HARDWOOD ESSENTIALS

A GUIDE TO GUYANA'S TIMBER SPECIES

Guyana's Hardwoods Are Known For Their Strength, Durability And Reliability

GUYANA'S FOREST

99%

of 18 million hectares intact

ONE OF FOUR

verified High Forest Low Deforestation countries

SECOND HIGHEST

percentage of forest cover on earth

HIGH LEVELS

of biological diversity and endemism

GUYANA'S APPROACH TO DEVELOPMENT

THE LOW CARBON DEVELOPMENT STRATEGY 2030

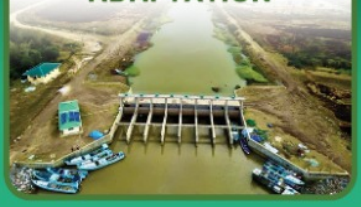
1 CLEAN AND RENEWABLE ENERGY

- WORLD FIRST ISSUANCE OF ART TREES CARBON CREDITS
- INCREASING SOLAR ENERGY BY OVER 173% SINCE 2020, THROUGH THE GUYSOL PROJECT FUNDED FROM CLIMATE FINANCING

2 SUSTAINING LIVELIHOODS

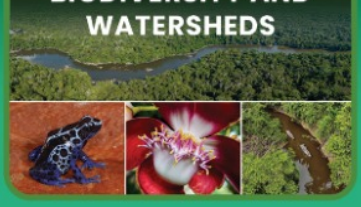
- LEADER ON CLIMATE TRANSPARENCY
- SUPPORTING OVER 800 SUSTAINABLE LIVELIHOOD PROJECTS FINANCED BY CARBON CREDITS REVENUES

3 CLIMATE ADAPTATION



- WORLD'S FIRST SALE OF JURISDICTIONAL CARBON CREDITS

4 PROTECTING FORESTS, BIODIVERSITY AND WATERSHEDS



- WORLD'S FIRST ISSUANCE OF CORSIA ELIGIBLE CREDITS AT JURISDICTIONAL SCALE

PROTECTING FOREST, BIODIVERSITY AND WATER.
ADVANCING CLEAN ENERGY AND ADAPTATION.

Published by:

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Message of
HIS EXCELLENCY, DR MOHAMED IRFAAN ALI
President of the Co-operative Republic of Guyana

PRESERVING NATURE; POWERING PROGRESS

Guyana is renowned for its hardwood timbers. These timbers, of which there are more than 1000 species, are harvested from the country expansive tropical forests which cover more than 87% of the country and which spans some 18.5 million hectares. This world class resource has remained relatively intact through the centuries because of low deforestation and sustainable forestry management . Guyana remains proud of its stewardship of this vital resource which provides valuable ecosystem and environmental services to humanity.

Guyana is protecting and preserving its invaluable natural patrimony. Our groundbreaking Low Carbon Development Strategy 2030 (LCDS) provides a comprehensive framework for sustainable forest management. The LCDS is ensuring that our forests continue to play a vital role in climate change mitigation, while adding value to our timber resources and unlocking the economic potential of our standing forests. Through the sale of carbon credits, Guyana is generating significant financial inflows while maintaining low deforestation levels, demonstrating that environmental stewardship and economic progress can be compatible.

This publication Hardwood Essentials, produced by the Guyana Forestry Commission, showcases Guyana's prized timbers. The magazine also highlights the country's sustainable forestry practices, its promotion of responsible resource management and the economic contributions of our forestry sector.

In this regard, "Hardwood Essentials" is an invaluable resource that offers insights into the distinctive qualities, properties, benefits and applications of the country's timber species. The publication features a thoughtfully curated selection of both well-known and lesser-used species, each with significant aesthetic and functional benefits.

Those who browse or read these pages can be assured of being mesmerized by the extraordinary abundance and wealth of our forest resources, the stunning spectrum of hues, grains, and textures of our timbers, and their impressive durability, strength and density. Hardwood Essentials Magazine invites us to appreciate the unique characteristics of each species while exploring the limitless opportunities they offer.

As we advance towards a low carbon economy, publications such as Hardwood Essentials support our vision of sustainable management and the monetization of our forest resources. I commend the Ministry of Natural Resources and the Guyana Forestry Commission and all those involved in crafting this insightful publication.

I wholeheartedly commend Hardwood Essentials to all readers—whether industry professionals, craftsmen, conservationists, or those simply eager to learn about Guyana's extraordinary forest wealth. May this publication inspire greater appreciation and responsible utilization of our forests.

Let us continue to work together to preserve the rich legacy of Guyana's forests while unlocking their potential to build a sustainable future for all.

Dr Mohamed Irfaan Ali
President of the Cooperative Republic of Guyana

Message from the Minister
Hon. Vickram Bharrat , M.P.

Guyana has one of the best managed forests globally. Over the years, Guyana has implemented strong forest management guidelines and has a strong chain of custody system that's supports the sustainable management of the forest. We have embarked on many national and international initiative such as, signing and ratification of the European Union Forest Law Enforcement Governance and Trade Voluntary Partnership Agreement (EU FLEGT VPA), having in place a Forest Partnership Agreement also with the EU, and more recently Development of the Guyana National Standard for Forest Certification which received the Programme for Forest Certification (PEFC) Endorsement. These Programmes complement our existing guidelines and Codes of Practice. Guyana Strategic vision for Forest and Environmental Stewardship is well elaborated in the Low Carbon Development Strategy 2030.

It is with great pride that I announce the publication of this compilation that is entitled: “Hardwood Essentials: A Guide to Guyana's Timber Species” is a renewed effort by the Ministry of Natural Resources (MNR), the Guyana Forestry Commission (GFC) and the Forest Product Development and Marketing Council (FPDMC) to promote the qualities, uses and benefits of Guyana's vast timber species including the traditional and Lesser Used Species (LUS) thereby encouraging greater diversity in forest products utilization. It will also assist in improving production levels, creating more economic benefits for forest sector operators and the economy as a whole. This initiative aligns with the Low Carbon Development Strategy 2030, which emphasizes the balance between economic development and sustainability.

Guyana's forests are among the most biodiverse in the world, offering an extraordinary array of timber species with unique characteristics and immense potential. While some species have traditionally dominated the market, many lesser used timber species remain unexplored.

Guyana is recognized internationally for its Sustainable Forest Management (SFM) practices which has led to it having one of the lowest deforestation rates, globally. Additionally, Guyana is harvesting well below its Sustainable Annual Allowable Cut. By encouraging the use of lesser used species; it reduces the over reliance on popular species, foster more equitable resource distribution and open new opportunities for value added processing, innovation and export markets.

Over the past decades, the Ministry of Natural Resources (MNR) and the Guyana Forestry Commission (GFC) have been encouraging stakeholders to utilize more of these Lesser Used Species (LUS). Testing on a range of these species were done with reputable international laboratories which pronounce on the suitability of some LUS for internal and some external end use applications.

This guide, along with other guides will serve as an invaluable resource for forestry professionals, entrepreneur, builders or anyone passionate about the sustainable use of Guyana's timber species. As we continue to lead globally in forest management and climate resilience, let us embrace the opportunities this guide provides. It is the fervent hope of the MNR, GFC and FPDMC that stakeholders will start to maximize the application of these wide range of Guyana's timber species inclusive of the LUS.

Together we can foster innovation, expand economic opportunities and ensure that our forests continue to thrive for generations to come.

Vickram Bharrat, MP
Minister of Natural Resources

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INTRODUCTION

Guyana's forestry sector showcases the country's vast natural resources, featuring a diverse range of timber species found in its lush forests. As a key player in the global timber market, Guyana offers many wood species to meet the diverse needs of consumers and industry professionals. To promote these offerings, a comprehensive handbook has been created through a collaboration between the Forest Products Development and Marketing Council and the Guyana Forestry Commission, incorporating insights from industry experts.

This handbook serves as a valuable resource for consumers both local and international such as contractors, carpenters, lumberyard dealers, and prospective homeowners. The handbook provides detailed information on various commercially available timber species as well as lesser-known varieties. It includes thorough descriptions of important properties such as application uses, green density, heartwood color, grain patterns, and texture, enabling users to make informed choices.

The handbook's information can be relied on as it is supported by research conducted by reputable organizations like the Timber Research and Development Association (TRADA) and the Tropenbos International Foundation. By including information on both popular and lesser-utilized species, it encourages stakeholders to explore a broader range of options, enhancing project aesthetics and functionality.

For contractors and carpenters, the detailed information assist with construction and design decisions, while lumberyard dealers can better meet customer needs through informed recommendations. Homeowners also benefit, as the handbook guides them in selecting timber that aligns with their design vision and practical requirements.

Furthermore, the handbook promotes sustainable forestry practices by encouraging the use of lesser-known species, supporting economic growth within the industry. Overall, this handbook enhances understanding and appreciation of Guyana's timber resources, paving the way for a sustainable future in the forestry sector.

EXPLANATORY NOTES

Guyanese Name
The vernacular name used in Guyana and other producing countries

Wood Description
Heartwood - color of the inner most part of the log

Grain - general alignment of fiber (straight, slightly and/or occasionally interlocked, highly and/or frequently interlocked)

Texture - the feel of the grain in the wood

Physical Properties
Air dry density at 12% moisture content (MC)

These values, expressed on g/cm , indicated the possible range or the average wright per volume of wood at 12% moisture. The densitycategory refers to the following classification system:

Very Light: under 0.5 g/cm^3
Light: 0.50 to 0.65 g/cm^3
Medium: 0.65 to 0.80 g/cm^3
Heavy: 0.80 to 0.95 g/cm^3
Very Heavy: over 0.95 g/cm^3

Strength
The strength of a species can be assessed using various methods but in this handbook the general strength is assessed using the modulus of elasticity.

Modulus of Elasticity	N/ mm²
Very High	19,000
High	14,000-19,000
Medium	11,000-14,000
Low	9,000-11,000
Very Low	9,000

OVERVIEW OF THE FORESTRY SECTOR

THE FOREST RESOURCES

The forest of Guyana covers approximately 18 million hectares or 85% of the total land area. Of this area 12.5 million hectares is under State Forest Management. The forest is generally considered tropical moist evergreen rainforest, though represented by various forest types.

The permanent State Forest Estate, which covers some 12.5 million hectares, is administrated by the Guyana Forestry Commission. The remaining forest areas are either Private Property, Community Titled Area, Protected Areas and Forest on State Lands administered by the Guyana Lands and Surveys Commission.

The forests are heterogeneous in nature. About 70 species of timber are utilized commercially on a regular basis and another forty (40) species being extracted in more irregular manner.

The forest land is dissected by many large rivers that provide a means of transporting forest produce to the processing centers. Some of these rivers, however, are very difficult to navigate due to masses of rock outcrops in their channels and periodic low water patterns.

ADMINISTRATION OF FOREST AREAS

Forests are allocated for commercial harvesting under three categories small, medium and large concessions ranging from three years (small) to five and more in the large concession category. Forest products includes logs, lumber, poles, piles and other non timber forest products. To date just over 50% of the State Forest are under allocation for commercial harvesting. The work of GFC is guided by the Forest Legislation, National Forest Plan and Policy, The Low Carbon Development Strategy and other policy documents.

It is important to note that Guyana has a very robust system of forest management and monitoring which is achieved through a very robust chain of custody system and a national log tagging system. These systems ensure utilization is done in a very controlled and sustainable manner.

Guyana has signed a Voluntary Partnership (VPA) with the European Union that promotes legal and sustainable products in the EU and other markets. Guyana has also developed a National Standard that has been endorsed by the Programme for Endorsement of Forest Certification (PEFC).

WOOD PROCESSING OPERATIONS

Guyana has very vibrant down stream and value added processing subsector. There are many sawmills, lumberyards, kiln drying facilities, furniture manufacturer and one plywood factory operating in the value added sub sector.

Some of the products include sawn timber, kiln dried lumber, flooring, shingles, decking, kitchen cabinets, pre fab housing, plywood, house components and furniture.

EXPORTS

Products from the forest and the processing sub sector are utilized locally but a significant volume is also exported. To various international destination.

OVERVIEW OF THE FORESTRY SECTOR

The following products are available for export by producers:

- Logs
- Sawn and Dressed Timber
- Hewn Squares (mainly Greenheart)
- Piling (Greenheart, Kakaralli)
- Poles and Posts (Wallaba)
- Shingles (Wallaba)
- Railway Sleepers
- Charcoal
- Plywood and Veneer
- Furniture
- Non-Timber Forest Products

MARKETING OBJECTIVES OF THE GUYANA FORESTRY COMMISSION

The Guyana Forestry Commission aims to:

- Monitor the marketing and export of timber and forest products
- Maintain quality standards of Guyana's timber exports
- Assist in the development of Guyana's timber industry
- Co-ordinate the international promotion of Guyana's tropical hardwood timber species
- Make information on production and export available to the public

STS SAWMILLS
www.stsguyana.com

AN INDUSTRY LEADER IN

SUSTAINABLE CERTIFIED TIMBER

STS is a Guyanese company, staffed by skilled Guyanese foresters operating throughout the supply chain from harvest, to saw milling, to exports. We work closely with the Guyana Forestry Commission (GFC) and have built a network of commercial partnerships with small, community and large scale foresters across the country to offer our clients unrivaled access to sustainably sourced, FSC™ and PEFC certified tropical timber.

- Timber is a renewable resource
- Timber is Carbon negative
- FSC™ and PEFC certified
- Sustainable forest management while maintaining biodiversity
- STS supports small and community concessions and economies

OUR PRODUCTS

- Marine timbers & piles
- Construction beams timbers
- Boards & planks
- Fencing
- Joinery
- Crane mats
- Pallets
- Round & transmission piles
- Live edge slabs

Species: Greenheart, Purpleheart, Mora, Wallaba, Cowwood, Crabwood, Darina, Kabukalli, Kereti, Locust, Muniridan, Simarupa, Shibadan, Tatabu, Tauroniro, Tonka Bean, Wamara, Waramadang.

FOR MORE INFO

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PEFC

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HARD WOOD SPECIES FOUND IN GUYANA

This booklet presents a selection of commercial and potential commercial timber species found in Guyana. However, it does not claim to be a complete list of all the woods that may have commercial potential in the future. The technical information provided offers a general overview of the characteristics and uses of these particular species. The primary goal is to encourage the utilization of a wider variety of species growing in Guyana's forests.

This publication has been compiled using data from various international research groups focused on Guyanese timbers. It offers concise technical information, including the following details on these species:

a) trade, botanical and other names

b) wood description

c) physical and mechanical properties

d) physical and end use

e) availability for export

QUICK REFERENCE GUIDE FOR COMMON USE

General Use	Recommended Species
Transmission Poles etc.	Shibadan, Manni, Wallaba, Black Kakaralli
Above Water Marine & Bridge Construction	Tatabu, Determa, Mora, Manni, Wallaba.
Agricultural Implementation	Mora, Kabukalli, Aromata, Tatabu
Boat and Ship Construction (Keel & Underwater structural parts)	Greenheart, Mora, Kabukalli, Purpleheart, Black Kakaralli, Morabukea, Burada
Carpentry & General Construction House Framing	Greenheart, Purpleheart, Mora, Kabukalli, Morabukea, Tatabu, Crabwood, Kurokai, Tauroniro, Shibadan, Locust, Determa, Cedar, Manni,Black Kakaralli, Kokoritaballi, Wina Kakaralli,Fukadi, Darina, Limonaballi, Burada, Tonka Bean, Muniridan
Decking	Cedar , Determa, Silverballi
Decorative Veneer & Plywood	Baromalli, Crabwood, Cedar, Tatabu, Aromata, Locust, Hububalli, Silverballi, Dukali, Black Kakaralli, Morabukea, Burada
Finish & Trim	Cedar, Crabwood, Silverballi, Determa
First Grade Furniture and Cabinet Work	Crabwood, Cedar, Tatabu, Purpleheart, Aromata, Tauroniro, Locust, Wamara, Hububalli,Itikiboroballi, Fukadi, Kurokai, Muniridan
Flooring (including heavy duty)	Greenheart, Purpleheart, Tatabu, Aromata, Tauroniro, Shibadan, Locust, Wamara, Mora, Kabukalli, Black Kakaralli, Tonka bean, Morabukea, Kautaballi, Kokoritaballi, Wina Kakaralli,Fukadi, Darina, Suya, Limonaballi, Manni
Frames & Timbers	Cedar, Determa, Silverballi, Futui, Dalli
Heavy Construction	Greenheart, Kabukalli, Mora, Manni, Shibadan, Kokoritaballi, Kauta,Kautaballi, Burada
Interior Trim & Finish	Crabwood, Cedar, Locust, Tatabu, Aromata, Hububalli, Tauroniro, Darina, , Itikiboroballi, Limonaballi, Fukadi, Manni, Suya, Maho, Muniridan, Korokororo, Wadara, Futui, Dalli, Duka
Millwork	Crabwood, Cedar, Determa, Kurokai, Tauroniro, Shibadan, Locust

QUICK REFERENCE GUIDE FOR COMMON USE

General Use	Recommended Species
Musical Instruments	Cedar, Silverballi, Letterwood, Itikiboroballi
Railroad Crossties	Greenheart, Mora, Manni, Kabukalli
Shingles	Wallaba,Kauta
Sporting & Athletic Items	Cedar, Locust, Purpleheart, Wamara
Tool Handles	Crabwood Tatabu, Determa, Tauroniro, Locust, Aromata, Purpleheart, Limonaballi, Cow wood
Turning	Crabwood Tatabu, Determa, Tauroniro, Locust, Aromata, Purpleheart, Limonaballi, Cow wood
Underwater Marine Piling and Construction	Greenheart, Kakaralli, Kauta, Kautaballi
Utility Grade Furniture and Cabinet Work	Determa, Simarupa, Kurokai, Shibadan, Kabukalli, Mora, Manni, Burada ,Manni, Suya, Kurokai, Korokororo, Wadara
Utility Veneer & Plywood	Baromalli, Crabwood, Haiariballi, Silverballi, Simarupa, Dukali, Cedar, Manni, Suya, Maho, Iteballi

FORESTRY TRAINING CENTRE INC.


FORESTRY TRAINING CENTRE INC
"Promoting Sustainable Forest Management through training in Reduced Impact Logging"
AN ASSOCIATE BODY OF THE GUYANA FORESTRY COMMISSION
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Density of Species
Organized by Weight Categories

Density Category	Species	Density g/cm^3
Very Light *Under 0.50 g/cm³*	Duka	0.40
	Simarupa	0.41
	Ocotea oblonga (Silverballi)	0.42
	Futui	0.43
	Red Cedar	0.44
	Dalli	0.46
Light *0.50 to 0.65 g/cm³*	Haiariballi	0.51
	Dukali	0.52
	Iteballi	0.58
	Aniba hypoglauca (Silverballi)	0.59
	Baromalli	0.60
	Wadara	0.62
	Korokororo	0.62
	Ocotea glomerata (Silverballi)	0.63
	Maho	0.64
	Kurokai	0.64
	Determa	0.66
Medium *0.65 to 0.80 g/cm³*	Crabwood	0.67
	Hububalli	0.68
	Suya	0.71
	Muniridan	0.72
	Mann	0.72
	Darina	0.75
	Cow Wood	0.80
Heavy *0.80 to 0.95 g/cm³*	Fukadi	0.84
	Purpleheart	0.84
	Kabukalli	0.84
	Soft Wallaba	0.86
	Wina Kakaralli	0.86-0.96
	Locust	0.88
	Burada	0.89
	Itikiboroballi	0.89
	Shibidan	0.91
	Tatabu	0.91
	Sarebebballi	0.92
	Limonaballi	0.95
	Tauroniro	0.95

Density of Species
Organized by Weight Categories

Density Category	Species	Density g/cm^3
Heavy *0.80 to 0.95 g/cm³*	Aromata	0.96
	Greenheart	0.97
	Mora	0.99
Very Heavy *Over 0.95 g/cm³*	Morabukea	1.03
	Kauta	1.03
	Kautaballi	1.03
	Wamara	1.06
	Black Kakaralli	1.07
	Kokoritaballi	1.07-1.33
	Tonka Bean	1.07
	Licaria Canella (Silverballi)	1.11

CATEGORY ONE

Very Light Density Species

Common Name	Botanical/ Scientific Name	Density g/cm ^{3}
Duka	*Tapirira marchandii*	0.40
Simarupa	*Quassia simarouba L.f.*	0.41
Ocotea oblonga (Silverballi)	*Ocotea oblonga*	0.42
Futui	*Buchenavia fanshawei Exell*	0.43
Red Cedar	*Juniperus virginiana*	0.44
Dalli	*Virola spp*	0.46

DUKA

Air Dry Density at 12% Moisture Content: 0.40-0.48*

Heartwood: Off White to Pale Cream Pinkish

Grain: Straight

Texture: Fairly Fine

Density Catagory : Very Light

Application: Used locally for Interior Construction, Upholstered Furniture framing, Boxes, Plywood

Commercial Species Grouped with Duka: Red Cedar, Baradan, Dukali, Simarupa, Silverballi

Processing:

Sawing: N/A

Drying: N/A

Machining: N/A

Gluing: N/A

Nailing: N/A

Finishing: N/A

MECHANICAL PROPERTIES	
Bending strength at 12% (N/mm^2)	N/A
Modulus of elasticity at 12% (N/mm^2)	N/A
Crushing strength at 12% (N/mm^2)	N/A

SIMARUPA

Scientific Name: Quassia simarouba (formerly Simaruba amara)

Family: Simarubaceae

Standard Name: Marupa

Other Name: Aceituno, Acajou Blanc, Scemardepa, Bitterwood

Wood Appearance: The heartwood is whitish but not differentiated from the whitish or straw coloured sapwood. Wood has a slightly bitter taste, but is odourless. The grain is straight, texture is medium, uniform and lustrous. The bole is 15-30m in length with a diameter of 40-60cm.

Natural Durability: Timber of low durability, blue stains easily. Green converted timber can easily be treated by short dipping and diffusion.

Uses: Suitable for use where a light, easily worked hardwood is required and where its lack of durability and low strength are not important. Examples are in furniture for interior use, drawer slides, and some types of cabinet framing, interior joinery and shoe heels. Excellent qualities for model-making, utility wood ware and toy manufacture. Simarupa peels well and makes attractive plywood.

Timber Processing:
Drying : Dries very rapidly and very well but prone to blue stain. Kiln Schedule L.
Working: Easy to work with both manual and machine tools
Assembly: Can be easily nailed with medium to good holding qualities.
Finishing : Easy to paint, stain and varnish.

Supplies: Adequate supplies available in commercial quantities.

Physical Properties: A very light, soft timber. In several respects very similar to Obeche (Triplochiton scleroxylon). The movement is small. It is low in bending strength, stiffness, crushing strength and shock resistance.

MECHANICAL PROPERTIES	
Air Dried density at 12% (kg/m ^{3})	410
Bending strength at 12% (N/mm^2)	66
Modulus of elasticity at 12% (N/mm^2)	8,100
Crushing strength at 12% (N/mm^2)	34

Compliance Is Not Just A Legal Requirement — It Is the National Standard.

Forest Sector Operators must be compliant by December 2025

Operating legally protects your investment and brings fair market competition and business growth.

What is compliance, and how can you achieve it?

Compliance means following national laws, regulations, and standards for sustainable forest management and harvesting, processing, and trade (including market access) of timber and timber products.

To be a **legal** Forest Sector Operator (FSO), you must comply with the **Guyana Forestry Commission (GFC)**, **Guyana Revenue Authority (GRA)**, **National Insurance Scheme (NIS)**, **Environmental Protection Agency (EPA)**, and the **Ministry of Labour (MOL)**, among others.

What is market access and the FLEGT VPA?

Market access is the ability to legally sell timber and timber products in domestic and/or international markets.

For an FSO to trade timber and timber products covered under the Voluntary Partnership Agreement (VPA) with the European Union (EU), a **Forest Law Enforcement, Governance, and Trade (FLEGT) licence** must be obtained. This licence confirms that you have met all national legal requirements to export those specific products to the EU market.

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@guyanaeuflegtvpa www.euflegt.gov.gy

THE GUYANA NATIONAL FOREST CERTIFICATION SYSTEM - PEFC ENDORSEMENT

The Guyana National Forest Certification System achieved Programme for the Endorsement of Forest Certification (PEFC) endorsement on 21 March 2024.

- **Guyana has a robust wood tracking system.** The National Certification System is built on this tracking system, which aims to protect forests by promoting sustainable forest management.

- **PEFC in Guyana will support forest- dependent livelihoods and local communities.** Apart from individual certification, there is the group certification model, enabling small community associations and indigenous communities to achieve certification to demonstrate sustainability.

- **PEFC is the world's leading forest certification system.**
- **Certification issued in Guyana under PEFC will cover timber products as well as non-timber products.**
- Governments around the world are putting in place legislation designed to support the trade of legal timber and to deny the entry of illegally-produced wood products into the marketplace. This includes the EU Deforestation Regulation (EUDR), the U.S. Lacey Act, and the Australian Illegal Logging Prohibition Regulation. PEFC Certification in Guyana is designed to demonstrate compliance with such legislative requirements.

Guyana forest cover

87%

Guyana forest size

18 mil Ha

Annual average deforestation rate

0.036 %

3rd party audits

Passed all audits from 2012- 2022

Discover more about PEFC in Guyana at www.forestry.gov.gy

FUTUI

Air Dry Density at 12% Moisture Content: 0.43

Heartwood: Yellowish white or Pinkish with streaks

Grain: Straight

Texture: Medium to Coarse

Density Catagory : Very Light

Application: Plywood (core), Blackboard, Moulding, Boxes and Crates, Matches, Toys, Interior Joinery, Upholstered Furniture Framing, Broom Stick

Commercial Species Grouped with Futui: Red Cedar, Baradan, Dukali, Simarupa, Silverballi, White Cedar

Processing:

Sawing: Easy, risk of splitting wooly surfaces, presence more or less internal stresses, blunting effect very slight

Drying: Easy and rapid, movement in service medium to large

Machining: Easy but the cutters have to be kept sharp to avoid wooliness

Gluing: Good

Nailing: Good holding of nails

Finishing: Good

MECHANICAL PROPERTIES	
Bending strength at 12% (N/mm^2)	60
Modulus of elasticity at 12% (N/mm^2)	89,000
Crushing strength at 12% (N/mm^2)	31

RED CEDAR

Scientific Name: Cedreta odorata

Family: Meliaceae

Standard Name: Cedro

Other Name: Cedro, Acajou Rouge, Ceder Rouge

Wood Appearance: The wood bears a general resemblance to the softer grades of Mahogany, but the heartwood varies from pale pinkish-brown to dark reddish brown, according to the locality of growth. Growing zones are distinct, as is its lustre. The grain is usually straight or shallowly interlocked. Its texture is moderately coarse and the wood is characterized by a distinct fragrant scent. The bole is 12-18m in length with a diameter of 50-90(-180) cm.

Natural Durability: It is moderately durable and resistant to decay in grave yard and pure culture tests. The sapwood is reported to be permeable to preservatives. In its dry state, the wood is resistant to termites.

Application: Red Cedar has many and varied uses. Suitable for high quality cabinet work, interior joinery and paneling, cigar boxes and sometimes for sound boards of organs. In boat-building it is employed for planking and for skirls of racing boats and decks of canoes as it combines durability and light weight. It is also used for coffins, drawers and shelves and suitable for sliced and rotary cut veneer.

Timber Processing:

Drying : Dries rapidly without marked distortion. Kiln Schedule J

Working: Works easily and finishes smoothly. For rip-sawing the recommended saw type is Hr54 and for wide band-sawing, saw type A.

Assembly: Takes glue, nails and screws well. Peels cold.

Finishing : When free from gum it stains and polishes beautifully (after filling). A good finish is produced by reducing the cutting angle to 200.

Supplies: Moderate quantities are available for export orders.

Physical Properties: The wood is soft but strong for its weight in both the green and the air dried state. Red Cedar was found to equal Honduras Mahogany (a denser species) in all strength properties except hardness, shear and tension. Movement is small.

MECHANICAL PROPERTIES	
Air Dried density at 12% (kg/m^3)	440
Bending strength at 12% (N/mm^2)	65
Modulus of elasticity at 12% (N/mm^2)	6,880
Crushing strength at 12% (N/mm^2)	35

DALLI

Air Dry Density at 12% Moisture Content: 0.46

Heartwood: Beige to Pale Brown

Grain: Straight

Texture: Medium

Density Catagory : Very Light

Application: Plywood, Interior Joinery, Moulding, Boxes and Crates, Matches, Light Carpentry, Particle Board, Fiber Board, Upholstered Furniture Framing, Cigar Boxes and Coffins

Commercial Species Grouped with Futui: Red Cedar, Baradan, Dukali, Simarupa, Silverballi, White Cedar

Processing:

Sawing: Easy, blunting effect very light

Drying: Reported moderately difficult, requires care

Machining: Good

Gluing: Good

Nailing: Good holding of nails

Finishing: Good

MECHANICAL PROPERTIES	
Bending strength at 12% (N/mm^2)	78
Modulus of elasticity at 12% (N/mm^2)	10,070
Crushing strength at 12% (N/mm^2)	40

CATEGORY TWO

Light Density Species

Common Name	Botanical/ Scientific Name	Density g/cm ^{3}
Haiariballi	*Alexa imperatricis*	0.51
Dukali	*Parahancornia fasciculata*	0.52
Iteballi	*Vochysia lanceolata*	0.58
Aniba hypoglauca (Silverballi)	*Aniba hypoglauca*	0.59
Baromalli	*Catostemma commune*	0.60
Wadara	*Couratari guianensis*	0.62
Korokororo	*Coriaria arborea var. arborea*	0.62
Hurasa	*N/A*	0.62
Ocotea glomerata (Silverballi)	*Ocotea glomerata*	0.63
Maho	*Swietenia mahagoni*	0.64
Kurokai	*Eperua falcata*	0.64
Determa	*Ocotea rubra*	0.66

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HAIARIBALLI

Air Dry Density at 12% Moisture Content: 0.51

Heartwood: Brownish Yellow, Occasionally Somewhat darker

Grain: Generally straight

Texture: Rather Course

Density Catagory : Light

Application: Interior Joinery, Furniture, Boxes and Crates, Light Carpentry, Veneer, Interior Trim, Upholstered Furniture Framing

Commercial Species Grouped with Haiariballi: Red Cedar, Baradan, Dukali, Simarupa

Processing:

Sawing: Easy, logs sometimes split in felling, blunting effect very slight

Drying: Difficult

Machining: Easy

Gluing: Good

Nailing: Good holding of nails

Finishing: Good

MECHANICAL PROPERTIES	
Bending strength at 12% (N/mm^2)	73
Modulus of elasticity at 12% (N/mm^2)	10,890
Crushing strength at 12% (N/mm^2)	39

DUKALI

Scientific Name: Parahancornia fasciculata

Family: Apocynaceae

Standard Name: Amapa

Other Name: Amapa, Dokali, Mapa, Doekali, Amapa, Amargoso, Amapa branco

Wood Appearance: The heartwood is normally off-white (occasionally pale cream to pinkish) but not sharply defined from the sapwood. It is fairly lustrous, odorless and tasteless with moderately fine texture and straight grain. The bole goes up to 20m in length with a diameter of 25-45(-100) cm.

Natural Durability: It is not naturally durable but easily preserved. Durability class 2.

Uses: It is suitable for interior construction and general manufacturing.

Timber Processing:

Drying : Dries easily. Risk of distortion and checking is slight
Working: Sawing and machining are easy. Blunting effect is slight
Assembly: Glues well and holds nails satisfactorily
Finishing : Good.

Supplies: Moderate quantities are available for export.

Physical Properties: It is a low density timber; air-dries easily with little degrade except for sap stain if improperly stacked. Works easily and finishes smoothly

MECHANICAL PROPERTIES	
Air Dried density at 12% (kg/m^3)	520
Bending strength at 12% (N/mm^2)	89
Modulus of elasticity at 12% (N/mm^2)	10,600
Crushing strength at 12% (N/mm^2)	44

ITEBALLI

Air Dry Density at 12% Moisture Content: 0.58-0.62*

Heartwood: Pale Pink Brown darkening to Golden Brown often with yellow stripes

Grain: Generally straight to slightly interlocked

Texture: Rather Course

Density Catagory : Light

Application: Boxes and Crates, Utility Plywood, Turnery, Moulding, Wainsciting, Light Carpentry, Upholstered Furniture Framing

Commercial Species Grouped with Iteballi: Determa, White Cedar, Ulu, Baromalli

Processing:

Sawing: Easy, wooly surface, blunting effect very slightly

Drying: Kiln - drying difficult and slow, quarter sawing and slow drying are recommended

Machining: Special tools recommended

Gluing: Good

Nailing: Good holding

Finishing: Good

MECHANICAL PROPERTIES	
Bending strength at 12% (N/mm^2)	78 - 81
Modulus of elasticity at 12% (N/mm^2)	9179 - 9700
Crushing strength at 12% (N/mm^2)	43 - 45

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BAROMALLI

Scientific Name: Common Baromalli- Catostemma commune Sand Baromalli - Catostemma fragrans

Family: Bombacaceae

Standard Name: Baromalli

Other Name: Baramanni, Paku, Katama, Simaria.

Wood Appearance: The heartwood is dull yellowish to pinkish-brown but not sharply defined from the lighter coloured sapwood. Dark coloured resin streaks occur as arcs on the cross section and lines on the surface. The texture is coarse and the grain straight. The bole is 21-27m in length with a diameter of 60-90(-120) cm.

Natural Durability: It is not naturally durable with the sapwood susceptible to sap-staining fungi. It is, however, easily preserved by diffusion. Durability class 2.

Uses: The wood has been tested and found suitable for plywood manufacture. It is used for general manufacturing and interior construction.

Timber Processing:
Drying : Dryingis slow and risk of distortion and checking is slight to moderate.
Working: Sawing is easy with moderate blunting effect. Machining is moderately difficult.
Assembly: Glues and holds nails well.
Finishing : Filling is required. It can be easily cut into veneer.

Supplies: Moderate quantities are available for export.

Physical Properties: It is a low to medium density timber.

MECHANICAL PROPERTIES

Catostemma commune	
Air Dried density at 12% (kg/m^3)	600
Bending strength at 12% (N/mm^2)	77
Modulus of elasticity at 12% (N/mm^2)	13,540
Crushing strength at 12% (N/mm^2)	46

Catostemma fragrans	
Air Dried density at 12% (kg/m^3)	590
Bending strength at 12% (N/mm^2)	79
Modulus of elasticity at 12% (N/mm^2)	10,700
Crushing strength at 12% (N/mm^2)	46

WADARA

Air Dry Density at 12% Moisture Content: 0.62

Heartwood: Variable cream White to Light Beige with pinkish yellow tinge

Grain: Generally straight, sometimes roey

Texture: Medium

Density Catagory : Light

Application: Interior Joinery, Plywood, Exterior Joinery (with treatment), Light Furniture, Moulding, Light construction, Boxes and Crates, Framework, Toys, Flooring

Commercial Species Grouped with Wadara: Yellow Silverballi, Crabwood, White Cedar, Simarupa, Red Cedar

Processing:

Sawing: Easy, blunting effect; moderate to high silica

Drying: No important problems, risks of distortion very slight, risk of checking very slight, movement in service medium

Machining: Not difficult or difficulties could occur when highly interlocked grain is present

Gluing: Good

Nailing: Good holding

MECHANICAL PROPERTIES	
Bending strength at 12% (N/mm^2)	95
Modulus of elasticity at 12% (N/mm^2)	11,700
Crushing strength at 12% (N/mm^2)	48

KOROKORORO

Air Dry Density at 12% Mositure Content: 0.62

Heartwood: Dark Brown to Yellowish Brown with dark striping and sometimes a pinkish tinge

Grain: Straight to Moderately Interlocked roey

Texture: Coarse

Density Catagory : Light

Application: Light Construction, Furniture, Light Carpentry, Matches, Moulding, Turnery

Commercial Species Grouped with Korokororo: Yellow Silverballi, Crabwood, White Cedar

Processing:

Sawing: Easy, blunting effect very slight

Drying: Seasoning moderately difficuly

Machining: Easily worked, interlocked grain may be a problem

Gluing: Good

Nailing: Good holding of nails

MECHANICAL PROPERTIES	
Bending strength at 12% (N/mm^2)	95
Modulus of elasticity at 12% (N/mm^2)	11,859
Crushing strength at 12% (N/mm^2)	47

HURUASA

Scientific Name: Abarema jupunba

Family: Legumiosae (Mimosaceae)

International Trade Name: Limonaballi

Other Names: Klaipio, Kwatpain, Kwatupana, Soapwood

Wood Appearance: The sapwood is white to yellowish-white and the heartwood is pale brown to reddish brown. The grains are straight to interlocked and the texture is fine to moderately course.

Natural Durability: It has moderate resistance to decay. Poor treatability.

Uses: Suitable for furniture, interior trim, veneer, utility plywood and light carpentry.

Timber Processing:

Drying: Drying is fast
Working: Sawing is easy and machining is good.
Assembly: Gluing and nailing is good.
Finishing: Good

Supplies: Available

Substitute: Can substitute for Crabwood, Determa and Hububalli in construction and furniture.

MECHANICAL PROPERTIES	
Air Dried density at 12% (kg/m^3)	620
Bending strength at 12% (N/mm^2)	102
Modulus of elasticity at 12% (N/mm^2)	13,770
Crushing strength at 12% (N/mm^2)	51

MAHO

Air Dry Density at 12% Mositure Content: 0.64

Heartwood: Variable in color, Pink Grey, Orchre Beige or Light Reddish Brown

Grain: Generally Straight

Texture: Coarse

Density Catagory : Light

Application: Plywood, Interior Joinery, Boxes and Crates, Interior Trim, Light Carpentry, Blackboards, Particle Board, Paper, Pulp Framework, Furniture Components, Coffins

Commercial Species Grouped with Maho: Yellow Silverballi, Simarupa, Ulu

Processing:

Sawing: Easy, blunting effect very slight

Drying: Must be handled slowly

Machining: Not difficult; wooly surface; sharply cutters recommended

Gluing: Good

Nailing: Good holding of nails

Finishing: Filling required

MECHANICAL PROPERTIES	
Bending strength at 12% (N/mm^2)	104
Modulus of elasticity at 12% (N/mm^2)	12,650
Crushing strength at 12% (N/mm^2)	55

KUROKAI

Scientific Name: Protium decandrum

Family: Burseraceae

Standard Name: Kurokai

Other Name: Gommier Rouge, Sali, Tingimoni, Encens Gris

Wood Appearance: The sapwood is hardly differentiated from heartwood; the wood is red or pink-brown, changing to brown upon exposure. The luster is medium to high. The texture is rather fine and even and grain straight or shallowly interlocked. The wood secretes a fragrant resin. The bole reaches 18m in length with a diameter of 35-70(-100) cm.

Natural Durability: Kurokai is little or non-resistant to insects and decay and can be impregnated.

Uses: Suitable for general carpentry, boxes, crates, window sills and panes, millwork, interior work, furniture and cabinet making, plywood manufacturing and utility veneer.

Timber Processing:

Drying : Difficult but dries fairly rapidly. Kiln Schedule C.
Working: Sawing of wood has a moderate blunting effect on cutting edges because of resin content.
Assembly: Difficult to nail and screw and tends to split. Its reaction to glue varies.
Finishing : Little filling is required and polishes well.

Supplies: Available in quantity, but not in large dimensions.

Physical Properties: Medium movement. Strength comparable to European Beech.

MECHANICAL PROPERTIES	
Air Dried density at 12% (kg/m ^{3})	640
Bending strength at 12% (N/mm^2)	110
Modulus of elasticity at 12% (N/mm^2)	12,890
Crushing strength at 12% (N/mm^2)	61

DETERMA

Scientific Name: Sextonia rubra

Family: Lauraceae

Standard Name: Louro Vermelho

Other Name: Wana, Grignon Franc, Red Louro

Wood Appearance: It is pale reddish-brown with a subdued golden lustre. The grain is straight to irregular and texture rather coarse. Bears some similarity to a dense grade of African mahogany. The bole is 18-25m in length with a diameter of 50-90cm

Natural Durability: Determa's heartwood is rated durable in grave yard and pure culture tests. The wood equals Honduras Mahogany in its resistance to termites and is resistant to marine borers. Determa is highly resistant to moisture and has excellent weathering characteristics.

Uses: A general utility timber, used for interior and exterior work. Include-boat and shipbuilding (keel, frame, planking and decking); carriage and wagons building; interior and exterior building construction (framing, stairs, windows, sash frames, flooring strips, interior trim), cooperage, furniture and cabinet work. The wood is suitable for bending to a moderate radius of curvature.

Timber Processing:

Drying : Because of the slow diffusion rate of the moisture in the wood, Determa is difficult to season. Kiln Schedule E.

Working: Saws well, works easily with all tools; turns and carves well.

Finishing : Stains and polishes well after filling.

Supplies: Available in considerable quantities. Supplies adequate to meet all likely requirements, both in quality and quantity. The timber is available in large sizes.

Physical Properties: Determa is a medium density wood. Its movement low to moderate and it responds extremely slowly to atmospheric changes and is, therefore very stable in use.

MECHANICAL PROPERTIES	
Air Dried density at 12% (kg/m^3)	660
Bending strength at 12% (N/mm^2)	90
Modulus of elasticity at 12% (N/mm^2)	11,400
Crushing strength at 12% (N/mm^2)	51

CATEGORY THREE

Medium Density Species

Common Name	Botanical/ Scientific Name	Density g/cm ^{3}
Cow Wood	*Bagassa guianensis Aublet*	0.67
Hububalli	*Loxopterygium sagotii*	0.68
Suya	*Pouteria speciosa*	0.71
Muniridan	*Siparuna spp*	0.72
Manni	*Symphonia globulifera*	0.72
Darina	*Diniziaexcels (Hymenolobium genus)*	0.75
Crabwood	*Carapa guianensis*	0.80

COW WOOD

Air Dry Density at 12% Mositure Content: 0.80

Heartwood: Yellow becoming Dark Brown on exposure

Grain: Frequently buy Slightly Interlocked

Texture: Medium to coarse

Density Catagory : Medium

Application: Light Construction, Paneling, Turnery, Boxes and Crates, Furnature Components, Tool Components

Commercial Species Grouped with Cow Wood: Locust, Kabukalli, Wallaba, Shibadan, Crabwood

Processing:

Sawing: Power required, blunting effect; very slight

Drying: No important problems, movement in service low

Machining: Not difficult or difficulties can occur when highly interlocked grain is present

Gluing: Good

Nailing: Good holding of nails, at times pre-boring necessary

Finishing: Good

MECHANICAL PROPERTIES	
Bending strength at 12% (N/mm^2)	121
Modulus of elasticity at 12% (N/mm^2)	17,300
Crushing strength at 12% (N/mm^2)	78

HUBUBALLI

Scientific Name: Loxopterygium sagotii

Family: Anacardiaceae

Standard Name: Siangenhout, Hububalli

Other Name: Koika, Onotillo, Ormata

Wood Appearance: The wood is brown to reddish-brown and attractively figured. It contains numerous narrow to rather wide darker stripes and streaks. It is of medium luster and texture. The grain is straight, sometimes interlocked or wavy. The bole is 15-20m is length with a diameter of 40-90cm.

Natural Durability: Moderately resistant to decay and termites and highly resistant to moisture.

Uses: Because of its attractive figuring and relative scarcity the wood is best suited for panelling, high grade furniture and cabinet work.

Timber Processing:

Drying: Easy

Working: Drying is slow and moderately difficult with moderate risk of distortion and checking. Owing to the presence of highly interlocked grain, it is also difficult to machine.

Assembly: Nailing is good but gluing needs care.

Finishing: Good. There may however be difficulties varnishing due to the presence of gum.

Supplies: The wood is frequently found in the far interior. Moderate quantities are available for export.

Physical Properties: It is moderately hard and ranges from medium to very brittle. Movement is low. Air dry Hububalli compares closely with Burma Teak in all strength properties except compression and tension perpendicular to grain.

MECHANICAL PROPERTIES	
Air Dried density at 12% (kg/m^3)	680
Bending strength at 12% (N/mm^2)	94
Modulus of elasticity at 12% (N/mm^2)	12,060
Crushing strength at 12% (N/mm^2)	51

SUYA

Air Dry Density at 12% Mositure Content: 0.67

Heartwood: Pinkish Brown with occasionally darker streaks or zones to straw in color

Grain: Straight to wavy or interlocked

Texture: Coarse

Density Catagory : Medium

Application: Utility Plywood, Boxes and Crates, Interior Joinery, Light Furniture, Light Construction, Carpentery

Commercial Species Grouped with Suya: White Cedar, Yellow Silverballi, Crabwood

Processing:

Sawing: Easy

Drying: Blunting effect very slight but careful stacking is required

Machining: Not difficult

Gluing: Good

Nailing: Good holding of nails

Finishing: Good

MECHANICAL PROPERTIES	
Bending strength at 12% (N/mm^2)	95
Modulus of elasticity at 12% (N/mm^2)	11,800
Crushing strength at 12% (N/mm^2)	53

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MUNIRIDAN

Air Dry Density at 12% Mositure Content: 0.72

Heartwood: Beige Brown with Yellow Green or Orange Tinge

Grain: Medium Straight, sometimes irregular

Texture: Medium

Density Catagory :Medium

Application: Interior and Exterior Furniture Components, flooring, general Construction, Interior Fittings, Plywood, Carpentry, Cooperage, Sleepers

Commercial Species Grouped with Muniridan: Dakama, Suya, Determa, Tauroniro

Processing:

Sawing: Easy

Drying: Requires care, risks of distortion more or less high, risks of checking more or less high

Machining: Easy

Gluing: Good

Nailing: Good holding of nails

Finishing: Good

MECHANICAL PROPERTIES	
Bending strength at 12% (N/mm^2)	113
Modulus of elasticity at 12% (N/mm^2)	12,630
Crushing strength at 12% (N/mm^2)	58

MANNI

Scientific Name: Symphonia globulifera

Family: Clusiaceae (former Guttiferae)

Standard Name: Manni

Other Name: Matakki, Yellow Mangua, Boardwood, Paletuvier Jaune, Vanani, Anani, Ossol, Waika Chewsticks

Wood Appearance: The heartwood is pale yellowish-brown and generally of plain appearance. Sapwood is paler in colour, about 4-5 cm wide and sharply defined from heartwood. Grains are straight or slightly interlocked and texture is rather coarse. The bole is 21-24m in length with diameter 30-55 (-120) cm.

Natural Durability: Resistant to decay and the heartwood is durable while the sapwood is prone to attack by powder-post beetles. Manni has good weathering characteristics.

Uses: The timber is used for general construction, carpentry, housing construction i.e. framing members, exterior and interior work, flooring, furniture and cabinetwork. Packing cases, barrel staves and railway sleepers.

Timber Processing:

Drying: Should be dried slowly. There is high risk of distortion and checking. Movement is large. Kiln Schedule C.

Working: Saws, planes and turns easily; the surface may tend to roughen in planing and shaping, especially on irregular grain.

Assembly: Holds nails and screws well with some tendency to split. Glues satisfactorily.

Finishing : Polishes and takes stain well; paints and varnishes satisfactorily.

Supplies: Occurs frequently in the Guyana's forest. Regular supplies available in commercial quantities.

Physical Properties: A moderately hard and tough timber. Manni is strong for its weight and its strength properties is superior to the heavier White Oak and European Beech timber species. Manni is also similar in all respects to the heavier species Manniballi (Moronobea coccinea).

MECHANICAL PROPERTIES	
Air Dried density at 12% (kg/m^3)	720
Bending strength at 12% (N/mm^2)	113
Modulus of elasticity at 12% (N/mm^2)	12,630
Crushing strength at 12% (N/mm^2)	58

DARINA

Air Dry Density at 12% Mositure Content: 0.75

Heartwood: Dark Yellow Brown to Light Brown

Grain: Straight to Interlocked

Texture: Coarse

Density Catagory : Medium

Application: General Construction (flooring, ceiling, etc.), Paneling, Turnery, Boxes and Crates, Furnature Components

Commercial Species Grouped with Darina: Dakama, Suya, Determa, Hububalli

Processing:

Sawing: Easy

Drying: Moderately difficult to air-season; fast to moderate rate; slightly checking

Machining: Easy

Gluing: Easy

Nailing: N/A

Finishing: Smooth

MECHANICAL PROPERTIES	
Bending strength at 12% (N/mm^2)	121
Modulus of elasticity at 12% (N/mm^2)	14,135
Crushing strength at 12% (N/mm^2)	62

CRABWOOD

Scientific Name: Carapa guianensis

Family: Meliaceae

Standard Name: Andiroba

Other Name: Krapa, Guino, Figueroa, Tangare, Carapa, Crappo

Wood Appearance: The heartwood varies from pale pink to rich red-brown when freshly sawn, darkening to a uniform dull reddish-brown. The sapwood is pale brown or oatmeal coloured, not always sharply defined. Wood resembles a plain mahogany in appearance but lacks its natural luster. The texture is medium to coarse; grain is generally straight but sometimes interlocked. The bole is 15-20m in length with a diameter of 65-95(-180) cm.

Natural Durability: Heartwood is moderately durable and fire resistant. Logs prone to attack by ambrosia (pinholeborer) beetles.

Uses: Suitable for general carpentry, furniture, cabinet work, turnery and interior joinery.

Timber Processing:

Drying : Dries fairly well but rather slowly with a slight tendency to split in the initial stages. Kiln Schedule C.

Working: Saws without difficulty. Interlocked grain makes planing difficult. Works easily and turns well, finishing smoothly.

Assembly: Glues and holds nails well. Tendency to split on nailing.

Finishing : Takes stain and polish well.

Supplies: Occurs in reasonable quantities in Guyana. Regular supplies possible.

Physical Properties: Comparable in strength to European Beech. Small movement. Moderately hard with good mechanical properties and is fairly stable in use.

MECHANICAL PROPERTIES	
Air Dried density at 12% (kg/m^3)	670
Bending strength at 12% (N/mm^2)	111
Modulus of elasticity at 12% (N/mm^2)	11,800
Crushing strength at 12% (N/mm^2)	59

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CATEGORY FOUR

Heavy Density Species

Common Name	Botanical/ Scientific Name	Density g/cm ^{3}
Fukadi	*Goupiaglabra*	0.84
Purpleheart	*Peltogyne venosa*	0.84
Kabukalli	*Goupia glabra*	0.84
Soft Wallaba	*Eperua falcata & E. grandiflora*	0.86
Wina Kakaralli	*Eschweilera spp*	0.86-0.96
Locust	*Hymenaea courbaril*	0.88
Burada	*Parinari*	0.89
Itikiboroballi	*Sarebebeballi*	0.89
Shibidan	*Aspidosperma album*	0.91
Tatabu	*Diplotropis purpurea*	0.91
Sarebebeballi	*Vouacapoua macropetala*	0.92
Limonaballi	*Chrysophyllum pomiferum*	0.95
Tauroniro	*Bois Macaque*	0.95
Aromata	*Clathrotropis branchypetala*	0.96
Greenheart	*Chlorocardium rodiei*	0.97
Mora	*Mora excelsa*	0.99

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FUKADI

Air Dry Density at 12% Mositure Content: 0.84

Heartwood: Light Brown to Light Creamy Brown often with dark streaks

Grain: Straight to Roey

Texture: Medium

Density Catagory : Heavy

Application: Cabinet Work, Furnature, General Construction, Interior and Exterior Joinery, Turnery, Sleepers, Plywood, Dragline / Crane Mats

Commercial Species Grouped with Fakadi: Locust, Kabukalli, Wallaba, Purpleheart, Greenheart, Mora

Processing:

Sawing: Power required, somewhat difficult, blunting effect; moderate

Drying: Generally good, distortion and checking moderate

Machining: Moderately difficult; some tearing may occur in planing because of interlocked grain

Gluing: Good

Nailing: Pre-boring necessary

Finishing: Good, may require littlesanding

MECHANICAL PROPERTIES	
Bending strength at 12% (N/mm^2)	143
Modulus of elasticity at 12% (N/mm^2)	17,760
Crushing strength at 12% (N/mm^2)	71

PURPLEHEART

Scientific Name: Peltogyne spp.

Family: Caesalpiniaceae (Leguminosae)

Standard Name: Amarante

Other Name: Amaranth Nazareno, Pau Roxo, Bois Violet, Barabu

Wood Appearance: Dull brown when freshly cut and rapidly oxidizes to violet-purple on exposure to light, gradually toning down in course of time to dark purplish-brown. The sapwood is whitish or cream coloured and grain is generally straight, sometimes wavy or interlocked. The texture is moderate to fine. The bole is 15-27m in length, cylindrical; diameter 45-90 (-150) cm.

Natural Durability: Highly resistant to decay, termites and fire. The heartwood is very durable and extremely resistant to preservatives while the sapwood is permeable.

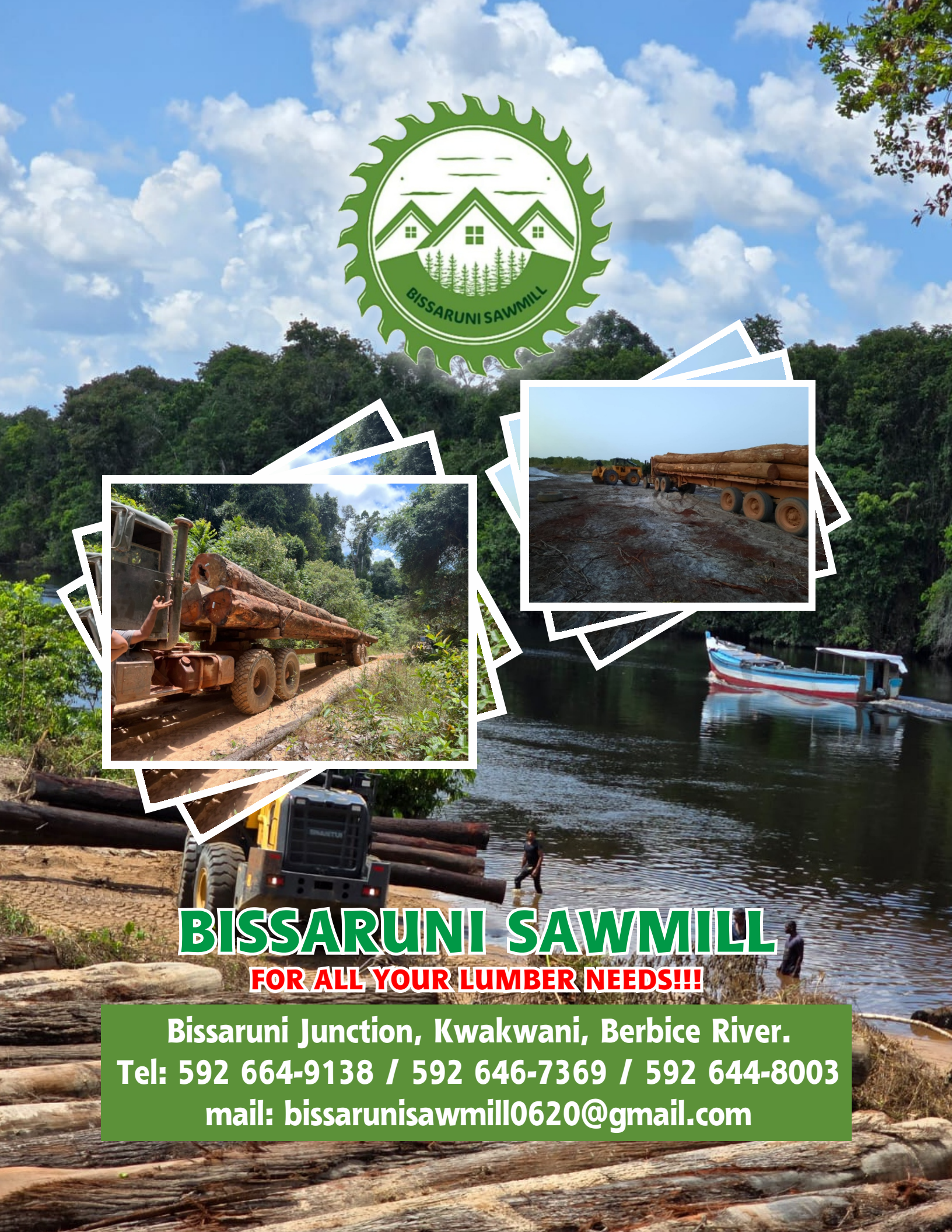
Uses: Possesses high strength and very good durability. It is an excellent structural timber suitable for heavy outdoor construction work such as bridges, docks work and park benches. As flooring, it has high wearing qualities and is suitable for most conditions of traffic. Has been used successfully in chemical plants for vats, filter press plates and frames. Also used for making billiard cue butts, tool handles, interior and exterior joinery and ship-building. A valuable wood for its attractive appearance and its strength.

Timber Processing:
Drying : Dries well and fairly rapidly with little degrade. Kiln Schedule E.
Working: Moderately difficult to work. There is a moderate blunting effect when sawing. Planes and turns well, finishes smoothly and takes a high polish.
Assembly: It takes glue well and holds nails and screws satisfactorily
Finishing : Gives good results when lacquered or polished

Supplies: Regular average supplies are available.

Physical Properties: Wood is very tough, strong and resilient

MECHANICAL PROPERTIES	
Air Dried density at 12% (kg/m^3)	840
Bending strength at 12% (N/mm^2)	155
Modulus of elasticity at 12% (N/mm^2)	16,860
Compression parallel to grain (N/mm^2)	78.5
Crushing strength at 12% (N/mm^2)	79
Shock resistance	medium



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KABUKALLI

Scientific Name: Goupia glabra

Family: Celastraceae

Standard Name: Goupi

Other Name: Cupluba, Kopi, Goupie, Copiura

Wood Appearance: The heartwood is light reddish-brown and of plain appearance, darkening on exposure. The sapwood is a distinct thick brownish or pinkish colour, and sharply demarcated. Grain is straight, sometimes interlocked and texture is medium to coarse and rather harsh. The freshly cut timber has an unpleasant scent which is lost on drying. The bole, cylindrical, is 14-21m in length with a diameter of 60-100(-150) cm.

Natural Durability: Good durability. Withstands both insect and fungal attack, even under unfavourable conditions of use.

Uses: Possesses high strength and very good durability. It is an excellent structural timber suitable for heavy outdoor construction work such as bridges, docks work and park benches. As flooring, it has high wearing qualities and is suitable for most conditions of traffic. Has been used successfully in chemical plants for vats, filter press plates and frames. Also used for making billiard cue butts, tool handles, interior and exterior joinery and ship-building. A valuable wood for its attractive appearance and its strength.

Timber Processing:

Drying : Generally drying is slow and difficult with high risk of distortion and checking. Kiln Schedule F.

Working: Generally easy to saw. Has a moderate blunting effect on cutting edges owing to wild grain. Care is required in machining and in planning to prevent tearing on quarter-sewn surfaces. In moulding there is a tendency for arises to chip.

Assembly: Does not glue well and tends to split when nailed. Pre-boring is necessary

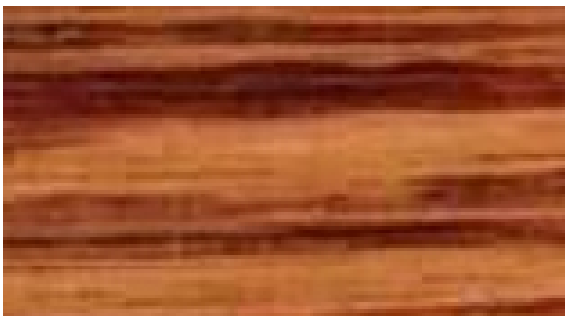
Finishing : Works easily to finish smoothly. Stains and polishes satisfactorily when filled.

Supplies: Regular average supplies are available.

Physical Properties: This is a tough, hard wood with satisfactory mechanical strength (stronger than European oak) and medium and dimensional stability.

MECHANICAL PROPERTIES	
Air Dried density at 12% (kg/m^3)	840
Bending strength at 12% (N/mm^2)	122
Modulus of elasticity at 12% (N/mm^2)	14,700
Crushing strength at 12% (N/mm^2)	62

SOFT WALLABA



Scientific Name: Eperua falcata

Family: Caesalpiniaceae

Standard Name: Wallaba

Other Name: Bois, sabre, Wapa gris, Uapa, Apa.

Wood Appearance: The heartwood is reddish-brown in colour, with dark gum streaks which tend to spread over the surface. The sapwood is pale in colour and is sharply defined from the heartwood. The texture is coarse and the grain is typically straight. The bole is 15-20m in length and diameter is approximately 60cm and occasionally up to 100cm.

Natural Durability: Soft Wallaba heartwood is highly resistant to decay and subterranean termites, and is fairly resistant to dry wood termites. Its resistance is extremely high. Soft Wallaba is self-impregnated by nature thus creosoting is unnecessary.

Uses: Soft Wallaba has excellent properties for transmission poles, flagstaffs, marine and bridge construction in non-teredo areas owing to its strength and durability. It is suitable for general heavy construction, utility and industrial floors and chemical vat staves. Additionally, the timber is used to make fence staves, fence posts and shingles for roofing.

Timber Processing:

Drying : Dries very slowly. Air-drying before kiln drying is recommended. Kiln Schedule B.
Working: Fairly easy to work but difficult to saw because of the high gum content.
Assembly: Glues well. It holds nails well but pre-boring is recommended because of tendency to split.
Finishing : It weathers beautifully, is difficult to paint because of gum exudation, but stains and polishes satisfactorily.

Supplies: Occurs abundantly in the forest of Guyana. Regular supplies in large volumes are easily

Physical Properties: Strength is mid-way between European Beech and Greenheart:

MECHANICAL PROPERTIES	
Air Dried density at 12% (kg/m^3)	440
Bending strength at 12% (N/mm^2)	65
Modulus of elasticity at 12% (N/mm^2)	6,880
Crushing strength at 12% (N/mm^2)	35

Other

• As transmission poles it is extensively used in Caricom countries and has been known to be in service for over 40 years in some countries.

• With the inclusion of Soft Wallaba in the British standard, it is hoped that the market in the UK will once again be revived.

• Tests in Japan have shown that the wood has a likeness to Rosewood when used as a furniture timber (after extraction of gum and resin).

• As a roofing material (shingles) it is known for its lasting qualities and the coolness it lends to a house.

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WINA KAKARALLI

Air Dry Density at 12% Mositure Content: 0.86 - 0.96*

Heartwood: Red Brown with Lighter Veins

Grain: Straight

Texture: Rather Fine to Medium

Density Catagory : Heavy

Application: Pile Timbers, Beams Heavy Carpentry (construction), Heavy Flooring, Tool Handles, Sporting Goods, Frame Construction Exterior, Joinery, Sliced Veneer, Stairs, Ship Keels and Beams, Sleepers, Dragline / Crane Mats

Commercial Species Grouped with Wina Kakaralli: Shibadan, Tauroniro, Moraballi, Greenheart, Aromata, Tatabu, Purpleheart

Processing:

Sawing: Power required, somewhat difficult, blunting effect; moderate

Drying: Generally good, risk of distortion and checking moderate

Machining: Moderately difficult; some tearing may occur in planing because of interlocked grain

Gluing: Good

Nailing: Pre-boring necessary

Finishing: Good

* Data from two different reference sources

MECHANICAL PROPERTIES	
Bending strength at 12% (N/mm^2)	136 - 157
Modulus of elasticity at 12% (N/mm^2)	16,700 - 17,640
Crushing strength at 12% (N/mm^2)	59 - 78

LOCUST

Scientific Name: Hymenaea courbaril

Family: Caesalpiniaceae

Standard Name: Courbaril

Other Name: Copalier, Algarrob, Gaupinal, Jatoba

Wood Appearance: The heartwood is light brown to brown often with dark streaks and a subdued golden glow. The sapwood of whitish grey colour is sharply defined. Texture is medium to coarse with straight grain straight. There is medium luster and distinct uniform vessel lines. The bole is 18-25m in length, with diameter 50-120(-150) cm.

Natural Durability: Very resistant to decay.

Uses: A wood of decorative appearance suitable for use in the manufacture of high grade furniture, cabinet work, decorative joinery and veneer. Also used for shipbuilding, general construction, and the making of tool handles and croquet mallets.

Timber Processing:
Drying : Dries readily with slight risk of distortion or checking
Working: Moderately difficult to work but finishes smoothly. Planes and turns without difficulty. Good bending to steaming process.
Assembly: Glues well, but difficult to nail. Fastenings are held well.
Finishing : Finishes smoothly and polishes and varnishes without difficulty.

Supplies: Occurs widely but not abundantly in the Guyana forests. Regular supplies in modest quantities are available.

Physical Properties: Very hard and strong. Moderate shrinkage, relatively stable once dry. Good mechanical properties, especially elasticity.

MECHANICAL PROPERTIES	
Air Dried density at 12% (kg/m^3)	880
Bending strength at 12% (N/mm^2)	176
Modulus of elasticity at 12% (N/mm^2)	18,500
Crushing strength at 12% (N/mm^2)	84

BURADA

Air Dry Density at 12% Mositure Content: 0.89

Heartwood: Light Brown or Yellowish Pink Brown

Grain: Generally straight, sometimes slightly interlocked

Texture: Fine

Density Catagory : Heavy

Application: Marine Construction (submerged), Ship Keels, Sleepers (treated), Heavy Construction, Dragline / Crane Mats

Commercial Species Grouped with Burada: Locust, Kabukalli, Tauroniro, Greenheart, Wallaba, Purpleheart

Processing:

Sawing: Power required, blunting effect: high silica

Drying: Rapid air drying prior to kin drying is recommended, risk of distortion moderate, risk of checking slight, possible risk of case hardening

Machining: Special tools recommended

Nailing: Pre-boring necessary

Finishing: Moderate

MECHANICAL PROPERTIES	
Bending strength at 12% (N/mm^2)	157
Modulus of elasticity at 12% (N/mm^2)	16,500
Crushing strength at 12% (N/mm^2)	86

ITIKIBOROBALLI

Air Dry Density at 12% Mositure Content: 0.89

Heartwood: Chocolate Brown to Pale Reddish Brown or Purplish Brown, occasionally marked by Dark Olive or Purplish Brown stripes

Grain: Generally straight, but may be variable

Texture: Moderate to Very Fine

Density Catagory : Heavy

Application: Inlay, Cabinet Work, Walking Sticks, Parquet Flooring, Bagpipes, Violins, Turnery, Fine Furniture, Cutlery, Marquetry, Musical Instruments, Interior Trim, Dragline / Crane Mats

Commercial Species Grouped with Itikiboroballi: Locust, Aromata, Wallaba, Kabukalli, Wamara, Greenheart, Wallaba, Purpleheart

Processing:

Sawing: Power required

Drying: Slow

Machining: Difficult due to hardness - power required

Gluing: N/A

Nailing: Pre-boring necessary

Finishing: Good

MECHANICAL PROPERTIES	
Bending strength at 12% (N/mm^2)	163
Modulus of elasticity at 12% (N/mm^2)	23,630
Crushing strength at 12% (N/mm^2)	85

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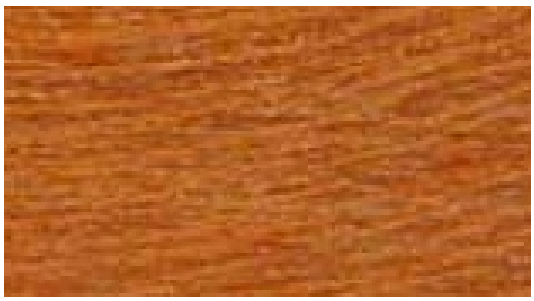

Scientific Name: Aspidosperma album

Family: Apocynaceae

Standard Name: Bois Macaque

Other Name: Red Peroba, Peroba Rosa, Kromanti Kipi

Wood Appearance: The wood is tan to rose-red, often streaked with purple or brown and becoming brownish-yellow to medium brown on exposure. The sapwood is yellowish, paler than the heartwood but not sharply demarcated. The grain is straight to irregular and the texture fine and uniform. The length of the bole is 18-21m and diameter, 50-80 cm.

Natural Durability: The heartwood is durable and extremely resistant to preservative treatment. The sapwood is permeable.

Uses: A good general all purpose wood suitable for construction works requiring strength and durability, and could also be useful for exterior joinery. Also suitable for panelling, turnery and furniture manufacture.

Timber Processing:
Drying : Dries without difficulty. Kiln Schedule E.
Working: Easy to work and finishes well.
Assembly: Gluing easy but hard to nail.
Finishing : Takes staining and polishing satisfactorily.

Supplies: Occurs frequently in Guyana's forest. Regular supplies are available.

Physical Properties: A hard and strong timber. Bending strength medium and crushing strength high:

MECHANICAL PROPERTIES	
Air Dried density at 12% (kg/m^3)	910
Bending strength at 12% (N/mm^2)	176
Modulus of elasticity at 12% (N/mm^2)	19,560
Crushing strength at 12% (N/mm^2)	93

TATABU

Scientific Name: Diplotropis purpurea

Family: Papilionaceae

Standard Name: Sucupira

Other Name: Sucupira, Alcoruoque, Zwarte Kabbes

Wood Appearance: The heartwood is dark chocolate-brown in colour with conspicuous paler markings, giving a decorative appearance which may be enhanced on quartered surface by a stripe figure. The sapwood is whitish, sharply demarcated from the heartwood. Grain is interlocked, sometimes irregular and the texture is moderately coarse. The bole is 18-21m in length and diameter 40-60(-100) cm.

Natural Durability: Very resistant to decay even under exacting conditions of use. Highly resistant to fungi and termite attacks.

Uses: Has a decorative appearance and is of interest for turned work and as a veneer for inlays in high grade furniture. Suitable for exterior and interior joinery, turnery, paneling and tool handles. A very useful timber with many applications.

Timber Processing:
Drying : Dries readily but slowly, without distortion or checking.
Working: Difficult to work due of its high density and interlocked and irregular grain, but can be finished to a smooth surface. Turns well.
Assembly: Glues well and holds nails and screws hold well.
Finishing : Polishes satisfactorily after filling.

Supplies: Occurs widely but not abundantly in the Guyana forests. Regular supplies in modest quantities are available.

Physical Properties: A heavy, strong, durable wood possessing high strength properties. Medium shrinkage, relatively stable once dry.

MECHANICAL PROPERTIES	
Air Dried density at 12% (kg/m^3)	910
Bending strength at 12% (N/mm^2)	156
Modulus of elasticity at 12% (N/mm^2)	18,000
Crushing strength at 12% (N/mm^2)	88

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SAREBEBEBALLI

Scientific Name: Vouacapoua macropetala

Family: Leguminosae (Caesalpineaceae)

International Trade Name: Sarebebeballi

Wood Appearance: The sapwood is a distinct cream colour (2-4 cm) while the heartwood is dark yellowish brown. The texture is fine to medium and the grain straight. The bole is 15-20m in length with a diameter of 40-60(-100) cm.

Natural Durability: Very good resistance to decay, termites and dry wood insects. It is resistant to marine borers in Panama waters. Poor treatability.

Uses: Suitable for fine furniture, cabinet work, flooring, stairs, cutlery, decorative trim, turnery, brush backs, sleepers, poles and posts, heavy carpentry, harbour or naval construction and joinery.

Timber Processing:

Drying : Must be handled with care and slow initial air seasoning is recommended to reduce drying time.

Working: Power required for sawing and machining due to hardness of wood.

Assembly: Special precaution is needed when gluing and there is good holding of nails though pre-boring is necessary.

Finishing: Good

Supplies: Abundant

Substitute: It can be used in the same capacity as Kabukalli and Purpleheart.

MECHANICAL PROPERTIES	
Air Dried density at 12% (kg/m^3)	920
Bending strength at 12% (N/mm^2)	164
Modulus of elasticity at 12% (N/mm^2)	15,940
Crushing strength at 12% (N/mm^2)	82

LIMONABALLI

Scientific Name: Chrysophyllum pomiferum

Family: Sapotaceae

International Trade Name: Limonaballi

Other Names: Aknon, Haimara-kushi, Kwikpa, Paripiballi

Wood Appearance: The sapwood is light brown but not clearly distinct from the heartwood which is pale, yellowish brown to dark brown. The grain is straight to interlocked and texture fine. The bole is 16-24m in length with a diameter of 60-90cm.

Natural Durability: Resistance to decay is slight to moderate and there is good treatability.

Uses: Suitable for heavy to light construction and posts.

Timber Processing:

Drying : Air-drying is easy to moderate with some checking.
Working: Power is required for sawing (blunting effect because of silica content). Machining is moderate to difficult due to silica content.
Assembly: Pre-boring necessary.

Supplies: Available

Substitute: Can substitute for Kabukalli, Shibadan and Taurniro. Used in the construction industry because of its high density.

MECHANICAL PROPERTIES	
Air Dried density at 12% (kg/m^3)	950
Bending strength at 12% (N/mm^2)	179
Modulus of elasticity at 12% (N/mm^2)	19,515
Crushing strength at 12% (N/mm^2)	79

TAURONIRO

Scientific Name: Humiria balsamifera var balsamifera

Family: Humiriaceae

Standard Name: Umiri

Other Name: Bastran Bolletrie, Oloroso, Chanul, Tabaniro

Wood Appearance: Heartwood varies from fawn colour to reddish-brown. Sapwood is not well defined. There is lustre and texture is medium to fine. The grain is straight and often interlocked. The bole is cylindrical, 18-20m in length, 50-90(-120) cm in diameter.

Natural Durability: Highly durable. Resistant to fungal attack even under unfavorable conditions of use. Good resistance to termite attack.

Uses: Suitable for general house construction, panelling and flooring. Its attractive appearance makes it suitable for furniture and decorative purposes. It can also be used for wheelwright work, counters and work bench tops.

Timber Processing:

Drying : Moderate rate recommended since risk of distortion is high.
Working: Power is required in sawing and machining. Blunting effect on saw is moderate. Prone to chipped grain when grain is highly interlocked. Finishes smoothly even on the end-grain when grain is straight.
Assembly: Glues well, nails and screws hold well.
Finishing : Varnishes and polishes without trouble.

Supplies: Species abundant in Guyana. Adequate supplies to meet any regular demand.

Physical Properties: Very hard, strong dense and highly durable wood. Weighs approximately 900 kg/m^3 (56/ft^3) seasoned. Medium shrinkage, very stable once dry. Very good mechanical properties, good elasticity and impact resistance.

MECHANICAL PROPERTIES	
Air Dried density at 12% (kg/m^3)	950
Bending strength at 12% (N/mm^2)	168
Modulus of elasticity at 12% (N/mm^2)	18,800
Crushing strength at 12% (N/mm^2)	86

AROMATA

Scientific Name: Clathrotropis spp.

Family: Papilionaceae

Standard Name: Aromata

Other Name: Acapu do jagapo

Wood Appearance: The wood is pinkish-brown to dark brown with lighter streaks. It has a waxy feel and the wood is well defined. The texture is moderately coarse and the grain straight. The bole is 12-15m in length (flattened) with a diameter of 40-50(-60) cm.

Natural Durability: Good. Resistant to insect attack and moderately durable under unfavorable conditions. As a rule it is not necessary to preservative treat for general use.

Uses: Suitable for flooring, interior and exterior joinery. Can also be used for cabinetwork and furniture making. It has adequate properties for use as railway sleepers and flooring.

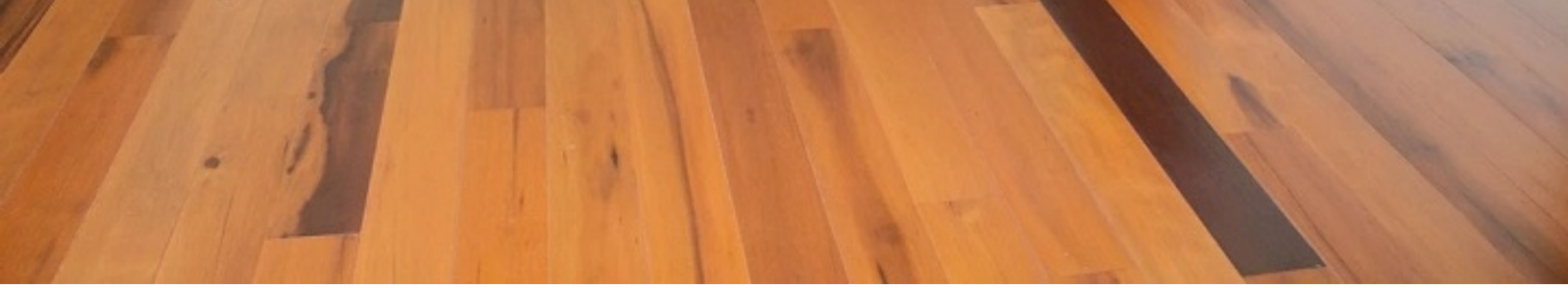
Timber Processing:

Drying : Dries easily with little degrade but flat-sawn timber has a tendency to shell out.
Working: Power is required to saw and machining is difficult. Takes a fine finish and the wood is very smooth to touch.
Assembly: Easy to glue.
Finishing : Polishes, varnishes and paints without difficulty.

Supplies: Species fairly common in Guyana. Adequate supplies to meet regular demand.

Physical Properties: Aromata is very hard, tough and strong. Moderate movement. Satisfactory mechanical strength

MECHANICAL PROPERTIES	
Air Dried density at 12% (kg/m^3)	960
Bending strength at 12% (N/mm^2)	153
Modulus of elasticity at 12% (N/mm^2)	24,120
Crushing strength at 12% (N/mm^2)	96



GREENHEART

Scientific Name: Chlrocardium rodiei

Family: Lauraceae

Standard Name: Greenheart

Other Name: Sipiri

Wood Appearance: Light greenish to dark olive-green, sometimes marked with brown or black stakes. Sapwood is pale yellow in colour, shading gradually into heartwood. The texture is fine and even and grain straight or interlocked. The bole is 15-23m in length with a diameter of 35-60 cm.

Natural Durability: Almost immune to decay and termites, highly resistant to marine organisms and fire. Extremely resistant to preservative treatment.

Uses: A very heavy, hard timber, suitable for use under exacting conditions. Outstanding in most of its strength properties and of very high durability with excellent resistant to attack by marine borers. Available in very large sizes and long length, and is suitable for piling, piers, lock gates, dock and harbor works. Useful for pier decking and hand rails, flooring and in the engineering industry as bearers for engines. Gives good service in chemical plants for vats, filter press plates and frames. Suitable for joinery in both exterior and interior situations, and used also for fishing rods and as center laminar for longbows and general construction.

Timber Processing:

Drying : Dries very slowly with minor degrade, particularly in the thicker sizes. Distortion is not serious, but checking and splitting may occur. Kiln schedule B.

Working: Power required with blunting effect being moderate to high. Turns well. Planing is not difficult despite the high density of the wood and interlocked grain.

Assembly: Easy gluing. Pre-boring is recommended for nails and screws. Good nail holding.

Finishing : Staining rarely necessary. Polishes satisfactorily.

Supplies: Found in commercial quantities only in Guyana's forest.

Physical Properties: Has exceptionally high strength properties even when its weight is taken into account

MECHANICAL PROPERTIES	
Air Dried density at 12% (kg/m^3)	970
Bending strength at 12% (N/mm^2)	240
Modulus of elasticity at 12% (N/mm^2)	24,500
Compression parallel to grain (N/mm^2)	89.9
Crushing strength at 12% (N/mm^2)	98

MORA

Scientific Name: Mora excelsa

Family: Caesalpiniaceae

Standard Name: Mora

Other Name: Pato, Pracuuba

Wood Appearance: Mora (and Morabukea which is similar in structure) heartwood varies from chocolate-brown to reddish-brown. Sapwood is wide with yellowish to pale brown colour. The grain is straight and often interlocked and somewhat wavy or irregular. The texture is coarse and bole 15-24m in length, rounded or flattened. The diameter is 60-90 (-120) cm.

Natural Durability: The heartwood is durable and extremely resistant to preservatives. Mora is markedly fire resistant.

Uses: Best suited for heavy construction work, jetties and foreshore work. Particularly suitable for sleepers, wagon bottoms, and for both traditional and mosaic flooring and ship-building.

Timber Processing:

Drying : Difficult i.e. it must be carried out carefully because of processing risk of distortion and checking. Kiln Schedule B.

Working: Difficult to saw, because of its density and interlocked grain. Blunting effect is moderate to high. With the same qualification, it can be planed, finishes smoothly, turns easily, splits with great difficulty.

Assembly: Difficult to nail but holds nails and rail spikes well. Pre-boring is necessary.

Finishing : Stains and polishes satisfactorily.

Supplies: Very common in Guyana. Abundant and regular supplies assured.

Physical Properties: A very heavy, hard wood. Outstanding strength properties.

MECHANICAL PROPERTIES	
Air Dried density at 12% (kg/m^3)	990
Bending strength at 12% (N/mm^2)	149
Modulus of elasticity at 12% (N/mm^2)	21,020
Crushing strength at 12% (N/mm^2)	81

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A- grade and lower grades are sorted and then moulded. After moulded a 3 inspection is carried out to sort the higher grades. Packing and strapping and loading is where our final inspection is done therefore ensure our customer never gets nothing but the highest quality.

CATEGORY FIVE

Very Heavy Density Species

Common Name	Botanical/ Scientific Name	Density g/cm ^{3}
Morabukea	*Mora excelsa*	1.03
Kauta	*Licania laxiflora*	1.03
Kautaballi	*Licania spp*	1.03
Wamara	*Eschweilera spp*	1.06
Black Kakaralli	*Swartzia leiocalycina*	1.07
Kokoritaballi	*N/A*	1.07-1.33
Tonka Bean	*Dipteryx odorata*	1.07
Licaria Canella (Silverballi)	*Kereti Silverballi*	1.11

MORABUKEA

Air Dry Density at 12% Mositure Content: 1.03

Heartwood: Pinkish Brown to Reddish Brown with paler streaks

Grain: Straight, often interlocked, sometimes irregular or wavy

Texture: Rather fine to moderate coarse

Density Catagory : Very Heavy

Application: Sleepers, Heavy Construction, Bridge, Decking, Planking, Heavy Carpentry, Industrial Flooring, Joinery, Boat Building (ribs, stern, keels, framing), Dragline / Crane Mats

Commercial Species Grouped with Morabukea: Mora, Shibadan, Moraballi, Greenheart, Purpleheart, Aromata, Tatabu

Processing:

Sawing: Power required, fairly difficult, tendency to spring

Drying: Slow drying and careful drying required to prevent degrade

Machining: Difficulties due to hardness and interlocked grain

Gluing: Special precautions needed

Nailing: Good holding of nails pre-boring necessary

Finishing: Good

MECHANICAL PROPERTIES	
Bending strength at 12% (N/mm^2)	176
Modulus of elasticity at 12% (N/mm^2)	21,910
Crushing strength at 12% (N/mm^2)	94

KAUTA

Air Dry Density at 12% Mositure Content: 1.03

Heartwood: Yellowish Brown to Brown or Dark Brown, Sometimes with a Reddish Tinge

Grain: Straight

Texture: Fine

Density Catagory : Very Heavy

Application: Heavy Construction (above ground), Shingles, House Framing, Charcoal, Underwater Marine Construction, Dragline / Crane Mats

Commercial Species Grouped with Kauta: Bulletwood, Moraballi, Greenheart, Aromata

Processing:

Sawing: Power required, blunting effect: high silica

Drying: Air drying reported as easy to moderately difficult, risks of distortion rated as slight, risks of checking rated as slight

Machining: Difficulties due to hardness and silica content, special tools recommended

Nailing: Pre-boring necessary

Finishing: Good

MECHANICAL PROPERTIES	
Bending strength at 12% (N/mm^2)	173
Modulus of elasticity at 12% (N/mm^2)	17,400
Crushing strength at 12% (N/mm^2)	84

KAUTABALLI

Air Dry Density at 12% Mositure Content: 1.03

Heartwood: Yellowish Brown to Brown or Dark Brown, Sometimes with a Reddish Tinge

Grain: Straight

Texture: Fine

Density Catagory : Very Heavy

Application: Heavy Construction, Shingles, House Framing, Charcoal, Underwater Marine Construction, Dragline / Crane Mats

Commercial Species Grouped with Kautaballi: Bulletwood, Moraballi, Greenheart, Purpleheart, Aromata, Tatabu, Tauroniro

Processing:

Sawing: Power required, blunting effect: high silica

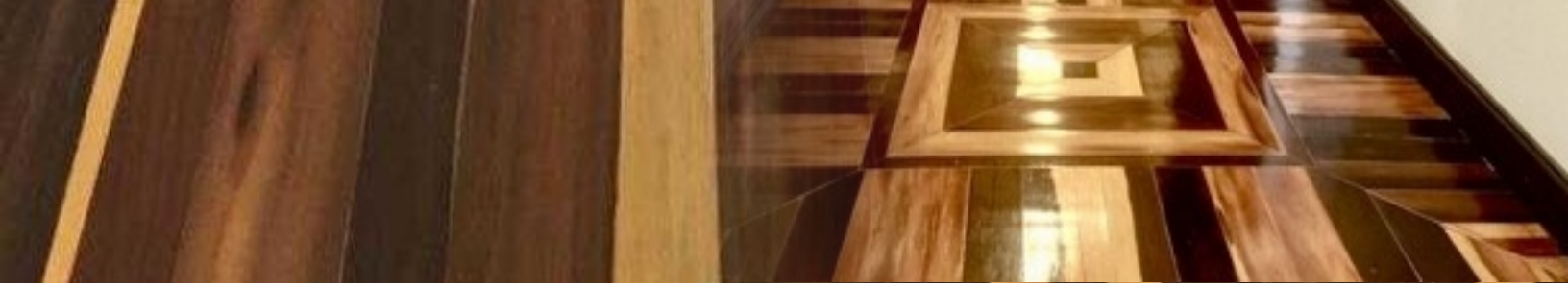
Drying: Air drying reported as easy to moderately difficult, risks of distortion rated as slight, risks of checking rated as slight

Machining: Difficulties due to hardness and silica content, special tools recommended

Nailing: Pre-boring necessary

Finishing: Good

MECHANICAL PROPERTIES	
Bending strength at 12% (N/mm^2)	173
Modulus of elasticity at 12% (N/mm^2)	17,400
Crushing strength at 12% (N/mm^2)	84



WAMARA

Scientific Name: Swartzia leiocalycina

Family: Caesalpiniaceae

Standard Name: Wamara

Other Name: Montouchi, Panacoco, Saboarana, Brown Ebony

Wood Appearance: The heartwood is chocolate to purplish-brown with darker purple streaks, giving the wood an attractive appearance. The sapwood is pale in colour and sharply demarcated from heartwood; sapwood and heartwood are often used in furniture to give two toned effect. The grain is straight sometimes irregular and texture fine. The bole is 18-21m in length with a diameter of 40-75cm.

Natural Durability: The heartwood is durable and extremely resistant to insects, decay and preservatives but not to marine borers. The sapwood is permeable.

Uses: Suitable for interior decorative work and fittings. Can be used for cabinetwork, furniture making, flooring and panelling. Very suitable for inlay work and turnery.

Timber Processing:

Drying : Dries slowly with appreciable surface checking. Kiln Schedule B.

Working: Difficult to work owing to hardness and interlocked grain. Easy to scrape and sand and gives a fine finish. There is a tendency for end splitting but distortion is not serious. Blunting effect is moderate to high. Suitable for bends of moderate radius of curvature if well supported with a metal strap.

Assembly: Difficult to nail and screw and tends to split, but fastenings are held well. Pre-boring is necessary.

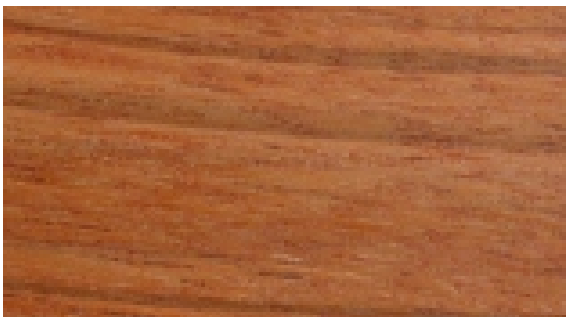
Finishing : Finishes smoothly and polishes well. Stains will not penetrate the timber.

Supplies: Occurs frequently in Guyana's forests. Reasonable supplies are available.

Physical Properties: A very hard, very heavy wood with medium movement. Excellent mechanical strength.

MECHANICAL PROPERTIES	
Air Dried density at 12% (kg/m^3)	1,060
Bending strength at 12% (N/mm^2)	213
Modulus of elasticity at 12% (N/mm^2)	23,630
Crushing strength at 12% (N/mm^2)	110

BLACK KAKARALLI



Scientific Name: Eschweilera subglandulosa, E. sagotiana

Family: Lecythidaceae

International Trade Name: Black Kakaralli

Wood Appearance: The sapwood is a light grayish-brown and the heartwood, a brown to dark brown colour. The grain is straight and the texture is fine to medium. The length of the bole is 12-20m while the diameter is 30-60cm.

Natural Durability: It is resistant to decay, termites and insects. Poor treatability.

Uses: Suitable for heavy carpentry, industrial flooring, sleepers, ship-building, poles and posts, turnery, frame construction and marine construction.

Timber Processing:

Drying : Moderately difficult to air-dry. There is slight risk of distortion, checking and case hardening.

Working: Power is required for sawing and blunting effect is high (due to silica). Special tools are needed due to hardness and silica content.

Assembly: Gluing is difficult and pre-boring is necessary.

Finishing : Good.

Supplies: Abundant

Substitute: It can be substituted for Greenheart in marine conditions. It can also be used in the same capacity as Bulletwood.

MECHANICAL PROPERTIES	
Air Dried density at 12% (kg/m^3)	1,070
Bending strength at 12% (N/mm^2)	182
Modulus of elasticity at 12% (N/mm^2)	21,635
Crushing strength at 12% (N/mm^2)	77

KOKORITABALLI

Air Dry Density at 12% Mositure Content: 1.07 - 1.33*

Heartwood: Reddish Brown

Grain: Straight

Texture: Fine

Density Catagory : Very Heavy

Application: Heavy Construction, Industrial flooring, Dragline / Crane Mats

Commercial Species Grouped with Kokoritaballi: Moraballi, Aromata, Shibadan, Greenheart, Tatabu

Processing:

Sawing: Power required, blunting effect

Drying: Air dried at moderate rate

Machining: Difficulty due to harness; special tools required

Nailing: Pre-boring necessary

MECHANICAL PROPERTIES	
Bending strength at 12% (N/mm^2)	259
Modulus of elasticity at 12% (N/mm^2)	30,430
Crushing strength at 12% (N/mm^2)	108

* The following data are based on *Pouteria egrega* and *P. eugenifalia* which are similar to *P. cuspidata* in appearance and technical properties.

TONKA BEAN

Air Dry Density at 12% Mositure Content: 1.07

Heartwood: Beige Brown with Yellow or Purplish Pink Tinge becoming Red Brown with age

Grain: Frequently interlocked, sometimes highly

Texture: Fine to Medium

Density Catagory : Very Heavy

Application: Sleepers, Bridges, Flooring, Weathered Construction, Dragline / Crane Mats, Gearing, Heavy Carpentry, Decorative Veneer

Commercial Species Grouped with Tonka Bean: Tatabu, Shibadab, Bulletwood, Mora, Purpleheart, Greenheart

Processing:

Sawing: Power required, moderate blunting effect

Drying: Must be handled slowly with care; risk of checking and distortion, high

Machining: Special tools recommended

Gluing: Difficult - special processing needed

Nailing: Pre-boring necessary

Finishing: Good

MECHANICAL PROPERTIES	
Bending strength at 12% (N/mm^2)	200
Modulus of elasticity at 12% (N/mm^2)	22,000
Crushing strength at 12% (N/mm^2)	105

SILVERBALLI (GROUP)

Scientific Name:

Brown: Licaria canella
Sofá Kereti: Ocotea oblonga
Hard Kereti: Ocotea wachenheimii
Kurahara: Ocotea glomerata
White: Ocotea kanaliculata
Yellow: Aniba hypoglauca

Family: Lauraceae

Standard Name: Canelo

Other Name: Pisie, Caraiou, Caneio, Louro Branco, Inamui, Preto

Wood Appearance: In Guyana the Silverballi group is divided into "hard" and '"soft", with the dividing line being put at an air-dried specific gravity of 37lb/ft^3. The heartwood ranges from greyish through yellowish-buff to light brown and darkens on exposure. The lustre is medium to high and the texture fine to moderately coarse. The grain is straight and occasionally interlocked and the wood usually has a pleasant aromatic scent. The bole is 15-21m in length and the diameter 50-60 (-120) cm.

Natural Durability: It is moderately resistant to insects and decay, highly resistant to marine borers but susceptible to termites. It is difficult to impregnate.

Uses: "Hard" Silverballi is used for general carpentry and boat-building (planking), suitable for both interior and exterior work in house construction, furniture and cabinet work, veneer and plywood.
"Soft" Silverballi is used in general carpentry, interior work, light weight furniture and suitable for utility plywood.

Timber Processing:
Drying : Covering when air-drying is recommended. The risk of distortion is high but that of checking is very slight.
Working: Saws well and works easily.
Assembly: Holds nails, screws and glue well.
Finishing : Finishes smoothly unless grain is severely interlocked. Paints well.

Supplies: Occurs frequently in the Guyana forests. Regular supplies are available.

Physical Properties: The "hard" Silverballi is rather light to heavy. Movement rather low; the lighter species shrink less than the heavier types.

MECHANICAL PROPERTIES

Licaria canella	
Air Dried density at 12% (kg/m^3)	1,110
Bending strength at 12% (N/mm^2)	226
Modulus of elasticity at 12% (N/mm^2)	26,000
Crushing strength at 12% (N/mm^2)	120

Aniba hypoglauca	
Air Dried density at 12% (kg/m^3)	589-640
Bending strength at 12% (N/mm^2)	67
Modulus of elasticity at 12% (N/mm^2)	9,100
Crushing strength at 12% (N/mm^2)	40

Ocotea glomerata	
Air Dried density at 12% (kg/m^3)	630
Bending strength at 12% (N/mm^2)	104
Modulus of elasticity at 12% (N/mm^2)	11,569
Crushing strength at 12% (N/mm^2)	60

Ocotea oblonga	
Air Dried density at 12% (kg/m^3)	420
Bending strength at 12% (N/mm^2)	72
Modulus of elasticity at 12% (N/mm^2)	9,167
Crushing strength at 12% (N/mm^2)	39

KILN DRYING

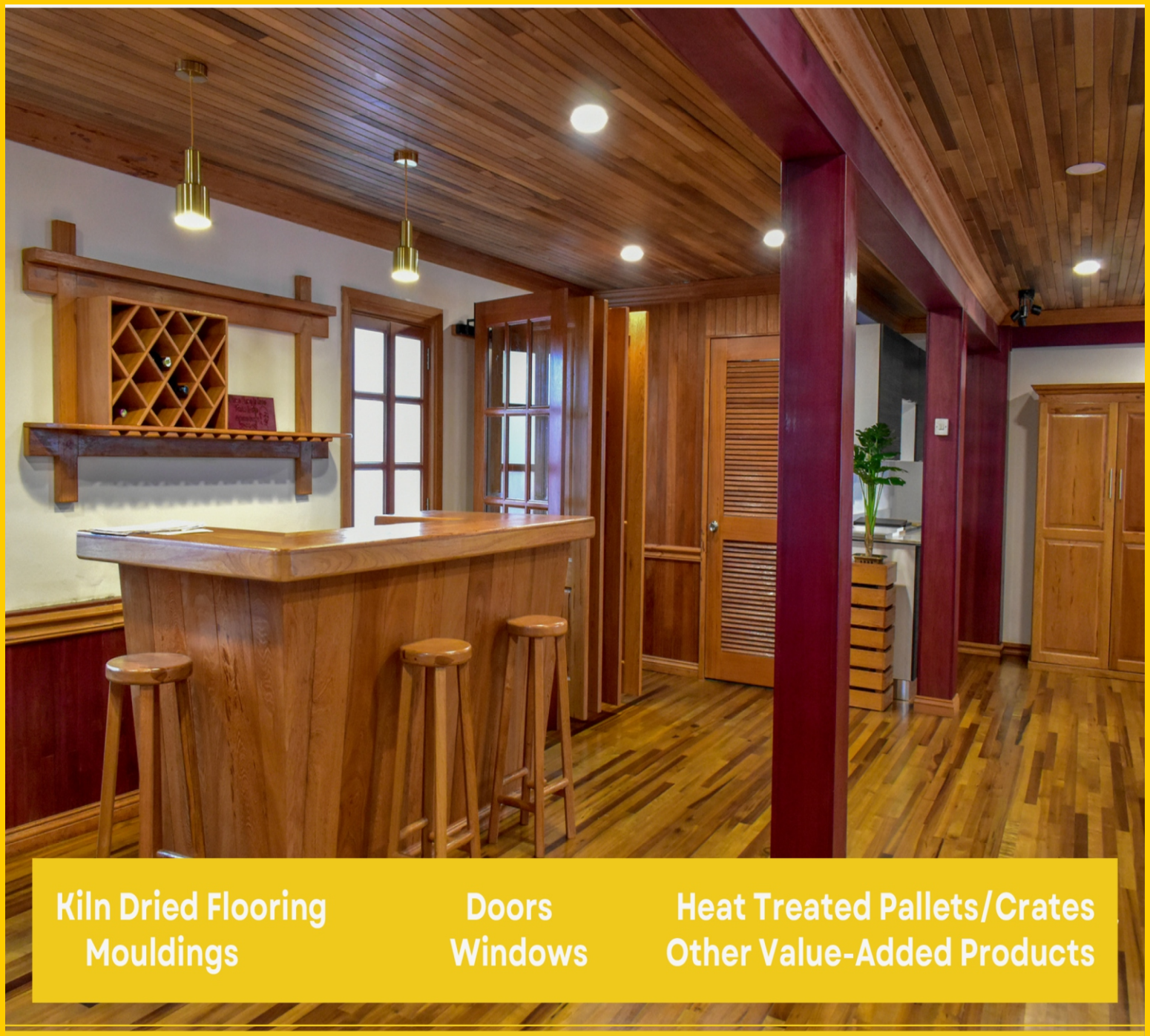
Kiln dried lumber is a standard in the lumber industry because dried lumber is generally prepared for manufacture into a finished product. As most valuable lumber is used within an enclosed environment-such as a home or place of business - the lumber must be suitably dried to prevent movement in service. For example, lumber dried incompletely and then manufactured into flooring will shrink and deform as it gradually loses moisture to the surrounding environment.

Additionally major international markets such as EU and North America require various species, thicknesses, lengths, and widths, however the one process which is necessary in the preparation of any lumber prior to entering these markets is kiln drying.

Benefits of Kiln Drying

- Increased profitability.
- Kiln drying completely sterilizes the material and kills any insects or microbes present, which can be especially important for interior application.
- Reduces weight of lumber.
- Minimizes shrinkage, hardens pitch, reduces warping and improves its workability; lumber becomes more receptive to the use of glues, fasteners, and bonding agents.
- Kiln drying lumber increases the strength of the lumber. Kiln dried lumber is stronger (over 2x) and stiffer (nearly 2x) than green lumber.

A LOCALLY CONSTRUCTED SOLAR KILN.



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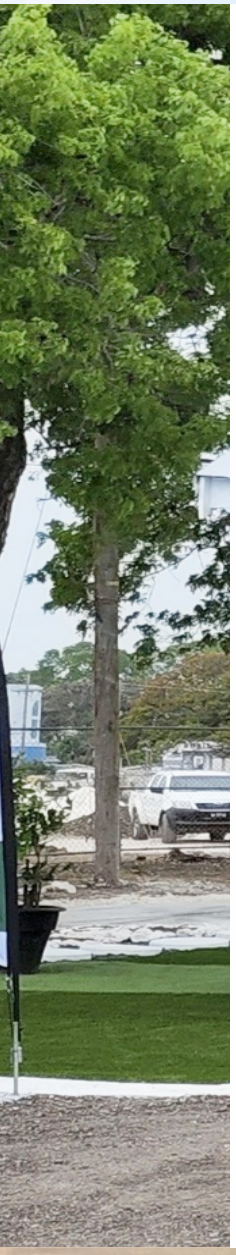

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