regularly, even daily, for the medicinal, stimulating and sustaining properties.

Kola is an important economic cash crop to a significant proportion of Nigerian population who are involved in kola farming, trading and industrial utilization. However, Nigeria accounts for about 70% of the total world production of kolanuts (Quarco, 1973; Jacob, 1973;

Pala, 1976; Oluokun and Oladokun, 1999). The kolanut is used as a masticatory and stimulant in the tropics and has social and traditional significance as it features in many traditional ceremonies in Nigeria. It also has industrial usage in pharmaceuticals, production of soft drinks, wines and in confectionaries (Beaties, 1970; Oguntuga, 1975). The kolanut pod husk, which is a by-product from processing the nut, is widely used for animal feeding because of its high nutritive quality. According to Babatunde and Hamzat (2005), broilers fed with kolanut pod husk meal diets had an outstanding growth performance. The main objective of this paper therefore, is to study the extent of kola production in the South Eastern states with respect to their cultivation, processing, storage and management problems (pests, diseases, weeds etc) associated with it.

TREND IN KOLA PRODUCTION IN SOUTH EASTERN REGION

In the South Eastern region there are no contiguous kola plantations, rather each homestead has about 2-15 kola trees around the family house. The kola tree to the Ibos is a sacred plant; hence it is planted around the house where it will be in constant interaction with the people and the ancestral spirits of their loved ones buried around the compound. The plants are either planted in orchards or

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scattered around the backyard of each compound. The major production states in the South East zone are Abia, Anambra, Ebonyi, Enugu and Imo States, where kolanut trade predominates.

In Nigeria, there is a common saying that "kola is produced in the West by Yorubas, consumed in the North by Hausas and worshiped in the East by Ibos". The South Easterners are more interested in *C. acuminata*, which features prominently in most traditional ceremonies and social functions. But recently due to the high cost of *C. acuminata* (referred to as Ibo kola) and low supply to equate demand, *C. nitida* and *Solanium marvelum* are gradually gaining ground as supplements for *C. acuminata* in social functions. There is a very high demand for *C. acuminata* in the region as each family consumes an average of six nuts a day depending on the number of visitors to a family. However, during ceremonies such as marriages, weddings, coronation, installation of high chiefs and traditional rulers, the consumption rate rises sharply as many nuts will be needed to entertain the guests. The excess of what is consumed locally is reserved for the markets in the Northern Nigeria (Kano, Sokoto, Boronu, Kebbi, Jalingo and Maiduguri etc). The non-establishment of kola plantations in the South Eastern region has been attributed to the densely populated land area and the pattern of land tenure system that exists in these areas. Even where land is available, the long gestation period of kola tree and floral incompatibility problem that drastically reduces yield have discouraged the farmers the more.

KOLA PRODUCTION PROJECTION FOR THE SOUTH EAST

The national proposal for the development of the Nigeria kola industry had it that a total of 540,000 acres (216,000 ha) of kola plantations will be established with proven materials during the period of 1971 to 1985 (FDA, 1973). Of these plantings, it is expected that 120,000 acres (48,000 ha) will represent replanting while 229,000 acres (91,600 ha) will be new plantings on land not previously under kola. The phased project was aimed at increasing the annual production level to 200,000 metric tons by 1985 and beyond (FDA, 1973).

The projected new plantings for the East Central and South East states was a total of 35, 600 acres (14, 240 ha) and 62, 500 acres (25, 000 ha) respectively. It was assumed that the level of production of existing plantings would be more or less constant throughout the period covered by the report and beyond. This assumption according to FDA (1973) was based on the following reasons:

- (i) Kola trees attain peak production at 15 to 20 years from planting.
- (ii) 290,000 acres (116,000 ha) or 91% of existing plantings

are over 20 years old, which means they have at least attained peak production.

(iii) The estimated productive life of kola trees is 70 to 100 years.

(iv) The rehabilitation programme will involve the selective felling and replacement of unproductive or low producing trees, so that total orchard production will be more or less unaffected.

KOLANUT HARVESTING

Harvesting of kolanut in kola growing areas of the South Eastern States is normally done by plucking ripe pod from the trees with the aid of Go-To-Hell, which is usually tied to a long bamboo stick. The farmers also pick the pods that naturally fall to the ground.

KOLANUT PROCESSING AND STORAGE

Cola acuminata

The processing of *C. acuminata* starts by careful examination and sorting out pods infested with weevils, diseases and other deformities, from the healthy pods. The seed coat or testa of the nuts from these healthy pods are removed by soaking the nuts in clean water for 24 h to enhance rotting, after which the nuts are skinned and rinsed in fresh water. The rinsed nuts are collected in wide flat baskets through which excess water drains off before they are kept inside the room where they are maintained under ambient room temperature for a period of three days to cure. Defective/infested nuts are picked out during this curing process that usually involves considerable sweating to reduce the moisture content of the nuts. The nuts are then graded into sizes for proper storage in big sized baskets.

The storage baskets are first lined up with thin transparent nylon sheet followed by a layer of *Newbouldia laevis* leaves placed with the ventral (upper) surface facing downwards in the basket thereby exposing the dorsal (back) surface of the leaves to the nuts. The nuts are carefully placed inside, layer by layer and after each layer *Parkia biglobosa* leaves is spread out evenly on top of the nuts. *N. laevis* leaves are used to cover up the last layer of the nuts, before finally sealing up the whole thing with the first layer of polythene sheet. The baskets are then stored under normal room temperature and relative humidity. The *N. laevis* leaves and the polythene sheets keep the nuts in an air tight condition and prevent desiccation of the nuts, while the *P. biglobosa* leaves was believed to brighten the nuts, thereby giving them a bright coloration which makes them attractive.

The nuts are inspected every eight days during the first few months of storage. The top leaves are removed and

the nuts spread out gently on a mat. Kolanut is noted for its characteristic quick shoot emergence without necessarily coming in contact with any growth medium. Each nut is carefully examined and any emerged shoot is removed with a pin and coated with a film of palm oil to slow down the emergence rate and prevent the splitting of the nuts. Any defective or infested nuts are sorted out during the inspection period. This periodical inspection also helps to prevent the over heating of the nuts. During inspection, the top leaves that have dried and shrunk, are changed. After three months, the inspection period can be extended to between 2 to 3 weeks depending on the quality and condition of the nuts at the last inspection. This cultural method of sorting out deformed and infested nuts during storage ensures maintenance of whole nuts and reduces or eliminates completely chemical usage in storage. The deformed and infested nuts are sometimes processed and sold out immediately, while the wholesome nuts are stored for over 14 months provided processing and handling are carried out with care.

Cola nitida

Rotting of the testa is achieved by keeping the extracted fresh nuts on bare ground (with occasional moistening) and covering with jute bags for 3 to 4 days. The testa of the fresh nuts wret (that is softens) and turn black. The premature nut also matures in this process. Alternatively the testa or seed coat of the fresh nuts are soaked in water for 24 h after which they are skinned, rinsed and collected in baskets to drain off. Defective and infested nuts are sorted out before curing the nuts in flat baskets for 3 days. The nuts are transferred to baskets lined with polythene sheet, followed by sheets of paper (old newspapers) and a layer of fresh leaves of *Tectonia grandis*, or *Marantochola* spp or *Terminalia catapa* (Indian almond), which are replaced during weekly inspection of the nuts. Alternatively the nuts may be stored in jute bags lined with thin transparent polythene sheet, which is in turn lined with a layer of paper and fresh leaves. After two months, the frequency of inspection may be reduced to between 2 to 3 weeks intervals.

KOLA PLANTATION MANAGEMENT PROBLEMS

Kola farmers in the South Eastern region are faced with the problem of pests, diseases, parasitic weeds (epiphytes) and other production problems, which have adversely affected their rate of production.

Pests

Few pests associated with kola production in the South

Eastern Nigeria are:

(a) Ants: Some ants like taylor ants *Oecophylla longinoda* Latl. (Hymenoptera: Formicidae) are observed to weave kola leaves to build nest and scale insect are sometimes harbored in these nests for protection against natural enemies. These ants are both agents of dissemination and sources of inoculum for some pathogens (Olunloyo, 1979). High rate of ant incidence in most cases constitutes great nuisance as they bite the farmers and thus disturb normal cultural work on the farm.

(b) Weevils: The kola weevils *Balanogastriis kolae* and *Sophrorhinus* spp (Coleoptera: Curculionidae) are the most destructive field to store pests of kolanuts in West Africa (Daramola, 1973; 1978). Their destructive activities also extend to the South Eastern Nigeria, where the beetle reduces the shelf life of kolanuts. The curculionids initiate their attack mainly from the field to storage and are therefore referred to as field to store pests. In Nigeria, high levels of infestation have been reported both in the plantations and in storage depending on the sanitary condition of the farm at the time of harvest (Daramola, 1973). The high significant level of weevil damage on stored kolanuts has been attributed to the favourable storage conditions, which encourage continuous development of various instar stages of the kola weevil within field infested nuts (Daramola, 1973; Ivbijaro, 1977; Ojo, 1979).

(c) Stem borers: The kola trees were attacked by some stem borers: *Phosphorous virescens* and *Phosphorous gabonator*. (Coleoptera: Cerambycidae). Trees of various ages were attacked, resulting to severe stunting and malformation on young trees, which often lead to the death of the plant. This makes the establishment of kola plantation very difficult and expensive especially in areas of severe attack by *Phosphorous* spp (Squire and Iwenjora, 1963). Attack on older trees by *Phosphorous* spp does not often result in the death of the trees, but as they are riddled with borers, they barely fruit. They remain living reservoirs for the pests and thus constitute a menace to the neighboring trees (Squire and Iwenjora, 1963).

(d) Termites: Termites (Isoptera: Termitidae) attack the kola roots and trunks. The termites tunnel into roots and stems of kola trees of various ages and introduce the rot pathogen into the plant. This result into destruction of the trees by degradation and general weakening of the stem (Eijnatten, 1965; Libby, 1968).

Diseases

The kola trees are hosts to many field and post harvest

diseases such as brown spot, brown blight, brown root rot and tip blight diseases. The brown spot disease manifests itself through chlorotic spots, which latter becomes dark brown with chlorotic surroundings. The causal agent is *Pestalotia* spp. The heavily infected leaves become dry and latter fall off (Adebayo, 1966). The casual organism for brown blight is *Botryodiplodia theobromae*. It forms small spots of irregular brown discolouration on the leaves, which later become enlarged and cause the leaves to assume a blight appearance. The brown root rot caused by *Armillaria mellea* and *Fomes noxius* causes extensive root decay of kola trees in the field (Odebode and Olunloyo, 1989). The tip blight disease caused by *Phomopsis* spp results in the blackening of young kola leaves tips and their subsequent death at a very tender stage (Odebode and Olunloyo, 1989). The major fungal causing mould and rots of the nuts are *Botrytis* spp; *B. theobromae*; *Paecilomyces variotii*; *Mucor* spp and *Fusarium* spp, which are all known to be favoured by high relative humidity (Adebayo, 1966; Olunloyo, 1979; Agbeniyi and Fawole, 1999; Agbeniyi et al., 2000).

Parasitic weeds / epiphytes

The kola trees were noted to be attacked by some parasitic weeds and epiphytes. The two mistletoes identified with kola trees are *Phragmanthera incana* and *Tapinanthus bangwensis*. During the survey mistletoes were found on a number of kola trees and in some cases they had virtually taken over the foliage of the trees thereby reducing the photosynthetic activities of these trees. The mistletoes are usually transmitted by birds, which feed on the ripe attractive reddish berries. Room (1970, 1971) reported that the birds normally feed on the succulent pericarp of the berries and then drop their sticky seeds on the branches of kola trees where they latter germinate and grow into full mistletoe plant. The epiphyte *Platyserium bifurcatum* is also found on most of the kola tree trunks in this region.

Other problems

The farmers in the South Eastern States are faced with the problem of sterility and incompatibility in kola, as most of their kola trees had not fruited at all or did not fruit heavily in the past few years. This coincided with the earlier observation of Okoloko and Jacob (1971) that many kola grooves in Nigeria contained both productive and unproductive trees. Most of the unproductive trees showed total sterility while some were partially sterile. The varying degree of sterility can be attributed to incompatibility, unavailability of hermaphrodite flowers, lack of effective pollinating agents and interspecific hybrid sterility of *C. nitida* X *C. acuminata* (Okoloko and Jacob,

1971; Jacob, 1973). The long gestation period of the plant has also discouraged farmers in this region from planting kola trees.

Other factor militating against heavy yield from this tree crop includes the poor nutrient status of the soils of South Eastern States which have been heavily leached and are deficient in nitrogen, potassium and phosphorous (N.P.K). This problem however, could be corrected by applying 131 kg N; 21 kg P and 139 kg K per hectare to compensate for nutrient removed from the soil (Ayodele, 1988). Also, there is the problem of lack of appropriate pollinator of the kola tree flowers.

KOLANUT MARKETING

Kolanut has for some hundreds of years served as an important article of trade in Nigeria and other parts of Africa (Nzekwu, 1961). The marketing of kolanut in Nigeria dated back to ancient times especially in the eras of the Ghana, the Shanghai, the Benin and the Kanem Borno Empires (Webster et al., 1967). Kolanut is produced in the Southern part of Nigeria and largely marketed and consumed in the Northern part of Nigeria (Akinbode, 1982). Most of the retailers/farmers sell their products in smaller units such as cups and bowls. There is no standard local price or grading for kolanut in Nigeria, however information on market transaction, especially with reference to price determination, measurements, sizes of nuts as well as quality of nuts/grading are based on mutual knowledge and understanding of the buyers and sellers.

C. nitida is the only kolanut of inter-regional and international trade. Kolanut is exported in substantial quantity to other African countries as well as to Europe and North America, which generate the necessary foreign exchange earnings to Nigerian government (Akinbode, 1982). It was estimated that the internal kolanut market in Nigeria worth about Thirty Million naira (N30,000,000.00), while in 1970, kolanut export fetched USD \$157,500 to Nigerian government (Pala, 1976). The white and bright coloured nuts attract more premium than the red and dull coloured nuts. At Ariam, in Ikwano Local Government Area of Abia State, kolanut is wealth, as it appeared to be at the centre of the business transactions (Olukayode, 2001). The situation is also the same in most rural markets in the South Eastern States.

CONCLUSION

Kola is yet to be granted a full export status by the Federal Government of Nigeria, unlike Cocoa, Coffee, Cashew, Palm kernel, Palm oil and others, which enjoy favorable market prices in the International markets. The official enlistment of kola as one of Nigerians export crops will awaken the interest of farmers in these areas

and encourage the establishment of kola farms. The result from the present study has elucidated the numerous problems encountered in kolanut production in the South Eastern States of Nigeria. There is therefore, the need for Government and Research Institutions with mandate on this crop, to address these problems and make their findings available to kola farmers in form of bulletin, hand bills, farmers guide, or by the use of electronic media as well as Extension Research Liaison Service (ERLS). This will sensitize farmers on improved agricultural techniques of production, processing, storage and marketing of the crop. It will also enhance the establishment and maintenance of kola farms, thereby improving the quantity and quality of kolanuts that will be produced in these areas.

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