

# INJURY TO AVENUE TREES IN THE UNIVERSITY OF IBADAN CAMPUS AND THEIR IMPLICATIONS ON WOOD QUALITY PARAMETERS

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## Abstract

This study examined injury on avenue trees within University of Ibadan campus and effect of such injuries on extrinsic wood quality parameters. The University Campus was stratified into cardinal roads and growth variables namely: tree height, diameter at breast height, crown diameter and merchantable height were collected. Data on 314 tree species obtained from 19 major roads were obtained. List of roads, tree species, stem status, types of injury were made and responses of the injured trees observed and recorded. Data obtained were analysed using inferential statistics. *Delonixregia* was most abundant (92.9%) while the least species were *Triplochiton scleroxylon* and *Bridelia micrantha*, (7.1%). Most of the injuries were anthropogenic. The highest rate of injury of 85.7% was observed on Philipson road; while Sankore road had the least of 23.9%. The type of injury were mostly stripping, debarking, and slashing. Most injured species like *Mangifera indica*, *Azadirachta indica*, *Entadrophragma cylindricum* and *Alstonia boonei* were medicinal with combined injury of 88.2% and the bark is most susceptible. Appropriate responses were secretion of exudates and callus formation. Trees closest to residential areas were the most affected. There is need to put in place measures to prevent indiscriminate destruction of these trees.

**Keywords:** Injury to avenue tree, anthropogenic activities, medicinal values, wood quality

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## Introduction

The importance of forest to human race are evident in our food, shelter and clothes; besides these basic needs of man are other sundry values which can qualitatively and quantitatively be valued. These include furniture use for various convenient purposes in homes and offices, the raw materials we depend upon directly or indirectly for provision of employment and the purity and abundance of the air we breathe in. It is not only the human race that benefits from the forest; animals, micro organisms and other plants also depend on the forest for their niches. A forest is made up of grasses, shrub, woody lianas, climbers and predominantly trees. This implies that without trees, there can be no forest. In the last half century, these trees have become domesticated in order to be used for beautification of the environment, provision of shade from direct rays of the sun,

nearness to the industries that make use of wood as raw materials, control of pollution and erosion and recently amelioration of climate change. According to Cahill (1984), each tree to be used has some set of traits or properties which determines its final quality of acceptance as specified by the end user.

Forest management decisions implemented in recent years to increase the volume product and reduce establishment cost are expected to negatively affect the performance of structural lumber through the influence on important wood properties and branch attributes.

In most developing countries, importance of municipal trees management has not been given the desired recognition and this is a major setback, because urban trees have several utilization potentials as standing trees and when felled as timber and this can reduce cost of production of wooden materials (Agbeja and Adesoye 2003).

According to Keslick (2004), a tree is a perennial woody plant with a single main trunk taller than about 2 metres, with xylem tissue in the trunk and branches that continues to enlarge during the life of the plant by the process of secondary growth. Keslick op cit submitted that the definition of tree may be narrower, including only very tall plants or those that could yield significant wood. The definition can instead be broader, including tall plants without secondary growth such as the taller palms and the tree ferns. Bamboo is a tall woody plant that is not usually considered to be a tree.

These trees could have straight boles or branched depending on the type of spacing (narrow for straight boles and wide for branched) given to them at the planting stage as a result of the intended or desired end use (for poles or fruit production) and silvicultural practices (pruning and thinning). Aside from the above implied uses, trees serve a lot of functions for other plants, animals, human beings, water bodies, physical environment and the climate of the region they inhabit.

Trees used for avenue has basic properties which could be any of the following: fast growth, easy adaptation, alternative to forest devastation, resistance to wind, pests and diseases; mechanical and physical properties which affect wood quality and ability to remove effluents. For instance, *Eucalyptus grandis*, one of the common species used as avenue trees in the University of Ibadan is a fast growing tree species (Walker et al 1993), and easily adapt to its environment and has the ability to remove effluents (Coppin, 2002) as evident in its presence in department of Forestry, University of Ibadan, where it is found enroute the wastes dumping ground. It can be used as lumber, moulding and mill work, sliced and rotary peeled veneer, plywood, composite panels, flooring, furniture and engineered wood products (Bradstock, 1981). Many of these avenues trees

suffer a lot of damages as a result of human interference thereby inflicting several types of injury.

Adegeye (2006) described injury as an abnormal physiology caused by a short term interaction of a stress factor with the plant. These stress factors interfere with the normal development of trees and may give room for the invasion of diseases. Tree injury can be caused mainly by biotic factors like parasites, animals (deer, elephants) and abiotic factors like the activities of man (machete cut to obtain the bark of a tree), rainfall, and lightning. Injury to trees could cause several abnormalities and thus affect the quality of wood in trees so affected thereby, affecting their aesthetic value and product devaluation. This study was initiated to investigate the type of injury on avenue trees within University Ibadan campus

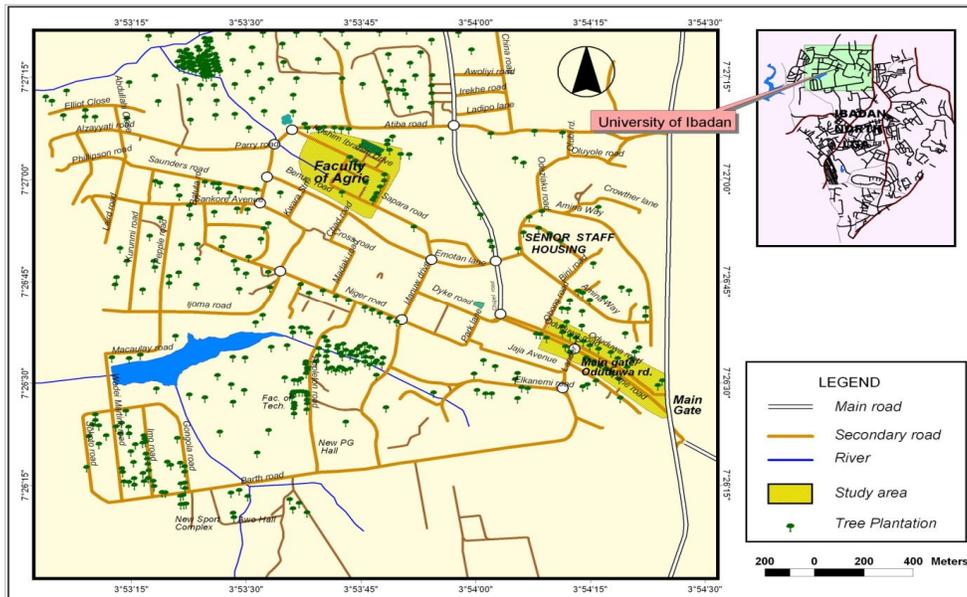
## **Materials and Methods**

### **Materials**

Avenue trees used for this study were obtained from the University of Ibadan founded in 1948 in Ibadan North Local Government Area of Oyo State at Longitude 3°54' E and Latitude 7°26' N.

### **Methods**

The method of data collection employed in the study was the multistage sampling technique. First stage was a random selection of nineteen (19) roads out of a total of thirty-three (33) on a 57.6% sampling intensity. The second stage was the random selection of residential and school areas. Random selections of trees regardless of species or height from one end of the roads to another formed the third stage of the sampling procedure. Finally, the fourth stage was made up of random selection of healthy and all injured trees of the same species on each road as a way of comparing the effect of injury on the tree's growth.



**Figure 1: Map of the University of Ibadan showing main roads and secondary roads from which data was collected on avenue trees.**

### Types of Injury Stripping

This occurs when the bark of trees are peeled from the stem with a sharp object like cutlass, knife or machete usually to obtain saps for laboratory test or other purposes. On such occasion, the trees usually respond by bringing out exudates which may be whitish, transparent, creamy or brownish in colour as can be seen in Plate 1 below. Sometimes the wound are deep to the cambium; other times the tree may be lucky. Trees with wound heal up by the formation of a covering tissue called calluses (Plate 2) which may be protruding in form of a canker or reaction wood. Most tree species affected are *Khayasenegalensis*, *Khayagrandidifolia*, *Terminaliasuperba*, *Alstoniaboonei* and *Terminaliacatappa*. These species were medicinal values that endeared them to the local folks who are privy to information about their usage.

A



Striped Bark in *Terminalia superba*

B



Striped Bark in *Alstonia boonei*

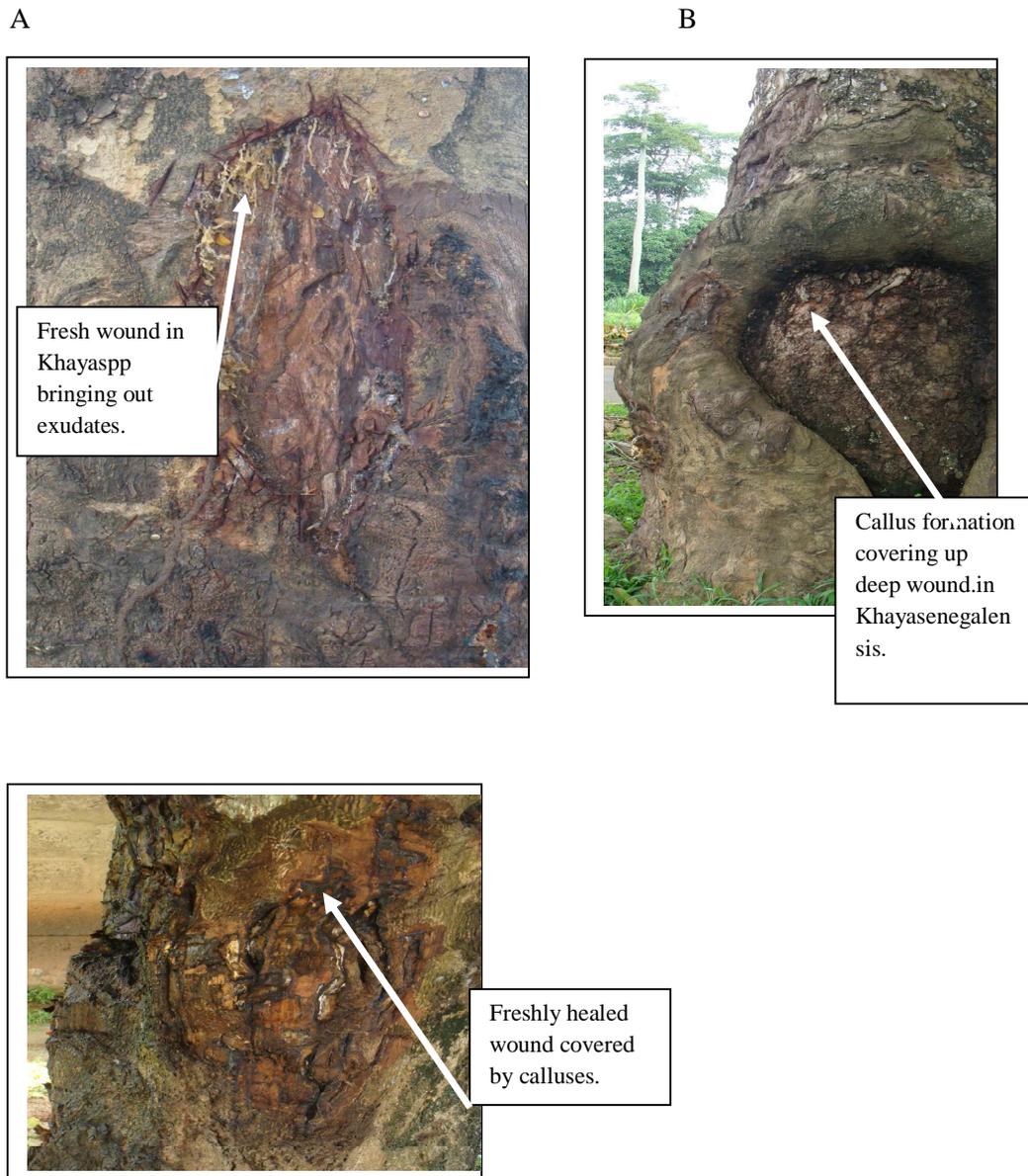


Striped Bark in *Sterculia setigera*



Striped Bark in *Khayasenegalensis*

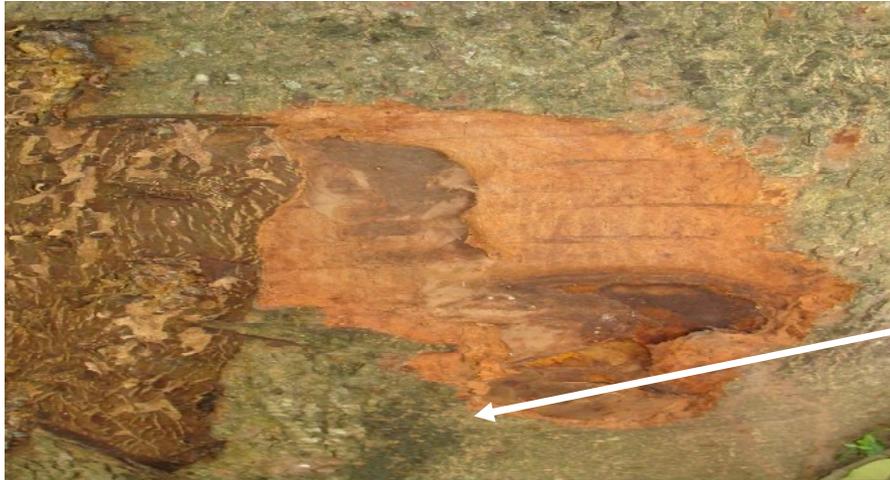
Plate 1: Striped bark in various tree species. (a) *Terminalia superba*. (b) *Alstonia boonei*. (c) *Sterculia setigera*. (d) *Khayasenegalensis*



**Plate 2: Different stages of tree response to wound (stripping) in *Khaya* spp.**

### Laceration

This is a type of tree injury that occurs as a result of multiple slashing on a particular tree as can be seen in Plate 3 below. Sometimes, the cut is deep enough to get to the cambial layer. Exudates are also one of the ways through which trees respond. The wound affects the physiological and developmental processes of the tree in such a way that the height, diameter and other biometric features are directly or indirectly affected. Formation of callus is the ultimate healing process.



Multiple slashing leading to laceration in *Khayasenegalensis*

**Plate 3: Freshly striped Bark of *Khayasenegalensis* after multiple slashing.**

### Result

It is evident that 84.6% of the species sampled as deduced from Figure 2 are injured while 15.4% are healthy. The affected species are *Azadirachta indica* and *Mangifera indica* among others with the bark being the injured part. The affected species were attacked mainly on their bark through stripping and laceration while the tree response includes the formation of calluses and production of exudates as is evident from Plate 1.

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**Figure 2: Graph of Species abundance, healthy and injured trees. Blue bar= total no of species, red bar= no of healthy species and green bar= injured species.**

### Roads and Species Identification.

The most abundant tree species identified was *Delonix regia* as it was found on 86.7% of the roads. This was closely followed by *Albizia saman* and *Newbouldia laevis* with frequency of 73.3% and 60.0% of the sampled roads respectively. The least represented species was *Triplochiton scleroxylon* and *Bridelia micrantha* among others.

**Conclusion**

The University of Ibadan recognizes the important attributes of every tree which is why; it has never for once deviated from its annual greenery exercise. The trees that are used for this exercise are mainly those that have been recognized by the residents to contain medicinal properties and as a result are continually harvested by the local folks. The use of these trees in treatment of various ailments is not a problem as the destructive harvesting of the tree parts especially stem bark. As students advocating for the importance of phytomedicine as opposed to orthodox medicine, we cannot stop people from making use of plant parts for their treatment of ailments but we are concerned about the destructive mode of harvesting that is preventing the trees from reaching their full potentials.

The result of the study carried out showed that the trees closest to residential areas like Philipson road, Parry road, Farm road, Abadina quarters, etc, occupied by the University staff and their families are the most susceptible to these injuries because they are easily accessible. On Africanus Norton road in front of the Chemistry and Computer science Departments, *Khayaspp* were badly injured to the extent of becoming an eyesore. The dastardly acts were carried out mainly in the evenings when there are less students and staff around as was evident in the injured trees found in Forest Resources Department. Trees in enclosed areas were also susceptible as was deduced in trees on Parry roads, Chapel burial ground and other areas. Those trees closest to halls of residence were not so affected as students prefer to see the trees as shade provider, objects of beauty and breathtaking backgrounds for their pictures to the use of trees for medicinal purposes. The major harm done to trees in halls of residence is the throwing of sticks to fell fruits of *Terminaliacatappa*, almond fruits though some students shy away from this act no matter the temptation of eating the fruits.

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