Journal of Natural Sciences Research www.iiste.org
ISSN 2224-3186 (Paper) ISSN 2225-0921 (Online)
Vol.5, No.15, 2015

# Some Useful Nigerian Timbers, Their Destroying Agents and Measures for Their Prevention

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**ABSTRACT**
The main source of supply of traditional Nigerian building timbers such as Iroko, Mahoganies, Obeche, has been from areas outside the forest reserves. As the stocking of timber in these areas become less, it is becoming increasingly difficult to obtain the traditional species. Much longer distances have for example to be travelled to find and take qualities that would have been considered low and inferior only a few years ago. These give rise to high conversion wastes and cost, explain why timber is a very expensive material in Nigeria today. It is only natural that as the sources of supply remain inadequate while the demand for building timbers continue to increase with improving living standards and with no immediate future prospects for relief, those species which are at present considered of no use but are still in plentiful supply and which have been proven by due processes of research to be suitable for certain purposes will come into their own.These study will look into some of the insect attack, fungal attack and other form of wood-decaying agents, names/ scientific name and their economic importance of some timbers commonly found in Nigeria that are of high qualities in the country.
**Keyword:** Traditional timbers, vernacular-names, suitability, availability, destroying agents.

## INTRODUCTION

The suitability of timber for building does not primarily depend only on its working stresses, but also on its natural durability, that is its ability to resist insect attack, fungi attack and other forms of wood decaying agents or where the resistance is low, on the timber being able to permit complete penetration of chemicals which will protect it from these attacks (permeability to complete out impregnation). On its possessing properties which enable it to dry quickly without many cracks and splits and without much warping and other forms of defects and finally on its resistance to shrinking and swelling in service. *(Lewington A. 1991).*

Most timbers under natural conditions will eventually disintegrate the rate depending on the type of timber and on the conditions to which they are exposed. The common causes of deterioration in building and other constructional timbers in Nigeria are decay fungi, termites (white ants) and wood-boring beetles. Tremendous quantities of timbers are destroyed annually by these agents particularly in the humid coastal areas where the very warm and moist climate offers conditions very favourable for their rapid development. *(Oluyege A.O 2005).*

There are, however a few timbers that are naturally resistant to their attack, but the vast majority of commoner timbers with which the forest areas are stocked are susceptible to attack by one or all of these pest. Adequate and appropriate treatment renders these perishable timbers just as resistance and as safe and economic in use *(F.A.O 1986)* as the natural resistance to deterioration and on their resistance to penetration of preservation chemicals.

## FUNGAL ATTACK

Fungi are responsible for the discoloration of timber quite common among the soft woods such as Obeche, Antiaris, Alstonia. They are also the cause of decay. The discolouration caused by fungal attacks is of two kinds. The first known as “stain” discolour not only the sapwood but often also the heart wood. The colour may be most commonly blue or greynish blue, but also black, green, purple, pink or brown. The other type affects only the sapwood and usually occurs as greenish or black or sometimes yellowish growths called Moulds at the surface of timber. Moulds rarely affect the strength of timbers and though they stain the surface, they can easily be brushed off. Stain on the other hand penetrate beneath the surface and cannot easily be removed. It reduces the decorative qualities of timbers and the value of wood where clean bright appearance is required. Decay fungi decompose the wood tissues thereby destroying the strength of the wood and finally reducing it to a crumbling mass. *(Hunn, E.S 2002).*

Among the most dangerous of these, are the fungi that cause “Dry Rot” which attack constructional timbers in poorly ventilated places. Any measures evolved for the prevention of attack must depend for their effectiveness on the elimination of one or some of these conditions. Once timber is attacked no curative measure in useful. Prevention is better than cure.

## TERMITE ATTACK

Termites are insects generally but erroneously called white ants, they are not ants at all. They live in communities and feed principally on wood substance. There are two common groups in Nigeria, dry-wood termites living entirely within the wood and sub-terranean termites living in the ground under earth mounds which they build above the ground. This latter group cannot live for long in wood that is dry because they must have some moisture. They therefore maintain contact with the ground. Timbers in contact with the ground are liable to severe damage by these insects. For this reason timbers in direct contact with the ground such as Fencing timbers, should be treated against attacks. *(Hutclunson J and Dalziel J.M 1972).*

Timbers treated against insect attack should not be refashioned or reconverted to expose fresh surfaces unless these freshly cut-surfaces are re-treated. The heart-wood of a few Nigeria timbers is however relatively resistant to sub-tetranean termites attack in untreated form *(Feder, G. 1979).* Such species include *Albizia ferruginea, Apa, Ayan, Dahoma, Iroko Makore and Opepe.*

## BORING BEETLE ATTACK

There are two types of wood destroying beetles that are so common in Nigeria that they deserve special mention. They are pin-hole borers and powder post beetles. Pin-hole beetles are essentially forest pests attacking the wood (both sap and heart-wood) of felled trees. *(Sodimu A. 1993).* Fortunately they do not attack dried wood. Powder post beetles on the other hand attack seasoned or partially seasoned timber reducing the wood to fine powder.

They attack mainly sapwood and very rarely the heart-wood. Pin hole borers or ambrosia beetles as they are often called do not feed on wood through which they tunnel to lay their eggs and cultivate their food of a fungus on which they and their offspring feed. *(Okali et al1987).* The fungus which is thus grown in the tunnels (hence the second name- Ambrosia) requires moisture to grow they are the cause of the dark stain that usually occur around the tunnels.

Powder-post attack is usually very serious since by the time the attack is detected the damage is already done. Their entrance holes are so extremely small that they are often not visible to the naked eye. The only means of detection of their presence is the wood-dust which they scoop out as they tunnel through the wood. *(Hall J.B 1977).*

## PRESERVATION

The superiority of chemical poisons over other physical methods, as a means of protecting timbers from attack by pests has been stressed in the section. It has also been observe that these destroying agents can attack wood at any stage. There is not much we can do at present about attack on living trees. *(Fuwape, J.A2009).* Preventive measures should therefore start as soon as a tree is felled. Infection by fungi and beetles can be does intact take place within a few days of felling. It is recommended that bark should not be removed from the logs in the bush and that exposed surface of logs should be sprayed or brushed with an insecticide and fungicide immediately after felling. *(F.A.O 2009).*

Extraction and conversion should follow as soon as possible, where they have to be stored for some time before conversion the best method is to submerge the logs completely in water. When this is not possible they should be stored over skids and frequently sprayed with chemicals. It has been found that for most species, spraying once a week is ample. An ideal wood preservative should have the following properties. It should be lethal to both fungi and insects and yet not harmful to those working with it. It should be easy to apply and should readily penetrate the wood tissue; it should remain chemically stable at all times and not be readily removed from treated timber by leaching with water, it should not have any wood destroying property; It should be cheap and easily obtainable , it should not increase the natural infammability of timber, it should be colourless or else it should not impede colouring, staining or polishing of the wood, it should be odourless and it should be non-corrosive to metals. *(Alimi, T and Ayanwale A.B 2004).*

## TYPES OF PRESERVATIVES

The three main types of preservatives that are available are:- (a) Tar oils
(b) Water Soluble Chemical (c) Chemicals Not- soluble in water but soluble in Organic solvents.

i). **Tar oils:** The most commonly used and most well known of this type is **creosote.** It is highly poisonous to fungi and insects and is easy to apply. Its main disadvantages are its dirty colour which stains the wood and therefore cannot be easily painted over. Its best use is in out-door constructional works and for poles and fencing posts.

ii). **Chemicals Soluble in Water:** Among the commonly used chemicals in this class are copper oxide, chromium oxide, and arsenic per oxide (CCA) also salt of zinc, copper, boron, mercury and sodium which are dissolved in water to give a toxic solution. Their main advantage is that they do not stain the wood much and therefore can be painted on. They are cheaper than creosote since they are imported in a solid and less bulky

form. Their one serious disadvantage is that being soluble in water, they can be washed out of the wood by rain. In Nigeria, the following are among chemicals of this type available in the markets: *(i) Mixol 20 (ii) Santobrite (iii) Dowicide (iv) Gammexane (v) Tanalith (vi) Celcure (vii) Atlas A. (viii) Wolmanit.(ix )CCA*

iii). **Chemicals soluble in Organic solvents:** Preservatives in this category contain penta-chlorophenol or chlorinated naphthalenes, dissolved in suitable solvents usually volatile like creosote they are imported in bulky liquid form which makes them expensive. They combine the advantages of creosote with those of the water soluble chemicals and in addition they have deeper penetration into the wood.

**METHODS OF APPLICATION**

There are other very simple methods of application requiring little equipment and which are therefore suitable for general use:-

i) **BRUSHING:-** This method should be regarded as temporary treatment. It does not give lasting protection and should be renewed from time to time. It is suitable for treating logs awaiting transportation and for retreating exposed surfaces of manufactured timber that has been previously impregnated. It is also a good method for renewing treatment of timber in use.

**ii) SPRAYING:** This is a more effective method than brushing. It is suitable for both logs and sawn timber and is the recommended method for renewing treatment of timber stacked for drying. Stacked timber should be sprayed weekly until the timber has dried down to the required moisture content.

**iii) DIPPING:** This consist of immersion for at least 15 seconds of sawn timber in a tank or pit containing the preservative. The longer the timber is kept in the preservatives, the better the penetration. This method gives a more complete coverage than spraying.

**iv) HOT AND COLD TANK PROCESS:** This is a simple method that gives protection approaches that of pressure treatment. It consist in its simplest form of submerging the timber in a bath of hot preservatives and allowing it to cool. While the preservative is hot, moisture and air are driven out of the timber and as it cools the preservatives is drawn into the wood. The total required is about 24hrs i.e 4-6 hours in the hot solution and 16-18 hours in the cold tank.

| S/N | Botanical Name / Scientific Name | Common Nigeria Name | Trade Name | Other Names |
|---|---|---|---|---|
| 1. | *Mitragyna ciliata, stipulosa* | Y - Abura<br>Ibibio-uburu | | Elelom, Subuha |
| 2. | *Terminalia superba* | Benin Egboin-nofua, Ibibio-Edo-ocha Y=Afara | Afara (White) | White afara, Limba limbo Ofram. |
| 3. | *Terminalia ivorensis* | Benin. Egboin-nebi Edoi-Oji Y= Idigbo | Afara (Black) | Black afara Idigbo |
| 4. | *Gossweileinidendron balsamiferum* | Benin = Agba, Achi Yor Loshi-orin | Agba | |
| 5. | *Albizia spp* | Benin- Ekpaghudo<br>Hau:- Nyie avu<br>Yor:- Ayinreta | Albizia | Okuro, pampena |
| 6. | *Alstonia boonei* | Benin: Ukhu; Egbu<br>Yor:- Ahun | Alstonia | Otondo, Stoolwod |
| 7. | *Antiaris Africana* | Benin: Ogiovu<br>Yor: Oro | Antiaris | Ako |
| 8. | *Afzelia spp* | Benin: Arinyan<br>Hau: Kawo<br>Yor:- Apa | Apa | Bilinga, Doussie |
| 9. | *Distemonanthus benthamianus* | Benin: Anyaran<br>Ibibio: Ochasi<br>Yor: Anyan | Ayan | Ayanran, satin-wood |
| 10. | *Berlinia spp* | Benin: Ekpogboi<br>Hau: Dokar rafi<br>Ibibio: Ububa<br>Yor: Apado | Berlinia | Essoule |

| S/N | Botanical Name / Scientific Name | Common Nigeria Name | Trade Name | Other Names |
|---|---|---|---|---|
| 11. | *Canarium schweinfurthii* | Hau: Atile<br>Ibibio: Ubemkpulaku<br>Yor: Origbo | Canarium | Abeul |
| 12. | *Celtis spp* | Benin: Ohia<br>Yor: Ita | Celtis | Esa |
| 13. | *Celba pentandra* | Benin: Okha/Ugbokha<br>Hau: Rimi<br>Ibibio: Eguntun<br>Yor: Araba | Cotton wool | Fromager silk cotton tree |
| 14. | *Piptadeniastrum africanum* | Benin: Ekhemi<br>Hau: Kiriya kurmi<br>Ibibio: Ufi<br>Yor: Agboin | Dahoma | Musese |
| 15. | *Nesogordonia papaverifera* | Benin: Urhuaro<br>Ibibio: Otalo<br>Yor: Otutu | Danta | Redwood |
| 16. | *Lophira alata* | Benin: Eba, Aba<br>Ibibio: Akufo<br>Yor: Ekki | Ekki | Azoba, Iron-wood Iropost |
| 17. | *Ricinodendron heudelotii* | Benin: Okhuen<br>Hau: Wawankurmi<br>Ibibio: Okwe<br>Yor: Erimado | Erimado | Sanga-sanga wana |
| 18. | *Erythrophleum shaveolens* | Benin: Ovinyi<br>Hau: Gwaska<br>Ibibio: Ihi<br>Yor: Erun- Obo | Erun | Tali, Hassanda, Sass-Wood, Missanda |
| 19. | *Combretodendron macrocarpum* | Benin: Owewe<br>Ibibio: Anwunsi<br>Yor: Akasun | Essia | Stinkwood, Minzu |
| 20. | *Entandrophragma angolense* | Benin: Gedunehor<br>Yor: Ijebu | Gedu Nohor | Gedu lohor, Bodongo |
| 21. | *Guarea thompsonii* | Benin: Obobonekwi<br>Yor: Olofun | Guarea (Black) | Pearwood, Diambi, cedar |
| 22. | *Guarea cedrata* | Benin: Obobonofua<br>Yor: Olofun | Guarea (sceated) | Obobo, Bosse, Cedar |
| 23. | *Pycnanthus angolensis* | Benin: Umokhan<br>Ibibio: Akwamili<br>Yor: Akomu | Ilombo | Okuma, lomba, carra-board |
| 24. | *Milicia excelsa* | Benin: Uloko<br>Hau: Loko<br>Ibibio: Oji<br>Yor: Iroko | Iroko | Mvule |
| 25. | *Manilkara multinervis* | Benin: Aganokpe<br>Yor: Oshere | Manilkara | |
| 26. | *Lovoa trichiliodes* | Benin: Apopo<br>Yor: Akoko-Igbo, sida | Walnut (African) | Wood |
| 27. | *Entandropharagma utile* | Benin: Utile<br>Yor: Ijebu | Utile | Nigerian Golden walnut, Alona |
| 28. | *Strombosia postulate* | Benin: Ubelu<br>Yor: Itako | Strombosia | |
| 29. | *Sterculia Oblonga* | Benin: Okoko<br>Ibibio: Ebenebe<br>Yor: Kokoniko | Sterculia (Yellow) | Afina Poe |

| | | | | |
|---|---|---|---|---|
| 30. | *Sterculia rhinopetala* | Benin: Ogiokoko<br>Yor: Aye | Sterculia (red) | |
| **S/N** | **Botanical Name / Scientific Name** | **Common Nigeria Name** | **Trade Name** | **Other Names** |
| 31. | *Nauclei diderichii* | Benin: Ovbiakhe<br>Ibibio: Ubwu, Ubali<br>Yor: Opepe | Opepe | |
| 32. | *Triplochiton scleroxylon* | Benin: Ovbekhe<br>Ibibio: Okpo<br>Yor: Arere | Obeche | White-wood |
| 33. | *Khaya senegalensis* | Benin: Ogwango<br>Yor: Oganwo | Mahogany (Dry Zone) | Orere, Djave |
| 34. | *Daniellia Ogea* | Benin: Oziya<br>Ibibio: Abwa<br>Yor: Ojia | Ogea | Green-heart |
| 35. | *Pterygota macrocarpa* | Benin: Okoko<br>Yor: Oporoporo | Pterygota | Sapeli |
| 36. | *Khaya Ivorensis* | Benin: Ogwango<br>Yor: Oganwo | Mahogany (Lagos) | Lagos wood |
| 37. | *Khaya gradifoliola* | Benin: Ogwango<br>Yor: Oganwo | Mahogany (Benin) | Benin-wood |
| 38. | *Mansonia altissima* | Yor-ofun | Mansonia | Bête |
| 39. | *Scottellia coriacea* | Benin: Emuefuohai<br>Ibibio: Akporo<br>Yor: Odoko | Odoko | Gum-copal |
| 40. | *Entandrophragma cylindricum* | Benin: Ubilesan<br>Yor: Ijebu | Sapele-wood | |

## RECOMMENDATION

1. As a guide to where some of the timber species recommended in this paper, the use guide may be obtained in reasonable quantities.
2. To call the timber user's attention to some of the species that prevent special problems and recommend some means of overcoming them.
3. The timbers that are not durable but are permeable to impregnation are by no means inferior to those that are durable.

## CONCLUSION

The 40 species dealt with in these paper represent only a small proportion of the wide Variety of species one is likely to come across. But they have been selected carefully as being a reasonable representative of many problems that deserve special attention. Most of them have one defect in common and that is they are not durable. Non-durability is therefore not really a serious defect and timbers should never be rejected on this basis alone.

## REFERENCE

*Alimi, T and Ayanwale, A.B (2004):* Economic impacts of chemical pesticides used on Fadama Crop farming in sudano-sahelian Zone" Journal of social science 9: 149-155.

*F.A.O (2009):* Trends and current status of the contribution of forestry sector to national Economics. Available from www. Fao.org.

*F.A.O (1986):* Some medicinal forest of Africa and American. F.A.O forest papers 67 pg 3-5.

*Feder, G. (1979):* Pesticides information and Pest management under Uncertainty Amer. J. Agr. Econ. 61 (2): 97-103.

*Fuwape, J.A (2009):* Forest biomass energy conservation and utilization in Nigeria. In the proceeding of the 1st National conference on forest products society of Nig Vol, 1Pg 154-158.

*Hall, J.B (1977):* Forest types in Nigeria: An analysis of pre-exploitation forest enumeration data. Journal of Ecology 65, 187-199.

*Hunn, E.S (2002):* Evidence for the precocious acquisition of plant knowledge by zapotec children. In Ethnobiology and Bio-cultural Diveroity (Ed.step, J.R, Wyndham, F.S Zarger, R and Athens, G.A)International society of Ethnobiology. Pg 604-613.

*Hutchinson J and Dalziel J.M (1972):* Flora of West Tropical Africa, Vol. 3 part 2, 2nd Ed Crown Agents. London Pg, 517.

*Lewington A. (1991):* Africa, medicinal plants Pg, 135-139.

*Okali, D.U.U and Ola- Adams, B.A (1987):* Tree population changes in treated rainforest at Omo-Forest-Reserve, Nigeria. Journal of Tropical Ecology3, Pg291-313.

*Oluyege A.O (2005):* Socio-Economic importance of forestry in Nigeria. In forest echo, Amaiden publication of the Association of forestry and Wood technology students. Vol 1 pg 17-18.

*Sodimu A. (1993):* The importance of some Forest plant species in pharmaceuticals.

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