UTILIZATION OF LESSER USED WOOD SPECIES IN GUYANA – PD 344/05 REV. 2 (I)

OUTPUTS UNDER PROJECT:

1. Review of Literature
2. Brochure on LUS
3. LUS Sample Board
4. Training Report
5. Report on Results of Test

Review of Literature

- The review of literature concluded that although general information on wood properties of the 15 species was available in most cases, information on the test method was not available to make defined conclusions on actual properties.

- It was recommended that the targeted species be included in the testing phase. The review outlined three main areas of interest of the species identified, these being: marine construction, heavy structural applications, and decking/cladding.

- Based on these identified end uses and assessment of information available from the review, the following tests identified to be conducted: Abrasion, Marine Borer, Natural durability. The review of literature was effective in establishing the basis upon which the recommendation was made to test and the relevant areas to do so.


Photograph 4 New samples on a last frame

6 Findings

6.1 Limonballi

(Chrysophyllum pomiferum Eyma*)*

Other names: Aknon, haimara- kushi, kwikpa, limonaballi, paripiballi, abiurana

Treatability

Treatability for species is noted as good[A], however, there is no information on the method used to assess treatability of this species.

Painting and Coating

No available information

Durability/Decay/Insect Attack

There is no available information on this particular species, but *Chrysophyllum* spp. are reputed to have a fair to good durability. However, this appears to be based on local reputation rather than on testing that has been undertaken [46].

Strength

No available information.

Ease of Working

One reference suggests that *Chrysophyllum* spp. is not difficult to work [46].

Properties

There is no specific data on this species. Information is available on the *Chrysophyllum* genus, which contains over 150 species. This suggests that members are hard and heavy, medium textured, fairly straight grained, not difficult to work and finish smoothly, with rather low lustre [46].

Moisture Movement

The total tangential shrinkage for this species is 11.2% and total radial shrinkage is 5.8%[A].

Uses

Chrysophyllum spp. have been used locally in general construction and carpentry [46].

Limonballi References

46) Record, S. J. & Hess, R. W. (1943) Timbers of the New World Yale University Press

A) Major Timber Trees of Guyana - Timber Characteristics & Utilisation Tropenbos Series 15

LUS Brochure

The design and layout and design for these were completed. The booklet was published and distributed to stakeholders within the forest sector. The Booklet outlined key areas on the 15 species:

- Wood description
- Tree description
- Processing requirements: sawing, drying, machining, nailing
- Natural Durability
- Treatability
- Uses
- Physical Properties: green density, air dry density, total tangential shrinkage, total radial shrinkage, and total volumetric shrinkage.
- Mechanical Properties: bending strength, modulus of elasticity, and crushing strength.

BURADA

Parinari campestris
Parinari rodolphii
Vernacular name:
Guyana: Burada / Brazil: Parinari

Family: Chrysobalanaceae
International Trade Name: Burada
Distribution: The Guianas and adjacent areas in Venezuela and Brazil

Tree Description

Length of the bole:	12-15m;
Height of tree;	20-40m
Diameter:	0.45-0.70 (-1.5)m
Shape of the log:	cylindrical; buttresses low and thick

Wood Description

Sapwood:	not clearly distinct (4cm)
Heartwood:	light brown or yellowish pink-brown
Grain:	generally straight, sometimes slightly interlocked
Texture:	fine

Processing

Sawing	power required blunting effect: high (silica)
Drying	rapid; air-drying prior to kiln - drying is recommended US kiln schedule T2 - C2 for 25-38 mm (4/4 to 6/4) stock, or British schedule B (25mm) Risk of distortion; moderate Risk of checking; slight Possible risk of casehardening
Machining	difficult; carbide tipped tools recommended
Nailing	pre-boring necessary
Finishing	moderate
Remarks	logs are inclined to split during felling, transport and conversion

Natural Durability

Resistance to decay	moderate
Resistance to insects of dry wood	good
Treatability	good
Remarks	resistant to marine borers
Uses	marine construction (submerged); ship keels; sleepers (treated); heavy construction; flooring

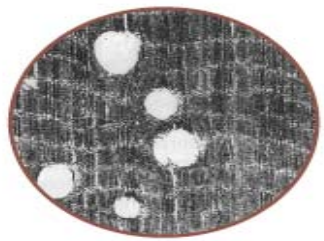
Technological Characteristics

Physical Properties

Green density (kg/m^3)	1100
Air-dry density at 12% (kg/m^3)	890
Basic specific gravity	0.76
Total tangential shrinkage (%)	9.8
Total radial shrinkage (%)	5.9
Total volumetric shrinkage (%)	17.0

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



Cross-section

LUS Training Manual

- Three sessions were held in the three major counties of Guyana: Essequibo, Demerara and Berbice. These sessions were attended by (25) in Essequibo, (27) in Berbice and (32) in Demerara. These sessions were attended by forest concession holders, saw millers, lumber yard holders, exporters, and other stakeholders.

- The main areas of discussions included:
- The availability of this species in some parts of Guyana
- The end use application of species which has the potential to be used in added value applications.
- The unique properties of some of the species in terms of the colour and texture of the finished product.
- The ease of workability of some of the denser species owing to high silica content.

Sample Boards

Photograph 4 New samples on a test frame

- Sample boards (40) were produced. These Boards were effective in highlighting the visual characteristic of the species including colour, texture and grain.

- **Marine Testing**

  - Abrasion testing for all species.

    The abrasion testing will be benchmarked against two other species commonly employed for marine construction in the UK, greenheart and ekki.

  - Marine borer testing against *Limnoria* spp.(*Limnoria*)for all species in the laboratory.

    The marine borer testing will be benchmarked against two other species commonly employed for marine construction in the UK, greenheart and ekki. Scots pine is used as a control to validate the vigour of the test organisms.

Test Results - Resistance to abrasion and attack by *Limnoria quadripunctata* Holthuis (marine borer)

		Limnoria Testing				Abrasion Testing			
		Ekki		Greenheart		Ekki		Greenheart	
LUS		**Better**	**Same**	**Better**	**Same**	**Better**	**Same**	**Better**	**Same**
Common Name	**International Trade Name**								
Burada	Parinari		√	√			√		√
Black Kakaralli	Mata Mata		√	√			√		√
Tonka Bean	Cumaru		√		√		√		√
Kurokai	Beru		√		√				√
Morabukea	Morabukea		√		√		√		√
Wadara	Wadara		√		√				√
Muneridan	Muneridan				√				
Itikiboroballi	Itikiboroballi						√		√
Darina	Angelim								√
Iteballi	Quaruba								√

Photograph 3 Show samples being soaked in sea water

Photograph 11 Samples on a test frame prior to the test

Photograph 4 New samples on a test frame

Photograph 14 Blocks at the end of 80,000 revolutions. Arrows show the rounded arrises as a result of wear.

Test on Natural Durability for Structural Applications

- The tests for natural durability were conducted by a UK consultancy firm, which assessed the results using European laboratory standards EN 113:1996 ‘Wood Preservatives –
- Test methods for determining the protective effectiveness against wood destroying basidiomycetes – Determination of the toxic values’, and EN 350 Part 1:1994 ‘Durability of wood and wood-based products – Natural durability of solid wood – Guide to the principles of testing and classification of the natural durability of wood’.
- The results show that of the 10 species tested, 3 species are very durable, 2 species are durable and 4 species are moderately durable – all measured against the mean % mass loss with corresponding x-value reading.

Species	***Durability Classification***	***Durability Class***
Tonka Bean	Very Durable	1
Black Kakaralli	Very Durable	1
Morabukea	Very Durable	1
Burada	Durable	2
Iteballi	Durable	2
Muneridan	Moderately Durable	3
Futui	Moderately Durable	3
Kurokai	Moderately Durable	3
Wadara	Moderately Durable	3
Dalli	Not Durable	5

NATURAL DURABILITY RECOMMENDATIONS FOR TIMBER COMPONENTS

		Durability class of timbers whose heartwood can be used without treatment		
		Species that are Suitable for Hazard Class for the following desired service life (Years)		
COMPONENTS	**Hazard Class**	***15***	***20***	***60***
Roof timbers dry	1	Dalli	Dalli	Dalli
Roof timbers dry (*hyloptrupes area*)	1	Wadara, Kurokai, Futui, Muneridan	Wadara, Kurokai, Futui, Muneridan	Wadara, Kurokai, Futui, Muneridan
External walls/ground floor joists	2	*No species tested as 'slightly durable'*	Wadara, Kurokai, Futui, Muneridan	Iteballi, Burada
Sole plates below damp-proof course (DPC)	4	Iteballi, Burada	Morabukea, Black Kakaralli, Tonka Bean	Morabukea, Black Kakaralli, Tonka Bean
External joinery	3	*No species tested as 'slightly durable'*	Wadara, Kurookai, Futui, Muneridan	Iteballi, Burada
Fence rails, garden decking	3	*No species tested as 'slightly durable'*	Wadara, Kurookai, Futui, Muneridan	Iteballi, Burada
Poles	4	Iteballi, Burada	Morabukea, Black Kakaralli, Tonka Bean	Morabukea, Black Kakaralli, Tonka Bean
Timber in freshwater	4	Iteballi, Burada	Morabukea, Black Kakaralli, Tonka Bean	Morabukea, Black Kakaralli, Tonka Bean
Timber in salt water	5	Morabukea, Black Kakaralli, Tonka Bean	-	-
Cooling tower packing (fresh water)	4	Iteballi, Burada	Morabukea, Black Kakaralli, Tonka Bean	-
Cooling tower packing (salt water)	5	Morabukea, Black Kakaralli, Tonka Bean	-	-

Photograph 4 New samples on a last frame

End