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"WHERE HAVE ALL THE FLOWERS GONE?"

TO BE DELIVERED BY
Prof. Mathew Oladejo Akanbi
Ph.D. (Ibadan)
Professor of Forest Entomology

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"WHERE HAVE ALL THE FLOWERS GONE?"

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ON

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BY

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"WHERE HAVE ALL THE FLOWERS GONE?"

The Vice Chancellor Sir, Prof Babatunde Benjamin Adeleke, The Deputy Vice Chancellor, Prof Razaq Olatunde Rom Kalilu; The Provost, College of Medicine; Principal Officers of the University; Deans, Senate Members of the University, My Lords Spiritual and Temporal; My Colleagues, All Staff and Students, Gentlemen of the Press, Distinguished Ladies and Gentlemen.

I feel highly honoured and delighted to deliver this inaugural lecture on behalf of the Faculty of Agricultural Sciences. I most sincerely thank the Vice Chancellor for granting my request to deliver the Lecture today 27th April, 2006. Some say it is too late; others say it is too early, but God says it is time, and who can stop it! "For He has made everything beautiful in His time; He has set the world in their heart, so that no man can find out the work that God made from the beginning to the end", quoting Oraphilip. So as it has been designed by Providence, this lecture is the first in the tenure of Professor B.B. Adeleke who I once again welcome into LAUTECH Community. I heartily congratulate you Sir.

I will like to begin the lecture with a tribute, probably an unusual style, by projecting the image of the foundation Dean of the Faculty of Agricultural Sciences, the late Professor Anthony Afolabi Adegbola of blessed memory, who was an inspiration and mentor to me. As Providence had ordained it, he happened to be my senior-most brother in-

law, a most worthy in-law at that. Some of his kins, including my wife will perhaps recall to memory the year 1972 or thereabout, when I was only about 4 years into marriage with his full-blood sister, who by the grace of God is present here today. There was a family social occasion which necessitated traveling to his home base (Ikorodu). From my inquisitive observation then, that appeared to be the first time many of them would be visiting home. Ibadan had hitherto been home for them! So the visit was historic. Of course, for me, it was novel.

Before that event, I had gradually been building a quiet admiration for this late brother who was fondly addressed as "SAY BROS". So, on one of the nights at Ikorodu, I moved to his wife Mrs. Maria Adegbola and said to her amidst some of the JJCs, "I admire Papa Lanre" (as he was more commonly known) and would like to emulate his noble achievements" This wishful expression came rather spontaneously. It had been heavy in my mind and so I felt totally relieved after I voiced it out. There were all forms of reaction and we all laughed it away. Little did anyone know that it was a premonition in the making. By accident or design, it seemed I was charting a course of life that, even if only apparent, has today re-incarnated a Professor Adegbola, more or less. I pray I will live much longer than this role-model of mine anyway.

It is not over yet. Late Professor Adegbola delivered his inaugural lecture, the title of which is today a well-known expression, even as it is also found in the Holy Book: "ALL FLESH IS GRASS", which translates into a food chain.

The title of my inaugural lecture no doubt takes a cue from the theme of his, even though it is incidental: "WHERE HAVE ALL THE FLOWERS GONE?" There is thus a striking relationship between both titles producing a kind of rhythmical chain as it were!

Mr. Vice Chancellor Sir, distinguished Ladies and Gentlemen, I picked the title of this lecture by happenstance. I don't want to present myself as if I steal things even though it is fashionable occasionally to steal or borrow, I mean in the area of science and technology. Thus I got fascinated by a piece of song when, a long while ago, during one of my travels overseas, this time in Trinidad and Tobago, I picked up this chain scenario. It was from a record album with the following wordings which I here abridge for the purpose of this lecture.
It reads:

"Where have all the FLOWERS gone?
Young girls pick them every one ...
Where have all the YOUNG GIRLS gone?
Gone to soldiers everyone .....
Where have all the SOLDIERS gone?
Gone to the graveyards everyone .....
Where have all the GRAVEYARDS gone?
Gone to FLOWERS everyone.....

Mr. Vice Chancellor Sir, distinguished Ladies and Gentlemen: WHERE HAVE ALL THE FLOWERS GONE? The answer to this question this time around is: All the flowers have gone into HONEY. This readily suggests the culturing

of the honeybee, the science of apiculture, known in common parlance, as be ekeeping.

My task today, Mr. Vice Chancellor is not to teach, or give a lecture to this august audience on beekeeping per se. I am aware many in this auditorium are knowledgeable at various levels of this scientific art. And for those who are either inquisitive or eager to acquire that knowledge, I assure that this lecture will open the avenue to accommodate and satisfy such desires and yearnings because you are sitting right here at the Centre of beekeeping per excellence.

My main task therefore, is to elucidate the ecological relationship between the honeybee, "fondly" but rightfully given a romantic appellation of THE GOLDEN INSECT, and the forest ecosystem within which the honeybee is habitated. I then hope to finally wrap up this lecture under a general purview of economic entomology.

Bees in general, the African honeybee Apis mellifera adansoni which is particularly in focus here, play a crucial role in biodiversity conservation. This implies a direct relationship with environmental protection, a major component of which is forest conservation. These include melliferous plants which are species-specific plants on which the honeybee forages in search of flowers. Honeybees are thus ubiquitous in plant ecosystems and are capable of adaptability to environmental changes.

They are known to be the most efficient pollinators, and hence are classically used by advanced farmers, especially in the industrialized countries to increase the

level of food crop production several-fold. National Agricultural Statistics Service of the United States Department of Agriculture (USDA) reported that 2,500,000 colonies were rented for pollination purposes in 1998, higher by 18.6% than the 2,035,000 in 1989. In money value, the 1989 figure earned $ 9.3 billion and as at year 2000, $ 14.6 billion.

The above scenerio indicates that honeybees are an integral part of modern American agricultural practice. According to USDA estimate, there were 2.9 million colonies in US as at 2000 owned by beekeepers with a minimum of five colonies. Over 2 million of these colonies are on the road annually to pollinate crops, producing honey and beeswax simultaneously. The question: can or will this happen in Nigeria? I belief YES, with but diligent efforts of course.

There is high demand for pure, clean beeswax abroad for enormous use industrially, while the demand for honey is limitless both at the home front and abroad. Beeswax is a by-product from honeycomb which many bee farmers in Nigeria discard out of ignorance. Many Nigerians now know, and indeed it is transparently clear, that honey is an excellent nutritional substitute for sugar. It is also applied in medication. In many ethnic communities honey is required for traditional uses.

Honey is formed from nectar and pollen of only melliferous plants. Pollen is the source of protein while the sugar in nectar is the source of energy. Honeybees suck both and convert them to honey with the aid of enzymes.

made to other minor forest insects with brief description of their host-plant relationships.

PROLOGUE

In Nigeria, and perhaps in some other parts of the world, forestry is regarded by many people, the illiterate and the educated alike, mainly as the exploitation of the natural forests. Such people are only conscious of the fact that Nigeria is blessed with very rich forest land. They are however oblivious of the fact that the forests have been under intensive and indiscriminate exploitation over the years. It is for this major reason, not known to such people, that forestry has had to be supervised under strict scientific management, solidly backed by intensive research. The latter serves as a source of information and guideline in the production and utilization of timber.

There are over 6000 assorted species of suitably and sustainably exploitable Nigerian tree species. Regrettably, attention has been focused on only between 65 - 70 i.e about 1%. Presently, more than 2 million cubic metres of wood is consumed annually. At this rate the high forests would last for perhaps less than 25 years, and for highly valued products, much less! Over 80% of our timber provides raw materials for building construction, furniture, railway sleepers, transmission poles, pulp and paper, plywood veneer, matches, fuel (coal industry), and fuelwood, while the remainder may be exported under very strict regulations. Thus, there is a Nigerian tree species available for every conceivable use into which wood can be put

.....EMPHASIS.

Two situations arise from the foregoing. First, a heavy pressure has been exerted on the naturally occurring "popular" species such as mahogany, iroko, opepe, obeche and others, and today, their availability is seriously threatened and indeed endangered. Secondly, and as a result of this demand, other hitherto lesser-known or lesser-used woods are also in heavy demand. Consequently, the natural forests as a whole have been considerably depleted. Therefore, it has become imperative to afforestate vast areas and regenerate depleted forest lands. This involves extensive establishment with the concomitant management techniques for exotic tree species as well as maintaining the existing fragile natural forests.

Against this background, man-made and natural forests under intensive care are bound to be disturbed, thus off-setting the biological equilibrium. This may often result in detrimental out-break of insect pests among other problems. For example, monoculture is frequently practiced in planted forests and is especially prone to pest outbreak. The protection of man-made and natural forests as well as timber against insect damage is the major concern of the forest entomologist. He has to provide practical and efficacious means of maintaining a suitable balance between the forest which is managed to meet the requirements of the society, and the insect pests of that forest.

I will now treat you to the history of forest entomology in Nigeria. Entomological problems in forestry

were recognized and reported since the early thirties by expatriate professional foresters. Such reports included the menace of the iroko gall bug, Phytolyma sp., and the insect problems of felled trees and lumber. The potential industrial impact of silkworms in Nigerian forestry was recognized even earlier. Some information was published but most observations did not see the light of the day as they were tucked away in files.

Few entomological investigations were carried out in spite of the many recognized situations. Organized research into entomological problems in forestry was thus set up by government in 1962 consequent on the advice of an expatriate forester, Mr. R. W. J. Keay. Accordingly, technical assistance was requested by the then government through the Food and Agricultural Organization (FAO) of the United Nations. Dr. D. C. Eidt of the Canadian Department of Forestry was assigned by the FAO principally to carry out a survey of forest insects in plantations and nurseries in Nigeria. This initiated formal and organized forest entomology in this country. The Forest Insect survey project lasted one year.

Hitherto, the West African Timber Borer Research Unit (WATBRU) based in Kumasi, Ghana, then the Gold Coast, was concerned with wood boring insects in wood and wood products mainly in that country. The work of this Unit was later extended to Nigeria where it initially maintained a skeleton service. Eventually, it became purely a Nigerian undertaking from early 1963 when the Unit was disbanded. Thus, the former WATBRU sub-section directed by Dr.

Hywel Roberts was attached to Nigeria and continued the Insect Survey project until Roberts also left in 1965. So began the evolution of forest entomology in Nigeria, essentially an invaluable spadework in insect survey, concomitant with field collection and rearing of forest insects which formed the nucleus of a standard reference collection for Nigeria.

Within this formative period, the services of Mr. M. G. White was secured through the United Kingdom Technical Assistance (UK/TA) to work specifically on Phytolyma sp (the Iroko gall bug). This was a clear indication of the increasing awareness of the economic impact of insect problems in forestry and the urgent need to find pertinent solutions to them. This insect was one of the first forest pests to be studied in full detail. Subsequently, activities in forest entomology expanded considerably.

FOREST INSECT PROBLEMS

A number of economically important forest insects have since been recognized through continuous survey conducted throughout the country, accompanied by biological evaluation of pest status. Some of these constitute tremendous hazards to tree crop planting programmes in Nigeria. A few of these have been studied in some detail with the primary emphasis on control. These include three most egregious pests of economic importance namely, the mahogany shoot borers (Hypsipyla spp), the iroko gall bug, Phytolyma sp. and the opepe shoot borer Orygmophora mediofoveata. A vivid account of the

distribution, host range and an outline of the biology of the mahogany borers emerged from preliminary studies. This was followed by a short review of that information which showed that certain basic information about the species were unknown. Similarly, further investigation on Phytolyma sp provided valuable knowledge of its relationship with the host Chlorophora (Iroko). This included the results of experiments to control the bug chemically. The experiments however produced mixed results that would be unsatisfactory for large-scale commercial application.

Other aspects of entomology which have received detailed attention included the control of termites on young plantations of exotics, and biological studies of some important timber insects especially beetles. In addition, a few other serious pests have been thoroughly studied with suggestions for their control in established nurseries and plantations. Examples are Diclidophlebia, spp. the psyllid on Obeche (Triplochiton scleroxylon); Phalanta phalanta (Nymphalidae), the defoliator of Populus sp (poplar), and a few others on which useful data have been obtained.

It is clear that generally, too little has been done thus far in the field of forest entomology in Nigeria. The over-riding constraints have been skilled manpower deficit, inadequate equipment, and communication problems with scientists elsewhere. Thus, there has been severe paucity of information on forest insect fauna in general, and on the taxonomy, ecology, biology and economic status in particular. The very few pioneer forest entomologists

concentrated in most cases on the essential survey of pest incidence, distribution and damage, as well as possible methods of control. These efforts have however been highly rewarding and yielded valuable information-base. The information contained essentially all the major and minor insect pests up to 1965. Some of these are also listed and discussed in the catalogue of major plantation pests occurring in the British Commonwealth.

For obvious reasons of time and space, only a few of the major known economic forest insects will be discussed in this lecture. They generally include pests which cause loss of vigour and/or the death of tree crops, the destruction of flowers and seeds, as well as known serious pests of log and sawn timber.

SOME MAJOR FOREST INSECTS

Coleoptera

Beetles are among the worst agents of wood bio-deterioration, especially newly felled logs, freshly sawn timber and wood in use. They are found even during and after drying, and hence in subsequently manufactured wooden materials. Their destructive role in wood in various conditions is sometimes the result of interplay with fungal decay. Thus, structures such as wooden beams, rafters, ceilings, doors, windows and frames, panels, furniture of various types etc. can be extensively damaged by beetles. Such bio-deterioration is a common occurrence in the tropics in general. The coleopterous insects bear direct relevance to the production of honey and its by-products

through injury to forest ecosystems including melliferous plants. They also constitute menace to wooden hive materials

The most destructive of the beetles are found in the families Scolytidae and Platypodidae: these are the ambrosia beetles, also known as pin-hole or shothole beetles. Pinhole borers essentially attack the wood of felled trees, i.e. the sap and heartwood, but not dry wood. They do not feed on wood itself but only tunnel through it to oviposit and cultivate fungi which is their major source of food, hence the description "ambrosia". These fungi require moisture to survive hence the affinity of ambrosia beetles for freshly felled timbers, the moisture content of which may therefore be critical for fungal growth. Apart from the physical degradation which this class of beetles causes, the ambrosia fungi that they cultivate cause dark stains that usually occur around the galleries made by the beetles. These stains devalue such timber and substantial losses may be incurred.

The Platypodidae and Scolytidae contain a number of important economic genera such as Xyleborus, Doliopygus, and Platypus. The platypodids D. conradti Strohm. D. brevis (Strohm.) and P. hintzi Schauf are the most important pinhole borers in Nigeria. Other major but less destructive ones are some of the scolytids such as X.peforans (Wollaston). In general, only a few of these species have been studied in detail.

Most timber are susceptible to the pin-hole beetles, but susceptibility is guided by factors such as climate,

locality, health condition of the tree, time lapse in extraction, influence of bark, storage period, moisture content and width of sapwood. Light hardwoods such as Antiaris africana, Terminalia superba, Daniella ogea. T. scleroxylon, and Mitragyna ciliata are highly susceptible.

On the other hand, seasoned timber, wood in use and other forest products are destroyed by the powder-post beetles (Bostrychidae and Lyctidae). Bostrychid beetles have cylindrical body while the lycitids have a flattened body. Adults and larvae of the bostrychids are found primarily in dry sapwood of hardwoods and softwoods, as well as sawn and seasoned timber with at least moderate starch content. They reduce these to powdery materials, hence the name powder-post beetles. Some of the important ones are Heterobostrychus bruneus Murr., Bostrychoplites cornutus Oliv., and certain species of Xylopertha and Apate. They attack a variety of wood in various conditions. The degree of susceptibility of each host varies with the respective species of borer, and the extent of attack is a factor of climate, locality and starch content.

The lyctidae appear to be less destructive than the bostrychids although both groups are often found together. It has been shown that Lyctus attack is confined to pored timbers, hence all conifers, being non-pored, are non-susceptible. Lyctus africana Lesne and Minthea obsita Woll. are two common lyctid borers in Nigeria. Generally, the presence of the powder-post beetles is often not observed except when damage is more or less at an advanced stage when the powdery substance becomes the

obvious symptoms. Thus, many of these species constitute frequent hazard in quarantine programmes. They are serious menace to furniture and other wooden items in homesteads.

Certain lamiids and cerambicids are also important, the former being more so. For instance, the adults of the longhorn Analeptes trifasciata (Fabricius) (Lamiidae) girdles trees of plant families, such as Anacardiaceae and Bombacaceae, as well as some eucalypts. The weevil, Apion (Catapion) ghanaense Voss (Curculionidae) destroys flowers, fruits and seeds of Triplochiton scleroxylon by feeding inside them. The weevil is known to cause losses of 10 - 85% of the annual seed production of T.scleroxylon in different ecological locations. Another weevil, Pachyonyx sp occurs in the northern parts of Nigeria. The beetle forms galls on Acacia nilotica and these cause tremendous loss of plants.

There is no doubt that attack by beetles at various stages of timber production and their products, tree seedlings, transplants and live trees is a perennial problem in tropical forestry. Beetles are favoured by the very warm and moist climate found in many tropical forests and the amount of wood they destroy annually is enormous. Much information remains to be acquired before such losses can be substantially quantified and then reduced.

Homoptera

While feeding, toxicogenic insects belonging to this Order may inject toxins into plants to which such plants

react in a variety of ways. The most important of such economic pests are in the family Psyllidae. Perhaps the best known is Phytolyma sp. which is a primary pest of one of the popular economic indigenous tree species in tropical Africa, Chlorophora excelsa. In Nigeria, plantations of C. excelsa are difficult or indeed impossible to establish because of the mass of galls formed on young plants. These galls rupture to release the adult insect and the subsequent concomitant infection and decay of the disrupted tissue result in dieback and death of seedlings. The starch in the parenchyma is often totally depleted through persistent attack. The growth-regulating mechanisms may also be affected. Older trees usually outgrow the attack of the psyllid but such trees maintain a population of Phytolyma on their leaves, acting as a reservoir of re-infestation.

Studies have been carried out on this insect in Nigeria and vivid reports given. Investigations have helped to clarify tremendously the hitherto confusing taxonomic status and regional distribution of the psyllid in Africa. However, the problem of Iroko lives on since its earlier recognition. The few natural enemies of the insect do not provide effective biological control, while formulations of systemic insecticides have not produced satisfactory results. However, it may be possible to protect juvenile plants with slow-release biodegradable systemic materials until they attain a predominance of the less susceptible mature foliage.

Obeche (T. scleroxylon) is one of the foremost economic indigenous tree species in Nigeria and renown for

its high export value. Two species of Diclidophlebia are of economic importance because of the serious damage they do to the various stages of Obeche. D. eastopi Vendracek and D. harrisoni Osisanya cause chlorosis, premature shedding of leaves, killing of apical bud and subsequent die-back.

The identity of both species and their biology have been studied. It has been shown that young, un-established seedlings are extremely vulnerable. The severity of attack is independent of insect numbers, but rather, may be due to the effect of toxin.

Isoptera (Termites)

Under natural conditions, most timbers deteriorate at varying degrees and the rate of deterioration depends on the type of timber and the conditions to which they are exposed. The common causes of deterioration are fungi, wood-boring beetles and termites (erroneously called "white ants"). Together, these three agents cause enormous loss of timber and wood in use. These organisms easily cause undesired deterioration to wooden hives which are so far the most popularly used by beekeepers.

Two groups of termites are common in Nigeria, namely dry-wood and the subterranean termites. Dry-wood termites live entirely within wood and the subterranean types live in the ground under mounds constructed by them. The latter do not inhabit dry wood for long because they require some moisture. They are therefore associated with timbers which are in contact with the ground, such as

fencing, transmission and other construction poles.

Generally, termites exhibit a variety of biological habits. Whereas their controversial role in the ecology of forests has been little studied, hence less understood, much attention has been paid to the damage done to live plants. However, cases of severe damage may be as a result of certain predisposing factors such as severe drought, or rarely, a disease. Eucalyptus spp. Tectona grandis (teak) and Cassia spp are a few of the most susceptible species. In Nigeria, 80 - 85% of a large plantation of young E. camaldulensis died within one and a half years of termite attack. Death of the plants was caused by Macrotermes bellicosus [Smeathman] and M natalensis (Haviland).

There are a host of other termite species of which the family Termitidae make up about 80%. All are distributed in forest ecosystems or associated with various forest products. Severe damage to dry wood or seasoned timber causes tremendous losses, and on construction wood, may constitute real danger to life resulting from possible collapse.

Lepidoptera

This order of insects contains perhaps more injurious individual species than any other group. They are largely involved in boring and defoliation of live trees. But the most serious of these in Nigeria are the borers. The most notable of the borers are Hypsipyla (Pyralidae) and related species namely, Catopyla dysophnaea Bradley, Gryroptera roberts Bradley, Cryptoblabes gridiella Milliere, and Pyralis

manihotalis Guenes. Of these, the most widespread and destructive is Hypsipyla known as the 'Mahogany shoot borer'.

Generally the larvae of these pyralids feed on fruits, flowers and the cambium of the members of one sub-family of Meliaceae, the Swietenoideae, except Cedrela odorata, an exotic. The damage they do is extremely serious. They attack the apical shoots of young plants especially as such infestations are often persistent. As a result, host trees become seriously stunted, deformed or are even killed. It has been estimated that 10 years growth might be lost from damage by the Mahogany shoot-borer if plants survived.

The difficulty in timber management caused by these pyralids is not peculiar to Nigeria but exists in nearly all Meliaceae growing countries around the world. In Nigeria, essential knowledge of the taxonomy, the complete biology, seasonal occurrence, ecological relationships and various other information on these species, are lacking. However, some biological information has been obtained. So far the control of the shoot and stem borers has not been holistically practicable because of the persistence of attack, and the elusive nature of the pest, among other factors. Silvicultural techniques employed in attempts to control the pest produced variable results although presently it is the best means to reduce the level of infestation. These methods include the provision of shade by planting mahogany species with nurse crops.

In Nigeria, Nauclea diderrichii and Gmelina arborea are the usual nurse crops used. The application of nurse

crops becomes logical because monoculture stands are usually disposed to a higher degree of attack compared with mixed stands. It is indeed clear that mixed planting of assorted meliaceae species would give added protection. It has also been noted that planting on a good soil usually aided fast growth which also produced especially succulent shoots attractive to the larvae. Apart from the heavy intensity of attack which resulted, such plants produced inferior timber. Therefore it is clear that a soil which promotes relatively slower growth and produces not too succulent shoots, will assist in reducing the viability of larvae and perhaps their numbers.

Control by the application of natural or biotic factors received only cursory attention in Nigeria. A few parasitoids, mostly hymenoptera as well as nematodes have been reared from the larvae. There is no doubt that biological control would be worthwhile but a critical appraisal is essential ab initio.

In India, a complex of natural enemies of various stages of H robusta has been established. It is anticipated that much needed coordination of efforts in the application of natural enemies could be established between Nigeria, India and other affected countries through collaborative efforts. The South American Working Group on Hypsipyla, Turrialba, Costa Rica has assembled considerable information in this respect.

Few other lepidopterous pests are also economically important. Orygmophora mediofoveata Hampson (Noctuidae) is a serious shoot-boring insect of N. diderrichii

(Opepe). Opepe is an important timber tree, which is durable and termite-resistant. It is grown extensively in Nigeria for utilization as timber and poles inter alia, although the damage by this pest tends to discourage investors. Trees in nurseries and transplant beds are most susceptible. Attacked trees are severely dwarfed, malformed, multiple-branched or may even be killed from intense attack. It was found that 30-80% of the plants in transplant beds in parts of western Nigeria were attacked. The impact of the attack by the Opepe shoot borer is shown by the fact that some time ago in Ghana, it was unwise to risk the establishment of Opepe plantation.

Tridesmodes ramiculata Warren is a serious borer of idigbo, Terminalia ivorensis, another important West African timber. This pest attacks terminal shoots and occasionally the stem in nursery and transplant beds throughout the rain forest areas. This was confirmed from surveys which showed that 25-70% of the host plants were attacked in parts of western Nigeria. It was also found that 45-50% loss of growth occurred from severe attacks in some transplants at Ibadan and Sapele.

The nymphalid Phalanta phalanta Drury, is a serious defoliator of Populus spp (poplar). Poplar was introduced into the country mainly for use in the match and match-box industry. Severe attack by the nymphalid adversely affected plant vigour and retarded growth. For control, planting sites, where the weed Tridax procumbens is abundant should be avoided. Otherwise, the use of contact insecticides offered a tolerable method of control.

Epicerura pulveralenta, a notodontid, severely defoliated tree species of the Combretaceae family notably Terminalia ivorensis, T. superba and Anogeissus leiocarpus. The moth is small to medium and generally inconspicuous. The voracious feeding habit of the larvae, usually in clusters, causes deterioration in the physiological condition of the host trees leading to loss in girth increment, as well as vigour. Environmental and biological factors, as well as the application of selective chemicals were identified as inputs which could be manipulated as pest management strategy against the moth.

Orthoptera

Very few orthopteran insects are known to constitute danger to forest trees. The most noteworthy so far is the variegated grasshopper Zonocerus variegatus L. (Pygomorphidae). This grasshopper generally has a wide host range and may completely defoliate seedlings, transplants and older trees of Tectona grandis (teak). It occurs between December and February in derived savannah and the rain forests, although other findings indicated certain peculiarities in the seasonal occurrence of the grasshopper between the north and south of Nigeria. An epizootic of the pest was observed in a clonal nursery of Populus in Ibadan. This should be investigated further for the control of the insect.

Other Insect Pests

There are a number of other minor insect pests with

fluctuating economic status. These, along with the insects described above represent over 7,000 individual specimens comprising some 400 species in 95 families and 8 orders meant for use in teaching, research, and in inter-institutional specimen exchange, and identification.

DISCUSSION

Although some work has been done in the area of forest insect control, most of these involved silvicultural and to a large extent, the conventional chemical control methods. Generally, the use of chemical insecticides in this context, has always been a handy tool in the field of applied research. This is considered to be a necessary evil because applied entomologists, especially those in the tropics, were without alternatives. Unfortunately, the use of chemicals is frequently indiscriminate. We are all aware of the environmental danger of pollution. Besides, we are also familiar with the adverse tendencies resulting from the use of chemicals with regards to insect population dynamics. Fortunately, the situation in this country has not attained such a dimension as to cause great alarm as far as forest insect control by insecticides is concerned. However, it is difficult to predict any future trend in this respect, in view of the increasing level of monocultural practices in forestry and indeed agricultural practices in general, that may cause sudden and widespread insect outbreak. In the circumstance, it appears opportune to embark on more modern and safer control approaches. For example the use of selective, biodegradable pesticides obtainable from the sophistication in modern knowledge of synthetic chemicals will go a long way to preserve non-target and other beneficial organisms (including the now well known golden insect the honeybee) and protect human and livestock as well.

It is generally known that chemicals are almost

indispensable even in the recent innovation known as integrated pest management (IPM). However, adequate care must be taken to employ chemicals which possess satisfactory "ecological selectivity", i.e. using selective systemics rather than the all purpose or a broad-spectrum chemical. To all intent and purposes, pesticides should be applied as "chemicals-with-mission". For instance, slow-release pesticides are control-released from a polymer matrix. The active ingredient is released either by diffusion from the polymer or through degradation of the polymer in which the pesticide is locked.

Evidently, not much has been done so far in the tropics in the application of natural enemies to suppress or control forest insects. In narrow terms, this is the biological method of control which has assumed popularity in more advanced countries. Biological control is no doubt, generally controversial. It is certain that where it has been successful, it was classical and most encouraging, but where it has failed, it has been tantalizing and dismal. Nonetheless, it has to be emphasized that basic research into the possibilities of biological control is pre-requisite to its effective application. That no West African countries have been prominently involved in biological control feasibility study in forestry strongly suggests this necessity. The inherent advantage of biological over chemical control is obvious, both in long and short term considerations. It is strongly suggested that consideration or indeed priority should be given to biological control in any pest research programme.

Even more desirable is integrated pest control approach which utilizes at least any two of the methods known in the field of control. Care must however be taken to ensure that appropriate biocides are used with other major methods. This approach has been described variously as "Modified Spray Programme" as in Nova Scotia in Canada; and "Supervised Pest Control" as it is known in Texas, (U.S.A) and British Columbia, (Canada). Other grey areas in relation to the foregoing include the role of bacteria, fungi, viruses, nematodes, sex attractants, chemosterilants and irradiation, or the use of isotopes in insect control. These areas should pose challenges in pest control studies in Nigeria. It is noteworthy that research efforts have been intensified in the use of botanical pesticides and repellants. Such products are environment-friendly components for integration.

Mr. Vice-Chancellor Sir, distinguished Ladies and Gentlemen, this perhaps is an opportune time to agitate briefly on the question whether in fact entomology as handled in research and higher institutions in this country should be addressed by specialists at narrow levels, namely, in the special fields of insect ecology, taxonomy, biology, population dynamics, biological control, insect pathology, insect physiology, toxicology etc., or be stuffed as it is mostly the case presently by "all purpose" entomologists. Some people think, the latter are better called economic entomologists or applied entomologists. This issue is probably applicable also to other areas of scientific research. A detailed discussion as to the merits in each case

may be windy and extremely lengthy and so it is beyond the scope of this lecture. Certainly it would be a tall order to expect to instantaneously turn entomology research centres in Nigeria into an equivalent of the Forest Entomology and Pathology Laboratory at Sault St. Marie, Canada, or the Forest Products Research Laboratory at Princes Risborough in England, or any of the several Forest Experimental Stations in the United States. Nevertheless, one cannot but be optimistic of considerable improvement in finance and staff quality in the future, which in turn would augur well for research activities in this country.

CONCLUDING REMARKS

Mr. Vice-Chancellor Sir, it is clear that forest entomological research activity has expanded over the years since its initiation, although limitations still occur namely in the paucity of skilled technical staff, necessary equipment and communication problems. In spite of all these, more attention should be devoted to investigations which can establish the status of potential pests. The urgency of such an approach weighs more in countries deeply involved in large-scale regeneration and plantation forests like Nigeria, with the economic aim of managing its wood and indeed non-wood resources such as the honeybee. It is also strongly believed that studies in the biology, ecology, life-history, population composition and

density, etc. are essential areas of research as a back-up, especially, with pests of man-made forests including **MPTs** and orchards, because of the serious havoc they can cause. In addition, research into pests of timber and forest products should be intensified to keep pace with the ever increasing volume of timber trade and wood-in-use. But above all, comprehensive control programmes should be evolved to find the most economic and pertinent solutions to counter the ever-present threat of insects.

Mr. Vice Chancellor Sir, having listened, I believe with rapt attention to this lecture, it is clear that the Center for Honeybee Resources Management and Research has to be re-addressed hence the Center presently housing the Department of Agronomy should be fully applied for its originate purpose. The donor of that center and indeed BAN will be very elated if this is done. Indeed, LAUTECH through the Faculty of Agricultural Sciences in which complex the Center is housed, will more eloquently be stimulated to boost the production and research in honey and its by-products. Donors to this valuable center will no doubt wish to see this happen soonest. The Center has been recognized nationally and internationally. To this end Mr. Vice Chancellor Sir, it will be our joy in the Faculty to see an early actualization of the proposed Faculty complex. This will allow the Center to perform its designated functions.

This lecture suffered three postponements with accompanying embarrassments, the most excruciating being in the year 2000, when it was completely halted. That for me was agonizing, traumatic and stressful. As a

Professor, I have always been fully conscious of the fact that delivering an inaugural lecture is a haulmark, a fulfilling task; it is a precious desire and aspiration to attain the pinacle of ones academic career. I thank the Almighty God that He has made it to happen this day. Now to God be the Glory, it has come in God's own time, and most significantly two days after my birthday .....April 25 2006.

It is most appropriate for me at this juncture to quote a portion of the holy book in Deuteronomy ..... just an excerpt of Moses' song which I strongly believe, has been my guiding pillar of fire. It has fulfilled the perfection of God upon me, and I quote: "He kept me as the apple of His eyes; as an eagle stirreth up her nest, fluttereh over her young, spreadeth abroad her wings, taketh them, beareth them on her wings, **SO THE LORD ALONE DID LEAD ME**, and there was no strange God with me. (So), He made me ride on the high places of the earth, — and He made me to suck **HONEY–"**. My first, and most humble tribute therefore goes to Almighty Father, who Maketh ALL good things possible. To Him be all Glory.

Today, the man who incensed me with greet inspiration is not here with us. For him, it is apt to say:

"Lives of great men all remind us,
We can make our lives sublime,
And departing leave behind us,
Footprints in the sands of time"

May I welcome and salute all the Akanbis', Adegbolas' and Solarins'. They all, supporting, my wife collectively have formed a formidable backbone. The holy

book in Proverbs says: "every wise woman buildeth her house, but the foolish plucketh it down with her hands". They have with a greet deal of understanding, maturity, and unalloyed courage stood firm to build my modest family, even in uncertainties and many times at the height of provocations, for example, long absences. And so, even when I kept searching for "the pearl" of life, my wife kept faith as the home-keeper, by the precepts of the holy book in Psalms which says "wherewithal shall a young man cleanse his way? – by taking heed thereto according to God's words" . At this juncture I wish to show appreciation to God for the blessing of our children, Bimbo (BCOS) and his family, Olawunmi and her family in USA, Olatokunbo and her family in the UK; and Ajibola in M-Tel Benin City. The Lord has caused them to prosper because they obeyed their father and mother as advised in the Holy Book. They had the option not to have done so.

Mr. Vice Chancellor Sir, people have been curious how I have survived the otherwise precarious disposition which made one appeared like a "bachelor" and by all standards, very eligible, in spite of age and position. So have many of my friends, colleagues and associates expressed such curiosity. Many will recall my response: "I have stabilized" I would then add to some of my doubting (Thomas) friends that I am no longer in their group. Ladies and Gentlemen I wish at this juncture to say huge appreciation to those who have benevolently cared for my welfare in various ways visible or invisible.

To all my close friends here present, many of them

from youth, I appreciate your affection, prayer, anxiety and commitment to see me move forward, especially during that period of vicissitude a few years back. To my professional and working colleagues, past and present, here and elsewhere, junior or senior, I give deserved recognition for unquantifiable cooperation. They can attest that I have lived my life based on a philosophy which I took back from the United States during my student days there, which says:

I am not in this world to live up to your expectation
And you are not in this world to live up to mine
You are you and I am I,
But if by chance we come together,
It's beautiful.

Mr. Vice Chancellor Sir, distinguished Ladies and Gentlemen, I am dedicating this lecture to my departed parents who through thick and thin gave me a legacy, a rare opportunity of getting educated in their own days. They had a choice not to have done that! May they continue to rest in God's bosom.

Finally:

When you stand before God to render your
final account, He will not ask you:
How popular you were during life;
How many parties you went to;
How well dressed you were;
How much fun you had for yourself;
How many clubs you belonged to;

How big a bank-account you had
.....BUT.....
He will ask you:
"What did you do for OTHERS?"

Lastly, I wish to give deserved recognition to just every one here present whose life has touched or is dependent on mine in one way or the other, and who has been patiently giving attention to this lecture, THAT MEANS, Mr. Vice Chancellor Sir, Ladies and Gentlemen ..... ALL OF YOU ... and request most kindly that you all rise up and join me to sing this piece to the Glory of God who has been gracious unto us all. If you are not familiar, your spirit is with us:

"Blessed assurance....."

Thank you.

Professor M.O. Akanbi.

Thursday, April 27, 2006.

My nuclear Family

Powder – post Beetles. Fam. Bostrychidae

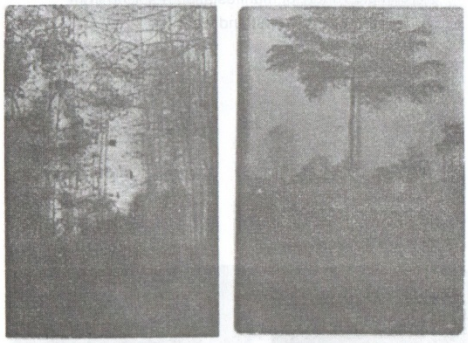
Apate monachus F

The Pinhole Borers. Fam. Platypodidae

Platypus hintzii Schauf

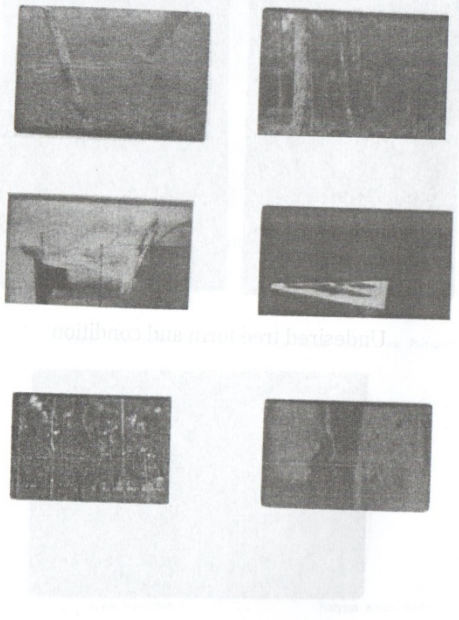
Wood beetles

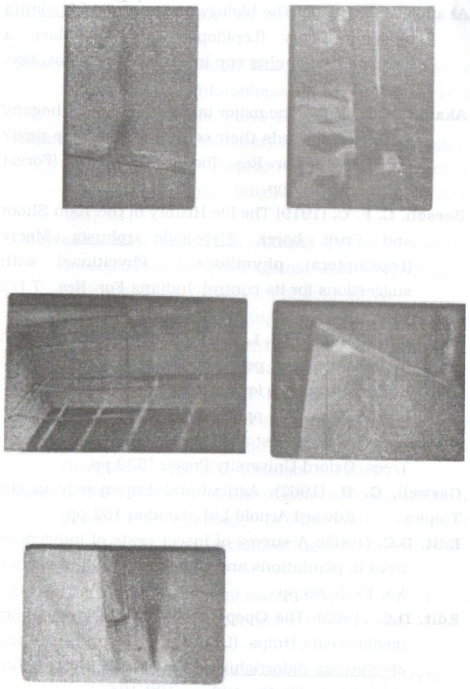
Desired tree form and condition



Undesired tree form and condition

A sample variety of manifestation resulting from damage by forest and wood insects.





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